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Measuring Medical and Cost Uncertainty in Health Care Seeking: Instrument Design and Validation

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Measuring Medical and Cost Uncertainty in Health Care Seeking: Instrument Design and Validation [⊥]

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Abstract

Uncertainty about medical outcomes as well as about costs to seek care might play an important role in the health care decision-making process, potentially deterring sensible health care choices. There is little theoretical and no rigorous empirical evidence on this relationship, though, also owing to the lack of established tools to measure uncertainties around medical benefits and costs of health care seeking. In this paper, we develop such a measurement tool, field a first version of it in a low-income population in Pakistan, and present the initial evidence from this pilot data collection. We conduct a qualitative and quantitative validation process and identify potential for improvement in future applications. Nevertheless, the data collected through the tool appears meaningful and the analysis shows that on top of many biases, both medical as well as cost uncertainty is present to a substantial degree in our target population. Our empirical results also suggest that uncertainty in both dimensions deters health investments.

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1. Introduction

Uncertainties about the medical benefits of seeking care have long been identified as an important factor in the health seeking process (Arrow 1963). In the context of expanding social health protection schemes across low- and middle income countries (LMIC), we expect such uncertainty to play a particularly large role: Many schemes were successful in lowering the financial barrier to seeking care (Das & Do 2023), yet incomplete information on the health shock and health insurance coverage can induce uncertainties in the medical and cost domain that still undermine effective health care seeking. To date, the scientific evidence is focused on theoretical examinations of medical uncertainty in the health seeking decision (e.g. Asano & Shibata, 2011) and do not account for the joint role of medical and cost uncertainty. Furthermore, there is no comprehensive measurement tool to provide empirical evidence on the extent and influence of uncertainties in the health seeking decision.

In this paper, we describe an initial version of such a tool and present the design and validation process as well as results from an initial data collection. This allows us to explore whether uncertainties about medical benefits and costs of seeking care exist and examine which role they play for health care decisions. We first fielded the tool in a low-income population in Pakistan in 2022. As suggested by the literature, for example recently by Danon et al. (2024), the validity and reliability of survey instruments should be assessed when they are new or applied to a new context. We hence conducted extensive validation exercises, which we present in this paper. Overall, they indicate that the initial version of the tool is indeed valid and reliable, but we also identified potential for improvement. Building on these learnings, we have further developed the concept and tool, extended it by a survey experiment (for trial registration see Imping et al., 2023), and fielded this adapted tool with a substantially larger sample of low-income households in Pakistan in 2023/2024. These results, as well the main theoretical foundations, are presented in Imping et al. (2024). The work presented here can thus be understood as a complementary companion paper that has the aim of documenting the design process and validating the initial measurement tool, along with reasons to adjust it, and to show initial empirical results, which underscore the potential of our research agenda.

The survey instrument is designed to measure expected medical benefits, expected costs, and uncertainties around both dimensions using hypothetical health scenarios (vignettes). The tool contains three health vignettes presenting symptoms of a heart attack, appendicitis and a case of light fever. For each vignette, we asked the respondents for their expected probability to get substantially better and the expected costs when imagining to visit different health provider categories. At the end of each vignette, respondents took hypothetical health care decisions on whether, where, and when they would seek care in the described situation.

For validation, we first check for inconsistent answers and rule out bunching around focal responses for the probability questions which gives us confidence that the elicited answers are meaningful. In our descriptive empirical analysis, we then present the first quantification of uncertainties in the health seeking decision. We present the results alongside further rigorous validation techniques to assess the validity and reliability of the new measurement tool. We first depict the levels of expected benefits (probabilities to get better), expected costs and the uncertainties around them. These initial empirical results indicate that respondents are indeed uncertain about the expected medical benefits and costs across scenarios and facilities. We find uncertainty about the probability to get better to be similar across scenarios and facilities, but cost uncertainty to be higher for private than public facilities. Our benchmarking exercises show that while expected benefits are rather in line with expert opinions for higher-level

providers, respondents tend to underestimate benefits for the light fever health scenario and overestimate them for the more severe scenarios for the primary facilities. The cost estimates largely reflect user experiences but are closer to actual reported costs for public than private facilities. As a reliability check, we applied a test-retest exercise by fielding the same tool with the same respondents on two consecutive days, allowing for information seeking in between. Around half of the respondents did not engage in information seeking, hence we used this group for the test-retest exercise. Almost all variables exhibit relatively strong and significant positive correlations between the first and second day of the application, indicating that results remain relatively stable over a repeated application of our tool. For the other part of our sample, we examine whether and how information seeking affects the beliefs by comparing measurements of our variables of interest on two consecutive days but do not detect any significant changes.

Furthermore, we look at the hypothetical health care decision in each health scenario and assess the role of the individual risk and uncertainty measures in this decision. When examining how the elicited expectations influence the hypothetical care seeking decision, we focus on the choice between the two most prominently chosen facility types: private primary and public secondary in the heart disease scenario. We find evidence for rational decision-making: relatively higher estimated benefits at public secondary facilities are positively correlated with the probability to choose this facility type, and higher costs negatively (yet not statistically significant). We further find that higher uncertainty regarding the expected costs and probability to get better are both negatively and significantly correlated with the probability to choose a public secondary facility, which supports the hypothesis that uncertainties in the medical and cost domain can deter sensible health care seeking decisions.

We contribute to the literature by introducing a new measurement tool for medical and cost uncertainty. With this, our work relates to two main strands of literature: For the measurement of uncertainty, our work builds upon empirical studies focusing on the elicitation of subjective expectations, particularly on its applications in LMICs. We extend this literature by applying the techniques in the health care seeking decision context. For validating the tool, we build on the established literature on validating survey instruments in psychometrics literature.

In the literature on subjective belief elicitation, scholars recently introduced accounting for the degree of ambiguity that many future events carry inherently. For this purpose, they propose to record not only point estimates for expected probabilities of future events from survey respondents but also probability ranges. For instance, Giustinelli et al. (2022) distinguish between precise and imprecise probabilities and as an uncertainty measurement, respondents who state imprecise probabilities are asked to quantify their imprecision by giving probability intervals. Similarly, Delavande et al. (2022) ask respondents for a range of probabilities to express their uncertainty around future (health) events. To quantify medical uncertainty, we build on this approach of eliciting probability ranges instead of only unique (point estimate) probabilities.

For quantifying the uncertainties around costs, we follow the approach of empirical studies eliciting probabilistic expectations in the monetary domain (Dominitz, 1998, 2001; Dominitz & Manski, 1997). As we collect our data in a low-income country, we are specifically guided by the approach of Attanasio and Augsburg (2016) and Attanasio and Kaufmann (2014, 2017) who also fielded their tools in LMICs. In these studies, respondents express their minimum and maximum expectations for a quantity, for example regarding future income. They then assign probabilities that the realized quantity would belong to a number of equally sized intervals within this range. These data points allow fitting a subjective distribution of expectations for

each respondent and retrieving the moments of interest. Applying this method, we elicit expected cost distributions for hypothetical health care visits.

The psychometrics literature guided us in selecting relevant validation exercises when fielding the new survey tool for the first time. To be considered adequate, accurate, and generally trustworthy, new survey instruments need to fulfil key validity and reliability criteria. Conceptually, validity of measurement refers to the extent to which the survey responses measure the construct of interest (Cronbach & Meehl, 1955). Assessing an instrument's validity empirically is not always straightforward and there are numerous approaches (Alwin, 2010). Commonly, the literature broadly distinguishes between (empirical) evidence on content-, construct-, and criterion-related validity (see e.g. De Leeuw et al., 2012; Kalkbrenner, 2021). We conducted empirical tests regarding criterion-related and construct-related validity and check for potential (systematic) measurement errors. Reliability describes the consistency of the measurement (Alwin, 2010). More specifically, an instrument is considered reliable if a respondent's value on a construct does not change when measured at different points in time and groups of respondents whose true value on a construct coincides should give the same answer to the question (De Leeuw et al., 2012). One common reliability test is the test-retest method, which measures how strong the correlation of responses of the same individual is at two different points in time. If an instrument measures the true value of interest, it should not vary over a short period of time, hence the two measures should be highly correlated (Danon et al., 2024). We apply the test-retest method by administering our tool with the same respondents on two consecutive days to compare and assess stability of our results.

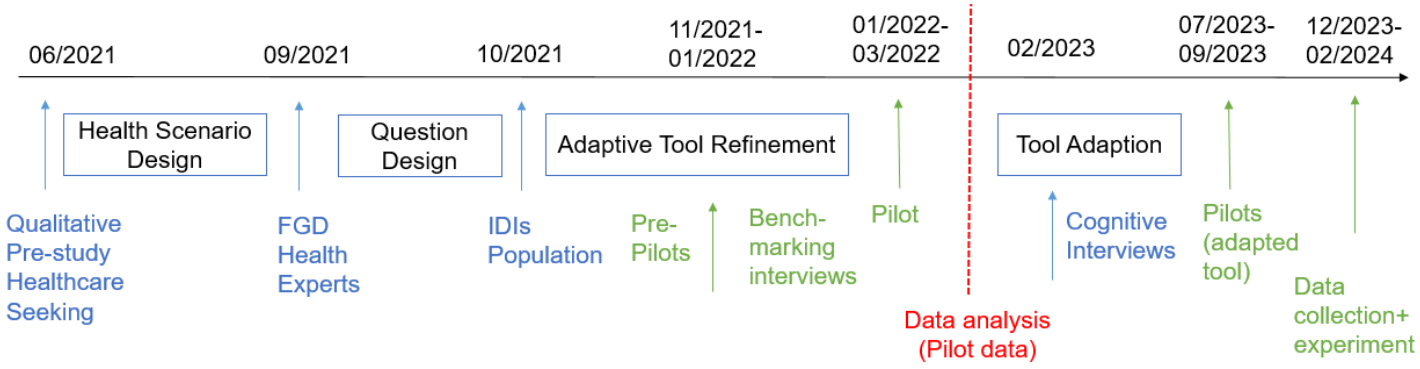
The remainder of the paper proceeds as follows. In chapter 2 we describe the measurement tool design step by step and the survey process. Next, chapter 3 presents the validation strategy and descriptive empirical results from the first tool application alongside validation results. In chapter 4 we present our empirical model for hypothesis testing and regression results on explaining the observed hypothetical health care seeking decisions. In chapter 0, we present changes induced by information-seeking for the sub-sample of respondents who engaged in information-seeking in between the survey days. In chapter 6 we describe the tool adaption that took place after the first tool application and chapter 7 concludes.

2. Measurement tool design

2.1. Design and validation process

The design process was based on several successive steps. We started with qualitative in-depth interviews (IDIs) of the local population to gain a deeper understanding of the health care seeking process in the region. Based upon the selection criteria described in subsection 2.2, we selected health scenarios for our health vignettes which were validated by local health experts in a focus group discussion (FGD) and refined afterwards. Based upon literature as described in subsection 2.3, we designed the questionnaire and developed appropriate visual aids as described in subsection 2.4. The questionnaire, health vignettes, and visual aids were further validated and refined via IDIs with people from the target population. Three small-scale pre-pilots were conducted and feedback and learnings incorporated into the tool before fielding the pilot data collection. Besides, benchmarking interviews were taken from local health experts in parallel. The pilot data collection with 319 respondents took place between January and March 2022, as described in subsection 2.5. This paper presents the results of the analysis of this initial data collection only. During and after the data analysis, we adapted the measurement tool according to the learnings we generated during this first tool application in the field as described in chapter 6. We conducted cognitive interviews with 12 respondents in February 2023 to ensure that all our questions were understood by respondents in the intended way and further refined the tool accordingly. We fielded the revised tool including a survey experiment in a larger data collection of around 3,400 respondents between December 2023 and February 2023. The results of this larger data collection alongside the survey experiment results are presented in Imping et al. (2024).

Figure 1 Design and validation process



Qualitative data collections are marked in blue, quantitative data collections in green. The empirical results presented in this paper in chapter 3 are based on the first tool version and data collected up until March 2022.

2.2. Health scenario selection

The survey tool builds on hypothetical health scenarios, so-called vignettes[1], which are employed to simulate an actual care seeking decision as this measurement is impossible in the case of a real health shock. The vignettes include symptom descriptions but do not reveal

[1] Vignettes are short descriptive scenarios to engage participants in hypothetical situations and are used in health research when it would be impossible or unethical to collect data in real-life situations (Keane et al., 2012).

the diagnosis to the respondent. Enumerators read the vignettes aloud and asked respondents to imagine that the described situation occurred to them in real life (even if it never has).

Our study contains three health vignettes, which we carefully designed, selected, and validated in a multi-stage process:

We aimed at including health conditions which are prevalent and relevant, i.e. that are very common and pose a significant burden of diseases[2] in our study region. Furthermore, we selected the vignettes to cover different types of diseases (communicable vs. non-communicable) and conditions differing in severity, expected treatment costs, and recommended access point of care. Another aim was to cover different levels of medical uncertainty. For this, we consulted local medical experts who assessed the awareness of different symptoms and diseases in the population (details see appendix Table A1).

A literature search in July 2021 showed that there were no pre-validated vignettes that fulfilled the above criteria available for Pakistan. Hence, we designed and validated vignettes specifically for our study. First, we identified seven health conditions that fulfilled the inclusion criteria: Simple broken leg, acute appendicitis, ischemic heart disease / heart attack, stroke, (unspecified) fever, gastroenteritis and tuberculosis. We then drafted generic symptom descriptions that would fit to patients of different ages, gender, and socio-economic backgrounds. We drafted the vignette scenarios in close cooperation with local health experts from a medical university in Khyber Pakhtunkhwa, Pakistan.

We follow the medical literature (Amarassinghe & Agampodi, 2019; Gourlay et al., 2014; Varga & Brookes, 2008) to validate and further refine the vignettes in three stages: an FGD with local medical professionals, IDIs with people from the general population without medical background, and three rounds of pilots including enumerator feedback after each of them.[3]
The FGD was conducted with five medical practitioners in September 2021 (see Appendix subsection A6.a for FGD interview guide). The participants were selected to cover diverse levels of care and patient experiences: at the time of the FGD; they were working at different health facility types (public and private, higher and lower level of care) in KP, all of them with at least seven years of experience, and two public health specialists from a local medical university. After analysis, we excluded two vignettes: the stroke scenario as it was similar to the heart disease scenario along several criteria, but less prevalent; and the tuberculosis scenario as it is commonly treated in vertical care structures, which makes it very different from other health conditions. The other five vignettes were refined based on the FGD feedback. In a second step, to test the population's understanding of the vignettes, we conducted nine IDIs in October 2021 (see Appendix subsection A6.b for interview guide). Respondents were from KP and belonged to the 21% poorest part of the population, which corresponds to the inclusion criteria of the quantitative data collection.

Finally, we included three of the five validated vignettes in our study to not overburden the respondents and elicit realistic expectations: ischemic heart disease with heart attack, acute

[2] For more severe scenarios, we considered the top 10 causes of total number of deaths in Pakistan in 2019, all ages combined as presented by the Global Burden of Disease project (see Abbafati et al., 2020). For a light scenario, we selected a symptom description that came out prominently in the qualitative pre-studies.
[3] See appendix A6 for interview guides of the FGD and IDIs. Both the FGD and IDIs were conducted in local language, transcribed, and translated. We used the NVIVO software to organize and categorize answers for analysis,

appendicitis, and light (unspecified) fever (see Appendix A4.d for full scenario texts). We further use the broken leg scenario as a practice scenario.

2.3. Measurement of medical and cost uncertainty

To measure expected benefits, we asked the respondent about the likelihood to get substantially better when visiting a health facility and, to assess uncertainty, we asked about a range in this probability. We define 'getting substantially better' as an improvement in the described symptoms to the degree that the person can lead their everyday life. We first asked about an overall assessment of this probability, and then a minimum (worst thinkable case) and maximum (best thinkable case). Hence, the overall probability to get substantially better measures the perceived medical risk of recovering (or not) when seeking care at a health facility. We use the difference in perceived probabilities to get substantially better in the best and worst cases as the measure of medical uncertainty.

To measure the expected costs at the respective health care providers, we elicit subjective cost distributions for each scenario-facility-combination, following an established literature on subjective expectation measurement in LMICs (e.g. Attanasio & Augsburg, 2016; Attanasio & Kaufmann, 2014, 2017).

The interviewers asked the respondents for their minimum and maximum expected costs when imagining to visit the respective provider with the hypothetical health issue. For simplicity, we chose to divide this range in only two equally sized intervals. For this, the survey software computed the midpoint (mean) between maximum and minimum expected costs and asked the respondent for the probability that the costs would be below this point. With this information on the support of the distribution and probability mass to the sides of the midpoint, we can fit individual expected cost distributions for each scenario-facility-combination.

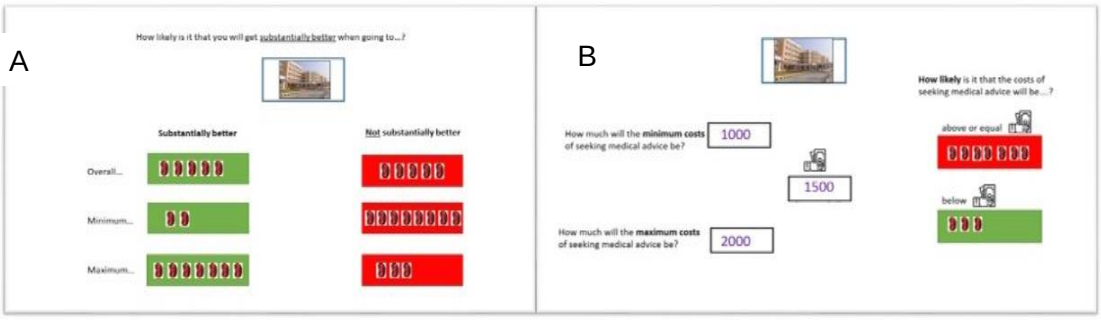
Given a distributional assumption, we can then estimate the moments of interest from the subjective cost distribution. We decided on assuming a bi-triangular distribution and calculate the fitted mean to display a point estimate of expected costs and the fitted standard deviation as measure for uncertainty surrounding expected costs. We chose to use the bi-triangular distribution assumption as it fits the nature of the cost estimates in our data well: it gives more weight to the middle of the support and less to the extremes and allows for asymmetries (see Guiso et al. (2002) for more details). As robustness checks, we fit a log-normal distribution instead of the bi-triangular distribution and we use the absolute spread between minimum and maximum costs instead of the fitted standard deviation as alternative cost uncertainty measure.

2.4. Visual aids

Previous studies demonstrated that survey respondents in LMICs understand and can answer probabilistic questions meaningfully and that the elicited expectations are useful predictors of behavior (Delavande et al., 2011a). To facilitate understanding of questions related to probabilities, it is a common method to employ visual aids to better represent probabilities (Delavande et al., 2011b). Following this approach, we worked with visualizations of the questions about the expected benefits and expected costs on printed sheets. Furthermore, we used beans to represent percentages of the probability questions in 10 percent steps (Figure 2).

A second purpose of employing visual aids is to make it easier for the respondent to imagine being in the hypothetical situation and answer realistically. For each scenario, we selected a pictogram that clearly displays the major symptoms that was shown at the time of reading the scenario text. For each health facility category, we included one photo of a facility of that type from the respective district.

Figure 2 Visual aids used for facilitation of eliciting expectations about benefits (A) and costs (B) in one example scenario-facility-combination

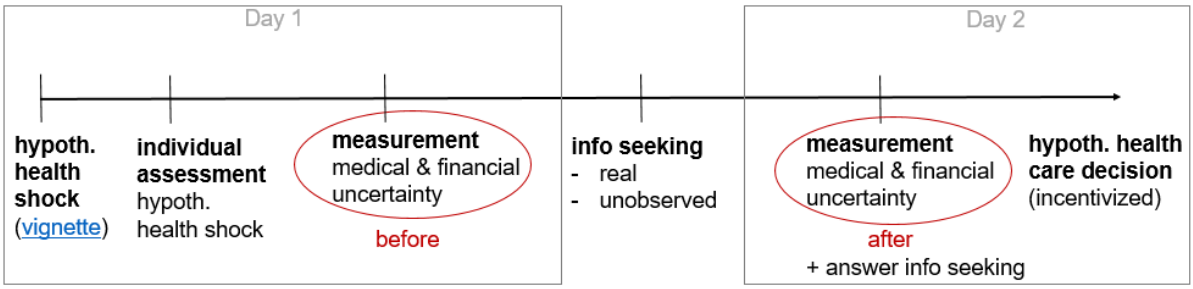


These pictures of the scenarios and facility types were also shown and validated during the FGDs with local health practitioners in September 2021 and during the IDIs with individuals in October 2021. Furthermore, the questions on medical and cost uncertainty alongside the visual aids and health vignettes were validated and gradually refined during the IDIs and three pre-pilot interview rounds between November 2021 and January 2022.

2.5. Survey process

As depicted in Figure 3, the survey tool was conducted over the course of two consecutive days. On day 1, the trained interviewers first presented each scenario to the respondent, left him/ her time for individual assessment and then asked about the expected benefits and costs when seeking health care if experiencing the described symptoms. For each scenario, those questions were asked separately for four health facility categories relevant for the Pakistani context: public primary, private primary, public secondary, and private secondary providers (see Figure A 1 for a graphical overview of all 12 scenario-facility-combinations).

Figure 3 Survey process



As we were interested in how information seeking would influence the measured uncertainties, at the end of day 1, respondents were asked to seek information on the presented health scenarios until the return of the interviewer the following day. The information seeking was unobserved and relied on the respondents' own information sources, no additional information was provided by the interviewers. As the information-seeking was voluntary and required

additional effort, we expected that only a subset of respondents would seek information in between the survey days.[4] The remaining observations then served to assess the reliability of the survey tool in a test-retest exercise by comparing answers of the same respondents at different points in time but under otherwise comparable conditions. On day 2, the interviewers presented the identical health scenarios and asked the same questions on the expected benefits and costs again. In addition, at the end of each scenario, respondents took an incentivized[5] hypothetical decision on whether, where, and when to seek health care.

[4] This expectation was met as around half of the respondents opted to seek information between the two days. Note that the two groups do not significantly differ in most basic observable respondent and household characteristics (see Table A 32).

[5] The incentive consisted of the prospect of earning extra mobile phone credit (on top of the compensation for taking part in the survey). This extra compensation was promised to be handed out if the respondent took hypothetical health seeking decisions that were good from a medical perspective.

3. Validation strategy and descriptive results

3.1. Sampling and sample characteristics

To pilot this uncertainty measurement tool for the first time, we fielded the tool among low-income households from four districts[6] in the Khyber Pakhtunkhwa province in Pakistan in early 2022. The households were randomly sampled in two stages from the full list of households in the lowest wealth quintile of the population, which is compiled und used by the government for poverty-targeted programs. The data collection took place in the course of a larger household survey, during which all respondents completed a detailed questionnaire on health needs and previous health care experiences just before participating in the measurement tool (Shaukat et al., 2024). We collected information on recent health care visits for inpatient care (within past year) as well as outpatient care (within past month) and also inquired about neglected health needs. For the most recent health care visits, we also elicited the respective expenditures. We are hence in the position to draw upon rich data for our benchmarking and validation exercises.

Even though the province's population is formally enrolled in a state-funded hospitalization insurance scheme, our survey data indicates that the population's awareness regarding this insurance scheme remains relatively low and knowledge regarding which health incidences are covered and which facilities are part of the scheme is incomplete for many respondents (Ahmad et al., 2022). It is hence a particularly interesting setting for our research question, since the uncertainty around the costs of a health care visit might be especially large when the knowledge on one's own health insurance is incomplete.

Our sample comprises 319 respondents but we exclude 11 observations from analysis due to quality concerns, 3 because of failed internal consistency checks[7] and 8 because interviewer feedback indicated poor understanding of the respondent. The 308 respondents of our analysis sample were on average 52.9 years old, 30% of them were female, and 31% of them had any form of formal education. The average household size was seven and average monthly household expenditures were 44,247 PKR. See appendix Table A2 for details.

3.2. Validation strategy

Following the psychometrics literature, we employed several validation techniques to assess the validity and reliability of our newly developed tool. Table 1 gives an overview of the validation-related research questions and the respective tests.

[6] These districts were purposefully selected to be pilot recipients of a new public health insurance scheme covering outpatient care, which was not yet launched or announced at the time of data collection.

[7] See details in subsection 3.3.

Table 1 Validation-related research questions

Research questions	Tests
On validity	
Measurement error related:	
Did the respondents understand the questions?	Internal consistency & monotonicity checks;
Are the answers meaningful?	Bunching around focal responses
Criterion-related:	
Do the results make sense when compared to an external criterion?	Expert benchmarking of benefits; Cost benchmarking with survey data; Decision benchmarking with survey data
Construct-related:	
Does the tool reflect the given construct?	Hypotheses testing for expected group differences (heterogeneities)
On reliability	
Are the results stable and are results comparable in repeated measurements?	Test-retest (two-day survey tool)

In the following, we present the descriptive results from our first measurement tool application jointly with the validation results. We start with the measurement-error related checks to rule out that the subsequent results are driven by any major measurement errors. We then present first the descriptive results on the expected medical benefits and attached uncertainties together with related validity checks and then do the same for the expected costs and cost uncertainties. Next, we present the results on tool reliability and then heterogeneities in results alongside related construct validity checks. Finally, we present descriptive results and criterion validity checks on the hypothetical health care decisions we elicited.

3.3. Results on measurement error

One potential source of measurement error is data-entry errors or respondent's misunderstanding of the survey questions. Both could reflect in internally inconsistent answers in the benefit and cost questions. For the questions of the probability to get substantially better, internally consistent answers must fulfill the condition that the overall probability to get better is above or equal the "worst thinkable" and below or equal the "best thinkable" case. In the cost questions, the maximum expected costs must be above or equal the minimum expected costs to fulfill the monotonicity criterion.

To deal with inconsistent answers, we replaced such answers with missing values in all probability related questions. At least one inconsistency is found in around 35% of interviews, but due to the high number of repetitions, we do not consider single inconsistencies a sign for overall insufficient quality of the observation. For this reason, we kept the observation in the sample[8] if there were not more than three inconsistencies within an interview, but if an

[8] Note that if there is at least one missing value for an individual within a scenario-facility-combination, the whole scenario-facility-combination cannot be included in the regression analysis. If e.g. the probability for the "worst thinkable" case is missing, medical uncertainty cannot be computed and also the respective best guess as well as the expected costs are not used for analysis. For the descriptive analysis, this applies to expected costs and expected benefits separately. If there is an inconsistency regarding the probabilities, best and worst thinkable case as well as best guess probability are set to missing for the respective scenario-facility-combination of this observation. If there is an inconsistency regarding costs, the expected costs and cost uncertainties are not computed for the individual for the

observation exhibited more than three inconsistencies it was excluded from analysis (this applied to three observations in our sample). For the cost related questions, inconsistent answers were replaced with missing values as well. No interview had more than one cost inconsistency hence no observation was excluded because of cost inconsistencies.

Another possible and more cautious strategy is to exclude observations exhibiting any inconsistency or missing value. For example, Attanasio and Kaufmann (2014) who ask about the future probability to work and elicit subjective earnings distributions from high school students in Mexico, exclude all observations with missing values or inconsistent answers in the expectations module. They have a rather large sample of more than 6,000 individuals and only exclude around 18% of them due to missing data or inconsistencies. Our sample is much smaller and only around 64% of interviews exhibited neither missing values nor inconsistencies on day 1, the same applies to around 65% of the sample on day 2. Excluding all observations with missing values or inconsistencies would diminish our sample substantially. Besides, the vignette tool comprised of 12 scenario-facility-combinations with 6 questions each, meaning that every respondent answered to 78 questions related to probabilities and expected costs in total. We hence think it is likely that in our case a respondent would not know or give an inconsistent answer at some point (or the interviewer would make a data entry mistake) and as long as this does not happen systematically we do not expect this to compromise data quality of the complete and consistent answers. We therefore did not exclude any interviews due to single item refusal or selecting don't know and only excluded interviews with more than 3 inconsistencies as described above.

Another source of measurement error is respondents' lack of understanding the complex concept of probabilities despite the efforts to explain and visualize it as described in subsection 2.4. To check the remaining extent of this problem, we follow the literature on probabilistic expectation measurement and used histograms to check for bunching around focal responses. This literature states that a high share of focal and extreme answers like 0%, 50%, and 100% likelihood might indicate that respondents rather express their uncertainty in answering the question than a real expectation of 0%,50% or 100% respectively (e.g. Attanasio, 2009; Delavande et al., 2011b; Kleinjans & Soest, 2014). We hence checked whether the answers to our probability questions exhibited any irregularities and signs of bunching around 0%, 50%, and 100% probability of getting substantially better. Figure A 2 - Figure A 4in the appendix illustrate that we do not see substantial bunching around focal responses for neither of the three health scenarios. Instead, answers seem roughly normally distributed in some cases (centered around different means depending on the respective question). For the "worst case" probability for the lowest care seeking option (public primary) we observe bunching at 0% but none at 50% or 100%; for the "best case" probability in the highest care seeking option (private secondary) we see bunching at 100% but none at 0% or 50 %. From this we conclude that respondents did not select the extreme answers due to lack of understanding as they are meaningful content-wise.

Furthermore, we checked bunching around 10%, 50%, and 90% probability for all questions on the likelihood of the costs being below the midpoint[9]. Figure A 5 shows that we do not see

respective scenario-facility-combination, but the expected benefits are part of the descriptive analyses (if they do not exhibit inconsistencies).

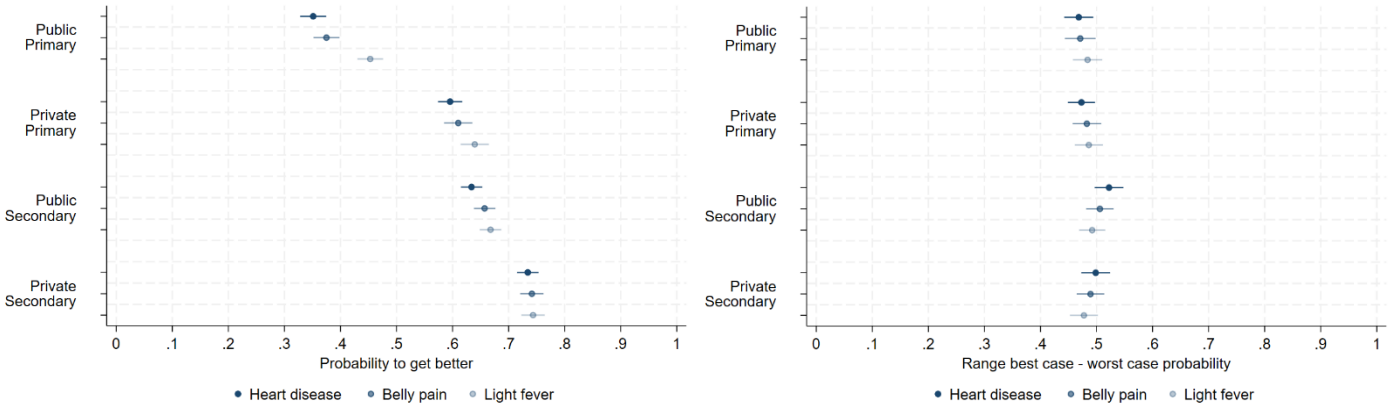
[9] Note that 0% and 100% were not rational answers to the questions on the likelihood that the costs would be below the midpoint as the expressed minimum and maximum expected cost should be within the possible range of outcomes.

any indication for bunching around focal responses there either. Even though there is some concentration of answers between at 40%, 50%, or 60% for some questions, the respective options were never chosen by more than 25% of respondents at the time.

3.4. Results on medical uncertainty

As the previously presented results give us confidence that the data is not subject to major measurement error, we now turn to presenting the descriptive results, starting with the medical dimension. Note that in the following, we mainly present the descriptive results from the day 2 data as the hypothetical health care decisions were also elicited on day 2. In addition, descriptive results from day 1 are presented in tables and figures in the appendix (e.g. Table A3). We find that respondents are indeed unsure about the benefits of seeking care, which differ in level, but not uncertainty across scenarios and facilities. The overall chance to get substantially better when seeking care is on average between 35 and 75 % for all three scenarios, though slightly higher for the less severe scenarios (see appendix Table A4). However, respondents expect to get substantially better at secondary as well as private primary facilities with a higher probability (around 60-75%) as compared to public primary facilities (around 35-45%). The uncertainty around the probability to get better (difference between best and worst case guess) is around 46-52 percentage points across scenarios and facilities.

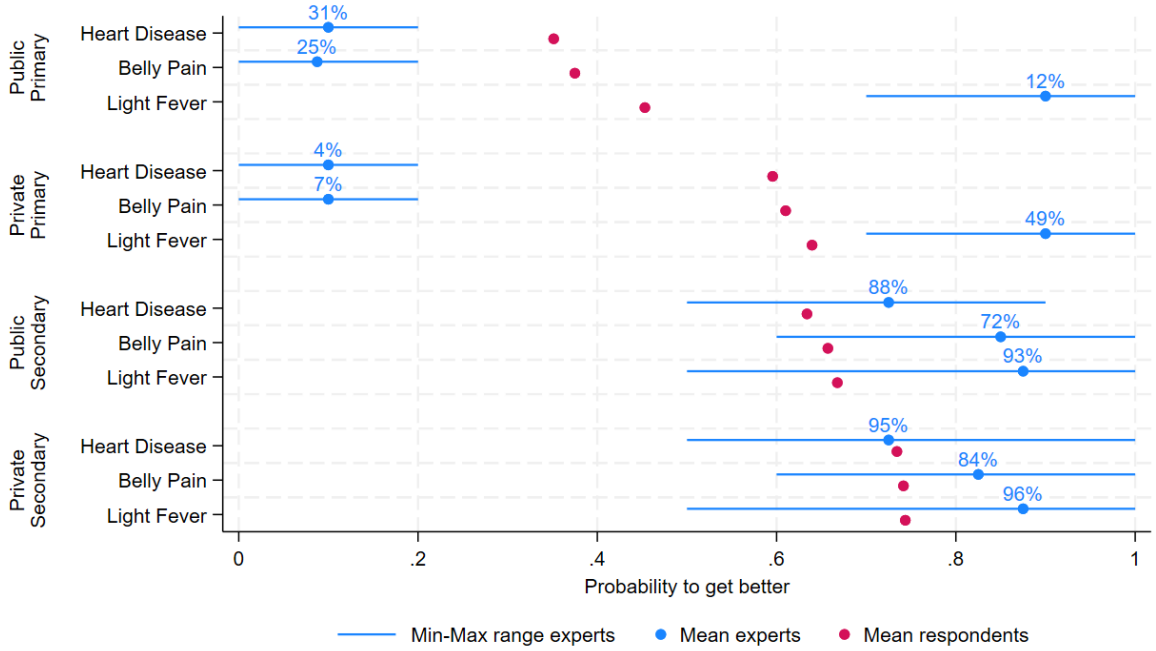
Figure 4 Probability to get better and medical uncertainty by scenario-facility-combination



Point estimates of respondent averages of the elicited probability to get better (left) and medical uncertainties (right) for all 12 scenario-facility-combinations; day 2 results; bars represent 95% confidence intervals of the mean estimate.

To judge whether the responses were realistic in the given setting, we conducted a benchmarking exercise to examine criterion validity. For the expected benefits, we asked the same questions on the probability to get better at each scenario-facility-combination for an average patient to four local medical experts in November 2021. We compared the respondents' answers to this benchmark. As depicted in Figure 5, we see that the expert judgements varied more strongly across scenarios and facilities, which means that the more stationary respondent guesses lead them to overestimate the probability to get better for the primary care facilities for the more severe scenarios and underestimate it for light fever. Their expectations concerning secondary facilities were quite in line with the expert opinion. Even though some uncertainty between the best and worst outcome will also remain for medical experts, we see that this range is still larger for respondents. This suggests that respondents lack information on the consequences of seeking care.

Figure 5 Probability to get better: Respondent guesses vs. medical expert assessment

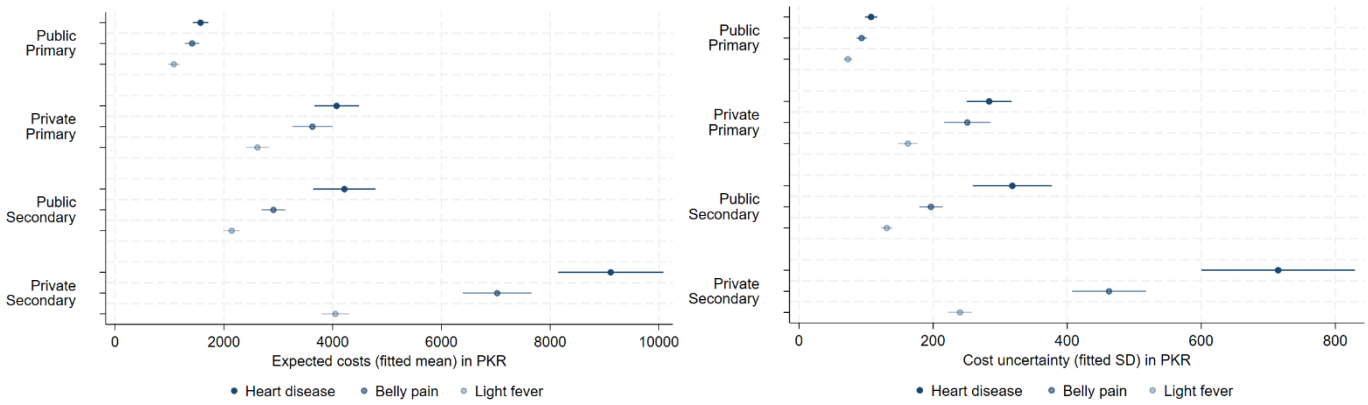


Point estimates of respondent averages of the elicited probability to get better for all 12 scenario-facility-combinations in red; day 2 results; expert means in blue; bars represent the minimum to maximum expert range; numbers in blue above the expert mean report the percentage of respondent guesses that fall within expert range

3.5. Results on cost uncertainty

We also detect uncertainty regarding costs in the hypothetical health scenarios. On the aggregate level, expected costs are higher the more severe the condition is, meaning highest for the heart attack (4955 PKR) and lowest for the light fever scenario (2375 PKR). There are also detectable differences between facilities regarding the expected costs: They are highest for private secondary facilities, on similar levels for private primary and public secondary facilities, and lowest for public primary facilities. Similarly, uncertainties about expected costs are increasing in severity of the health scenario. Besides, they are generally higher for private than public facilities.

Figure 6 Expected costs and uncertainty about costs by scenario-facility-combination



Point estimates of respondent averages of expected costs (left) and cost uncertainties (right) for all 12 scenario-facility-combinations; day 2 results; bars represent 95% condifence intervals of the mean estimate.

We also conducted a benchmarking exercise to examine criterion validity and to judge whether the responses on the expected costs were realistic in the given setting. For this, we compared the costs that respondents reported in the hypothetical scenarios to average costs for actual outpatient health care visits with health problems which are comparable to the ones in the vignettes. These costs were self-reported in the household survey on health needs that was conducted on day 1 just before a random subset of the 744 respondents also completed the uncertainty-measurement-tool. For each health scenario, we compared the average costs over all four facility categories from the household survey to the weighted averages over the same four facility categories[10] of the estimated costs in the uncertainty-tool.

The average estimates for a health care visit with a heart disease and with belly pain were very close to the user-reported costs for such conditions. Only for light fever costs are overestimated on the aggregate level by more than 45% (see Table A 6). Overall, this shows that cost estimates in the hypothetical scenarios seem to reflect user experiences and that there is also a high variability in incurred costs.

As robustness check, we fit a log-normal distribution instead of the bi-triangular distribution for estimating the cost expectations. We find our results to be robust to this change in assumption as correlations between the fitted means and standard deviations for the two different distributional assumptions are very high and significant for all scenario-facility combinations (see Table A 33).

3.6. Results on reliability

We further assess test-retest reliability, which is one of the most common ways to measure the stability of a survey tool (see e.g. Danon et al., 2024 for a similar recent application) . As the same health scenarios were presented and the same questions around the expected benefits and costs were posed to the respondents on two subsequent days, we can compare the measurements for each variable (probabilities to get better overall, in the best and worst thinkable case, expected minimum and maximum costs) as well as the expected mean costs and medical and cost uncertainties between the two days. Without seeking additional information, we did not expect systematic individual differences in the assessments between the two subsequent days of our survey. We hence apply the test-retest exercise to all respondents who reported to not have engaged in information seeking regarding the presented health scenarios in between the two survey days (around 44.3% of respondents).

Under classical measurement error, with a test-retest correlation one estimates the share of the variance of a measured value that is explained by the variance of the true value (as opposed to the error term ε). If we assume the measured variable is $X = X^* + \varepsilon$, where X^* is the true underlying value and $E(\varepsilon) = 0$ and $cov(\varepsilon, X) = 0$, then the variance of X is defined as $\sigma_X = \sigma_{X^*} + \sigma_\varepsilon$. The test-retest correlation is then defined as $r = \frac{\sigma_{X^*}}{\sigma_X}$. Researchers often consider a correlation of at least 0.7 indicating acceptable reliability (e.g. Danon et al., 2024). As not all assumptions for the use of the Pearson's correlation coefficient are fulfilled in our data[11], we use Spearman's correlation coefficient to check for correlations between the items on day 1 and day 2.

[10] We weighed the expected costs according to the weights of actual visits per facility type.

[11] For the use of Pearson's correlation coefficient, the following assumptions should hold: Pairwise correlations of continuous variables, linear relationship between variables, variables are normally

Table A 5 in the appendix shows the test-retest results for the expected benefits and medical uncertainty. The variables concerning the expected benefit to get substantially better (probability to get better overall, in the best thinkable case, in the worst thinkable case) exhibit a strong positive and highly significant correlation between the days. The correlation coefficients range from 0.3689 to 0.7619. Only seven of 36 correlation coefficients exceed the threshold of 0.7 indicating very good reliability. However, the majority of the others exceed 0.5 and are all statistically significant at the 1% level, we hence still interpret this as rather reliable measures. The lowest correlations are found for the worst case probabilities, where the lowest correlation is 0.3689 for the worst case probability for light fever at a private primary facility. The medical uncertainty measurement variables for the different scenario-facility-combinations are also rather reliable with a correlation exceeding 0.5 for almost all cases, ranging between 0.4624 and 0.7167.

Analogous to the procedure for the expected benefits, we applied the test-retest method to the expected costs and cost uncertainty estimates. Table A 7 in the appendix displays the respective results. We find quite strong positive and highly significant correlations for all variables concerning the minimum and maximum expected costs as well as the fitted mean costs. Here, all correlation coefficients are around or above the threshold of 0.7 and hence indicate a high reliability. The cost uncertainty variables (fitted standard deviations of the expected cost distributions) also exhibit a positive and highly significant correlation between the two days but are a bit less reliable as their magnitude is smaller compared to the other cost variables. Most correlation coefficients of the cost uncertainties range between 0.4 and 0.6 and therefore do not fulfill the threshold criteria of exceeding 0.7.

3.7. Results on heterogeneities

For construct validity, we investigated heterogeneities of our core measurement variables (expected probability to get better, costs, and uncertainties) along respondent characteristics, for which we expected the results to differ in a certain direction if the underlying construct is captured. We tested for heterogeneities in terms of age, gender, education, and recent health care seeking experience by simply regressing the outcome of interest on the respective respondent characteristics.

$$Y_{ij} = \beta_0 + \beta_1 age\_cat_i + \beta_2 female_i + \beta_3 educ_i + \beta_4 HC\_visit_i + district_i + \varepsilon_i \quad (1)$$

where Y_{ijs} is the respective outcome variable for individual i for facility j in scenario s, age_cat_i is a categorical variable for three age groups ($\leq$ 30 years, 31-60 years, $>$ 60 years), $female_i$ is a binary variable for gender, $educ_i$ is a binary variable for having at least primary education, and HC_visit_i is a binary variable for any recent health care visit for IPD care (within past year) and/or OPD care (within past month). We control for district fixed effects.

In line with the expectation that older individuals have a higher health need, which was confirmed by our household survey data (Shaukat et al., 2024), we find that older age groups tend to expect higher costs and a lower probability to get substantially better compared to young respondents especially for the belly pain scenario, but this does not hold for all scenario-facility-combinations (Table A 8, Table A 9, Table A 12, Table A 13). Although we expected more educated respondents and respondents with recent care seeking experience

distributed, no significant outliers. The first two assumptions hold but our data contains some outliers in the cost dimension and assuming normal distributions does not fit our data well. We hence use Spearman's correlation as there is no requirement of normality and it is less sensitive to outliers.

to exhibit lower uncertainties both regarding benefits and costs, we do not find evidence for lower levels of uncertainty for more educated respondents. Instead, we find mixed results and for some scenario-facility-combination the group of educated respondents even exhibited slightly higher medical uncertainties. But we detect a slightly lower medical uncertainty for those who recently sought health care (i.e. OPD care within the past month and/or IPD care within the past year) which is statistically significant only for private secondary facilities. Cost uncertainty, on the other hand, tends to be higher for those who recently sought health care for private primary and higher level facilities and the more severe health scenarios (Table A 10, Table A 11, Table A 14, Table A 15).

We did not have specific gender-related expectations but find significant gender differences. Females tend to be less uncertain both regarding costs and benefits and at the same time to have lower expectations regarding both costs and benefits (Table A 8 – Table A 15).

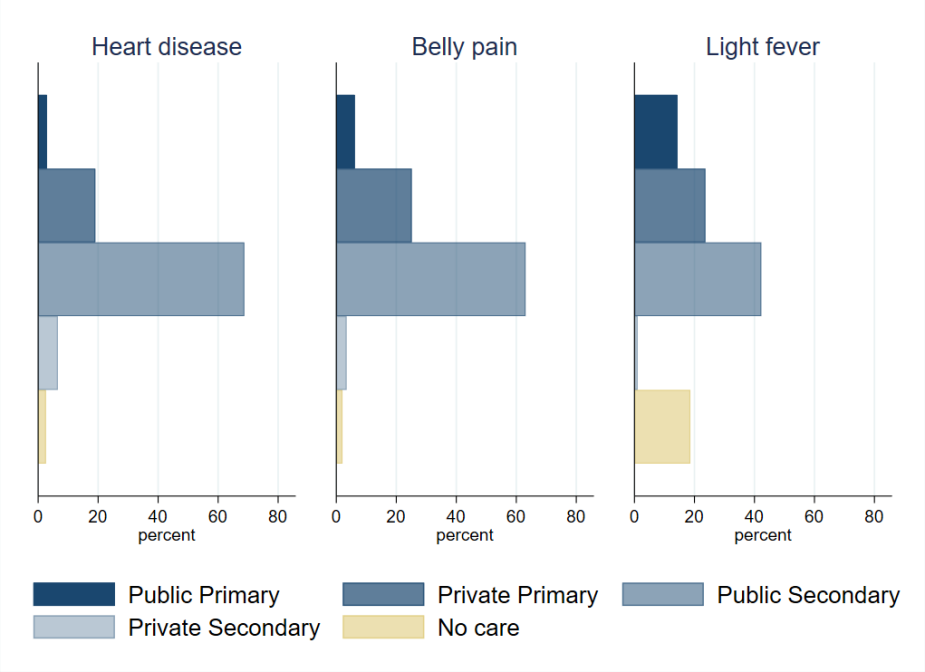
Besides, we examined whether recent care seeking experience at a certain provider type reduced medical uncertainty for that provider in particular. For this, we simply regress the uncertainty variables for the respective provider types on an indicator whether the person reported any recent health care visit(s) at the respective provider type and control for district fixed effects. We find that medical uncertainty tends to be lower for those respondents with recent care seeking experience at the respective provider category, but differences are only statistically significant for experience at private secondary facilities (Table A 16 – Table A 17).

We find almost no significant differences in cost uncertainties for those who recently sought care at the respective provider types for primary facilities (Table A 18). We find significantly lower cost uncertainty for those with recent experience at the respective provider type for secondary facilities for most health scenarios (Table A 19).

3.8. Results on health care seeking

In the hypothetical care seeking decision, almost all respondents decided to take up care. Across scenarios, most respondents opted for care in public secondary facilities (70% for heart disease, 60% for belly pain, 38% for light fever). Private primary facilities were also chosen by a substantial share (19% for heart disease, 24% for and 22% for light fever) and only few opted for public primary or private secondary (Figure 7).

Figure 7 Hypothetical health seeking decision across scenarios



Bars represent the percentages of respondents choosing the respective option for their hypothetical health care decision at the end of each health scenario

As a validation exercise, we furthermore checked for criterion validity by checking the association between past health care choices for the facility categories and the hypothetical health care decisions embedded in our vignette tool. We expected respondents who recently visited certain health care facilities in real life to also be more likely to choose those in the hypothetical care decisions (possibly due to an underlying preference for this facility type).

We use a Probit model to predict the probability to choose the respective facility for the health scenario depending on whether or not the respondent reported recent health care visits to this facility type (2) and by the number of his/her recent OPD visits to this facility type (3):

$$\Pr(fac_j) = \beta_0 + \beta_1 fac_{i1} + \beta_2 fac_{i2} + \beta_3 fac_{i3} + \beta_4 fac_{i4} + \varepsilon_i \quad (2)$$

$$\Pr(fac_j) = \beta_0 + \beta_1 nb\_fac_{i1} + \beta_2 nb\_fac_{i2} + \beta_3 nb_{fac_{i3}} + \beta_4 nb\_fac_{i4} + \varepsilon_i \quad (3)$$

where fac_{ij} is a dummy variable for any recent visit to the respective facility type, nb_fac_{ij} is the number of his/her recent OPD visits to the respective facility type, and $j = 1, \ldots, 4$ represents the four facility types (public primary, private primary, public secondary, private secondary).

For the extensive margin, we examined whether the respondent him/herself reported any recent IPD or OPD health care visit to the respective facility type (public primary, private primary, public secondary, private secondary)[12]. Around 31% of respondents had recently visited a public secondary and 22% a private primary facility, but only around 8% a private secondary and less than 4% a public primary facility. We find a positive and significant association between choosing the private primary facility category and recently visiting a private primary facility for all three hypothetical health scenarios. We furthermore see that choosing the private primary category is negatively and significantly associated with any recent

[12] The recall period for OPD visits was the past month and the recall period for IPD visits the past year.

visit to a public secondary facility. For the more severe health scenarios (belly pain and heart disease), we additionally find a positive and significant association between choosing the public secondary facility category and any recent visit to public secondary facilities. For the light fever case, there is also a positive association but it is not statistically significant (see appendix Table A 20 – Table A 22).

On the intensive margin, we observe the number of OPD visits within the past month to each facility type. There, we see a positive and significant association between choosing a private primary facility in the vignette set-up and the number of recent OPD visits to private primary facilities for all three health scenarios. At the same time, the number of recent OPD visits to public secondary facilities is negatively associated with choosing the private primary facility type. Conversely, the former also applies to the public secondary facility category, but only for the heart disease scenario. The number of OPD visits to public secondary facilities is positively associated with choosing a public secondary facility, while the number of visits to private primary is negatively associated with the same outcome. Furthermore, there is also a significant negative association between the number of recent visits to private primary facilities and choosing public secondary for the light fever case. For all other facilities, we do not find statistically significant associations between the hypothetical choice and number of recent OPD visits (see appendix Table A 23 – Table A 25). These results suggest that the relevant tradeoff for most respondents is between private primary and public secondary facilities, both in the hypothetical and real-life decisions. They also suggest that recent care seeking experiences and the hypothetical decisions in our vignette tool are correlated such that we can trust the hypothetical choices to be a good proxy for real-world choices. We suspect underlying preferences for the respective facility type might partly drive those choices.

4. Explaining health care seeking decisions

4.1. Empirical strategy

In the companion paper, we propose a simple theoretical framework on how expected costs, expected benefits, and uncertainties around them influence provider valuations and ultimately health care decisions. Please refer to Imping et al. (2024) for details on the theoretical framework and simulation exercises. Note that we included a simulation of choices between private primary and public secondary in the heart disease scenario to the appendix (see appendix section A3) as this simulation directly reflects the empirically elicited numbers from the pilot data collection presented in this paper.

From the theoretical framework and simulation exercises, we derive four hypotheses for empirically testing whether uncertainty may deter sensible health investments:

H1: Increasing the expected probability to get substantially better when choosing provider *k* ceteris-paribus increases the valuation of provider *k* and hence the share of patients choosing it.

H2: Increasing the expected cost of provider *k* ceteris-paribus decreases the valuation of provider *k* and hence the share of patients choosing it.

H3: Increasing uncertainty in the probability to get substantially better when choosing provider *k* ceteris-paribus decreases the valuation of provider *k* and hence the share of patients choosing it.

H4: Increasing uncertainty in the expected cost of provider *k* ceteris-paribus decreases the valuation of provider *k* and hence the share of patients choosing it.

To test how the expected benefits and costs and surrounding uncertainties impact the health care seeking decision in a regression framework, we employ the hypothetical decisions from the vignette experiment and test how the probability to get better p_k, costs c_k, and the respective uncertainties influence this decision. These parameters were elicited from each respondent for each scenario-facility-combination, which is laid out in detail in chapter 2.

We focus on the heart disease scenario and restrict this initial analysis to the tradeoff between two facility types: private primary (k=1) and public secondary (k=2). As this leaves us with a binary health facility choice, we can employ a Probit model, where the probability to choose a provider depends on the difference of valuations. We hypothesize that the expected valuation V_k of facility *k* should include the expected probability to get better $E[p_k(\gamma)]$ (called "prob k" henceforth), the expected cost $E[c_k(\gamma)]$ ("cost k"), and the variation of $p_k(\gamma)$ and $c_k(\gamma)$ around their respective expectation ("prob uncertainty k" and "cost uncertainty k"). We can hence model the probability of choosing a public secondary provider (over private primary) as follows:

$$\begin{aligned}\Pr(public\ secondary) &= \Pr(k=2) = \Pr(V_{2,i} - V_{1,i} + \varepsilon_i > 0) \\ &= \Pr(\beta_0 + \beta_1 prob2_i + \beta_2 cost2_i + \beta_3 prob\ uncertainty2_i + \beta_4 cost\ uncertainty2_i \\ &\quad -\beta_5 prob1_i - \beta_6 cost1_i - \beta_7 prob\ uncertainty1_i - \beta_8 cost\ uncertainty1_i + \varepsilon_i > 0) \quad (4)\end{aligned}$$

While we estimate this equation as part of the supplementary material in the appendix, we estimate the following equation over all individuals i in our main specification:

$$\Pr(public\ secondary) = \beta_0 + \beta_1 \Delta prob_i + \beta_2 \Delta cost_i + \beta_3 \Delta prob\ uncertainty_i + \beta_4 \Delta cost\ uncertainty_i + \varepsilon_i \quad (5)$$

Note that this reduced model simply assumes $\beta_1 = \beta_5$, $\beta_2 = \beta_6$, $\beta_3 = \beta_7$, and $\beta_4 = \beta_8$.

4.2. Regression results on hypothetical health care decisions

In subsection 3.8 we see that the relevant tradeoff for most respondents is between private primary and public secondary, so that we now focus on these facility types[13]. We leave the light fever scenario out of this analysis as the facility tradeoff is not as clear in this case and formal care is likely not needed in this scenario.

Given that our new measure reveals uncertainty both in the medical and cost dimension, we now examine how the individual estimations influence the hypothetical care seeking decision and compare this to the hypotheses derived from the theoretical framework and simulations (see subsection 4.1). Table 2 displays the results of the respective regression analysis of equation 5 in the heart disease scenario. From the regressions of each measure individually in columns 1, 2 and their combination in 5, we see that relatively higher estimated benefits at public secondary facilities are positively correlated with the probability to choose public secondary over private primary, and higher costs negatively, yet not statistically significant. In columns 3, 4 and 6, we include the respective uncertainties and see that higher uncertainty in the benefit and the cost dimension are both negatively and significantly correlated with the probability to choose a public secondary facility. More detailed regressions including each facility's measure instead of their difference mirrors these associations (Table A26). We see similar, yet slightly weaker, patterns in the belly pain scenario (Table A27 – Table A28), and stronger support for the influence of the benefits and their uncertainty.

Table 2 Choice of public secondary over a private primary facility in the heart disease scenario

	(1) Public secondary	(2) Public secondary	(3) Public secondary	(4) Public secondary	(5) Public secondary	(6) Public secondary
ΔProb	0.115**				0.106**	0.0966*
	(0.0456)				(0.0504)	(0.0501)
ΔLog costs		-0.135			-0.0994	0.119
		(0.110)			(0.119)	(0.206)
ΔProb uncertainty			-0.116*			-0.123*
			(0.0632)			(0.0649)
ΔLog cost uncertainty				-0.155*		-0.222
				(0.0924)		(0.164)
Constant	0.770***	0.694***	0.850***	0.683***	0.723***	0.792***
	(0.0904)	(0.0891)	(0.100)	(0.0895)	(0.0928)	(0.105)
N	247	242	246	241	232	231

Results from Probit regression of equation 5; standard errors in parentheses; * p<0.1, **p<0.05, *** p<0.01

[13] Note that this decision further reduces the estimation sample to 247 individuals.

To check robustness of our findings, we conducted the same regression analysis assuming log-normal instead of bi-triangular individual cost distributions and find our main results to hold (see appendix Table A 34 for a replication of Table 2 assuming log-normal cost distribution). Similarly, when using the absolute spread between minimum and maximum expected costs instead of the fitted standard deviation as cost uncertainty measure, coefficients are very similar in magnitude and statistical significance (see appendix Table A 35 for a replication of Table 2 with absolute spread as uncertainty measure).

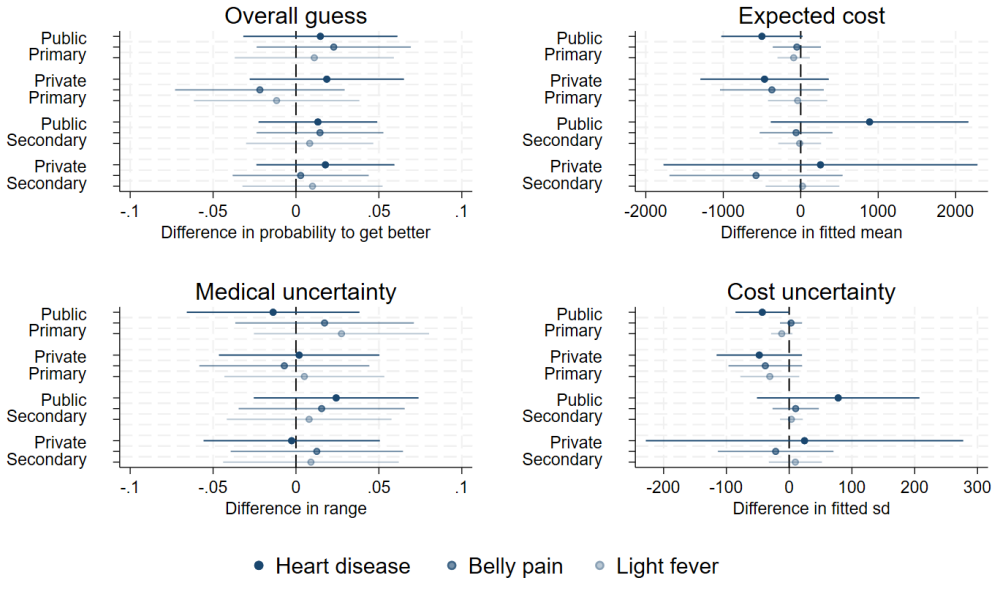
5. Changes and information seeking

As we saw potential for information-seeking to alter uncertainties around health care seeking, we measured expected costs and benefits twice on two consecutive days, leaving the possibility for private information-seeking between the days. This set-up enables us to examine the differences between our measurements between the two days and the role of information-seeking in inducing changes for the subsample of respondents who engaged in information-seeking.

Slightly more than half (55.7%) of respondents reported to have sought any information regarding the health scenarios between the first and second day. Information was mainly sought from private networks, meaning family and friends without (30.7%) or with medical education (15.3%), as well as from doctors at medical facilities (8%) or other health workers (7.3%). (For more details, see Figure A 6.)

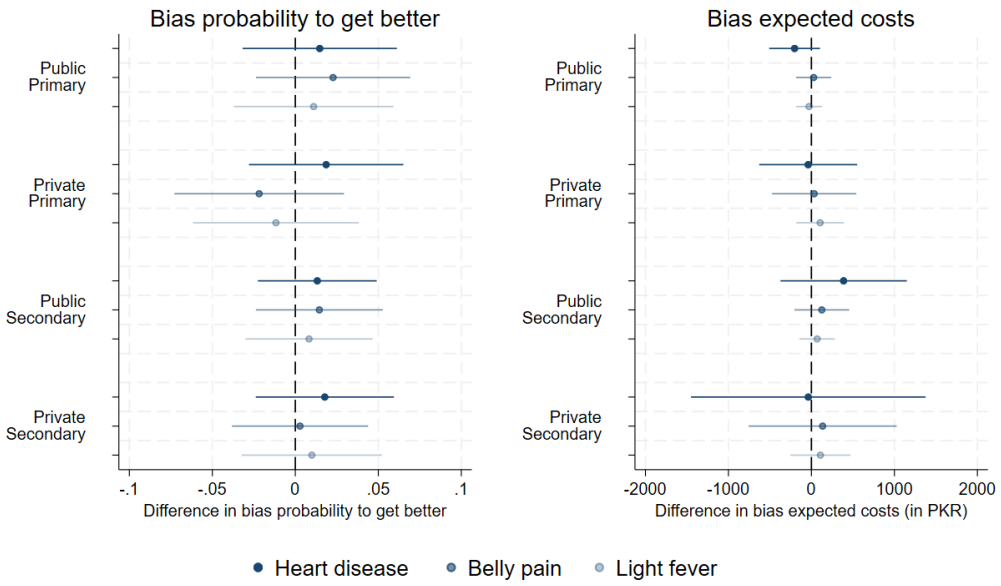
We expected the subgroup who engaged in information seeking to exhibit differences in the expected benefits and costs between the two days, especially in terms of a reduced bias regarding the expected probability to get better as compared to the health experts and reduced uncertainties. We do, however, not detect significant changes between the days in expected benefits nor expected costs nor the uncertainties around the medical or cost dimension (Figure 8). We also do not observe a significant reduction in bias as compared to the expert assessment of likelihood to get better for the information seekers. Also, the bias regarding expected costs (as compared to the household survey average reported costs for similar health incidents) does not significantly change between the days for the group who sought information (Figure 9).

Figure 8 Changes in expected benefits, expected costs, and uncertainties between day 1 and 2



Differences between day 1 and day 2 averages for the subgroup of respondents who sought information; differences in probability to get better (upper left), in fitted mean expected costs (upper right), in range between minimum and maximum expected probability to get better (bottom left) and in fitted standard deviation of cost distributions (bottom right), bars represent 95% confidence intervals of the mean estimate.

Figure 9 Bias changes in probability to get better and expected costs between day 1 and 2 among information-seekers



Difference in mean bias for expected proability to get better as compared to mean expert assessment (left) and difference in mean bias for expected costs as compared to cost benchmarking from average costs reported in household survey; bars represent 95% confidence intervals of the mean estimate.

However, as compared to the ones who did not seek information, for the probability to get better we see on average slightly more bias changes between the days for the information seekers, but going in both directions and differences are not statistically significant. Hence, information seeking seems to slightly affect but not improve accuracy of expectations.

As information-seeking was not randomly assigned but self-selected, we compare probabilities, costs, uncertainties and biases of the information seeking group to the group that did not engage in information seeking. We see some slight but significant group differences. For some scenario-facility-combinations the information seekers are more biased and for others less biased than the group who did not seek information. However, the information seekers tend to generally have more pessimistic beliefs regarding the probability to get better. This is true for both days, hence already before the information seeking occurs (see Table A 29). Hence, when respondents underestimate the benefits of seeking care compared to the experts, this is more profound for the information seekers who tend to be more pessimistic. If respondents overestimate the benefits, the information seekers are closer to the expert benchmarks. Besides, information seekers are on average a bit more certain about the medical benefits of seeking care, at least for some scenario-facility-combinations (Table A 30). This also applies already to the first day results. Furthermore, information seekers seem to on average have a lower bias regarding costs for the light fever scenario and a larger bias for the more severe scenarios. In general, information seekers have lower costs expectations on average on day 2, while their estimates are not significantly from the other group on day 1 (Table A 31). Their expectations are closer to the real incurred costs where costs are overestimated by the vignette respondents and further away where costs are underestimated. Overall, information seekers in our sample hence seem to be somewhat different from those who did not seek information in terms of expected benefits, costs, and uncertainties. This difference, however, cannot be explained by common respondent and household characteristics (compare Table A 32).

We do not find evidence for information-seeking to make a difference, regardless of the information source. Also the subgroup of individuals who sought information from a health professional did not exhibit a significant bias reduction. We also do not find significant changes in expected benefits nor expected costs nor the uncertainties between the two days for this subgroup.

Even though at the individual level, there are small positive and negative changes from day 1 to day 2, the probabilities to get better and uncertainties around them stay quite similar for most individuals. On the other hand, we see a lot of variation also within individuals regarding the cost expectations, indicating that many individuals are quite unsure about which costs to expect when seeking health care. Replicating the test-retest exercise as described in subsection 3.6 for the information seeking subsample, we see that the correlation coefficients for our variables between the days are quite similar in size and significance to the subsample of respondents who did not seek information. Hence, they are rather stable as the correlations are relatively high and significant. For the medical dimension, information seekers even exhibit slightly more reliable answers (i.e. higher correlations between the two days) than the ones who did not seek information.

Overall, our results indicate that information seeking from own sources as we implemented it in our set-up did not reduce biases nor alter medical or cost uncertainties.

6. Tool adaption

Applying the tool for the first time and analyzing the pilot data has provided us with important learnings and insights, including limitations. We used these learnings to further improve the tool and address the shortcomings.

Firstly, we extended the *health care seeking options.* As we learned from the data as well as interviewer feedback that self-medication or seeking advice at a pharmacy are relevant and frequently used ways of the local population to react to health problems, we included the option of informal care to our health care seeking options. We further included the option of not seeking any – neither formal nor informal – care to the options to elicit the beliefs of getting substantially better when not doing anything. By eliciting those beliefs, we can better disentangle what part of uncertainty stems from the uncertainty around the health shock itself and what part needs to be attributed to the uncertainty around the efficiency of available medical care. For the adapted tool, we included a detailed definition for each health care seeking option (see appendix subsection A5.a) and a pictorial representation or photo of a local example of the respective provider category.

Secondly, we improved the questions on the *expected benefits of seeking care and medical uncertainty*. We added a more specific definition of "getting substantially better" to ensure that all respondents understand and interpret this binary concept in a comparable way (see appendix subsection A5.b). What getting substantially better means exactly for the individual remains open to the extent that it can capture different ages, life circumstances, and health states well but is generalized to a degree that it should reflect the expected benefits of seeking health care. We also adapted the questions about the minimum and maximum probabilities to get better and moved closer to the examples from the literature (Delavande et al., 2022; Giustinelli et al., 2022). Instead of framing the minimum probability as the "worst thinkable case" and the maximum probability as "best thinkable case", which might have yielded too extreme answers, we directly asked which other likelihoods they could you imagine and how likely it would be at least and at most (see appendix subsection A5.c for exact script).

Thirdly, we adapted and improved the *visual aids and materials* as well as the overall storytelling to keep the respondents engaged and avoid interview fatigue despite the repetitive nature of the tool. For each health care option for each scenario, we emphasized what parts had changed and what part had stayed the same (e.g. still in the light fever case but now seeking care at different facility). We asked the respondents to come on an imaginative journey through the different health care seeking options, which were illustrated by pictures and printed on separate pages in a booklet (see Figure A 9 for an example page). We used district-specific example photos of health care facilities for the formal care seeking options and photos of pharmacies for the informal care (see Figure A 7). A play figure was used to walk from one health care option i.e. from one page to the other. We also altered the visual representation of probabilities as compared to Figure 2 and displayed the beans on a scale such that respondents had an improved visual representation of magnitudes and could visualize the ranges of their guesses better (see Figure A 8).

The adaptions took place between November 2022 and January 2023 and included some pre-test of new elements both in Germany and Pakistan (with student assistants and university employees). The adapted tool was fielded in a pre-pilot with 12 respondents of the local target population in February 2023. As part of the *local validation* strategy, this pre-pilot was accompanied by *cognitive interviews*. Cognitive interviews are a method to qualitatively assess

how well a quantitative survey question's intent and the respondent's interpretation and response match (Scott et al., 2020). The results generated by cognitive interviews can then help to identify interpretation mistakes of the respondent regarding the item or response options and ultimately to eliminate them (Artino et al., 2014). In our case, with the cognitive interviews we aimed to examine how the content and the visual aids were perceived by the study population to assess whether the concepts and questions were understood by the respondents in the intended way. The analysis of the cognitive interviews revealed that the majority of questions and concepts were understood in the way they were intended and only minor adjustments of the tool were necessary, mainly regarding the text and translations (for a more detailed analysis of the cognitive interviews see Ahmad et al. (2024)). The cognitive interviews also generated valuable learnings for the enumerator training (e.g. which aspects were prone to misunderstandings and needed specific attention during training).

As we saw the potential for information to reduce biases and uncertainties in our setting, in a next step we designed a *survey experiment*. More specifically, we designed a practical information intervention as part of the scenario texts as well as an intervention presenting a graphical overview of all answers and artificially manipulated uncertainties there. For a more detailed description of the survey experiment design see Imping et al. (2023). We furthermore added the possibility to rank choices for the hypothetical health care decision to get a better understanding of the relevant trade-offs the respondents are facing in this decision. Therefore, we additionally asked for the second and third most likely option where they would seek care in the described situation. Finally, we also added an ambiguity preference measure and a social desirability measure to the questionnaire. We then piloted the adapted tool and survey experiment in July and September 2023. We fielded the final measurement tool and survey experiment in a sample of more than 3,400 respondents between December 2023 and February 2024. Please refer to Imping et al. (2024) for more details and results.

7. Discussion and conclusion

In this study, we expand the evidence on barriers to health care seeking by examining the role of medical and cost uncertainties. We develop a new survey tool to measure these uncertainties in a hypothetical health decision setup with health scenario vignettes and fielded it in a sample of low-income households in Pakistan. With this first application, we validate our tool and present some preliminary empirical evidence.

We find that medical and cost uncertainty is present in our target population, and might pose a barrier to health care decisions. In descriptive analyses of the measures derived from our new survey tool, we show that our study population does face substantial uncertainties in the cost and medical domain, while the former is higher at higher-level and private facilities, but the latter does not vary strongly across health facilities and scenarios. At the same time, we detect biases in the stated probabilities to get better as they differ from expert assessments. Regarding heterogeneities, in accordance with our expectations, there is an age gradient for expected costs (higher) and expected benefits (lower) at higher-level providers. Besides, respondents with recent health care experiences show slightly lower medical uncertainty. However, we only find specific provider experiences to make a difference for the less commonly used private secondary facilities. As part of our validation strategy, we find no indications for bunching around focal responses for all probability-related questions and a test-retest exercise shows that our results remain relatively stable over repeated applications of our tool.

Our regression analysis on the health care seeking decision shows that higher estimates of the probability to get better increase the probability to choose public secondary over private primary facilities. We also find evidence that higher uncertainty in both domains tends to decrease the probability to choose care at a public secondary facility. This indicates that medical and financial uncertainties can deter health care decisions. This finding is particularly relevant in low-income settings, where information availability and access is limited, giving rise to high uncertainty and incomplete information. Hence, there is potential of addressing the biases via belief correction and reduce uncertainty with information provision. We see that information-seeking from own sources in our setup was not sufficient for this. However, this is quite in line with previous research which has shown that uncertainty is not dissolved easily. For example, Biener et al. (2019) who explore uncertainty of insurance contract nonperformance show theoretically that Bayesian updating resolves uncertainty only slowly and empirically via a behavioral experiment that individual experience does not affect uncertainty much, but mainly best guesses. We hence see large potential in more intensive and targeted information interventions, especially to alter expectations and thereby reduce biases. Therefore, we developed and fielded a survey experiment (Imping et al., 2023).We fielded the survey experiment jointly with a revised version of the uncertainty measurement tool addressing some limitations of the first tool version as described in chapter 6. We added not seeking care and informal care to the health care options, refined the questions regarding medical uncertainty, and improved the storytelling and visual aids further. The results of the second tool application including the survey experiment are presented in Imping et al. (2024).

Our study comes with a set of limitations that we address to the best of our knowledge and abilities. First, the hypothetical nature of the expressed valuations and choices in our measurement tool limits our ability to draw conclusions on real health decisions. Yet, it is unethical and unfeasible to elicit the survey tool in a real health shock, so that we designed the tool in a way to facilitate imagining the health scenarios using visual aids, storytelling and

incentivizing the health care decision. Secondly, the tool relies on measuring probabilities, which is a concept that is generally hard for respondents to understand, even more so in a low-education setting as ours. Here, we followed established literature in framing the questions, the use of visual aids and extensive validation.

As public health insurance schemes are spreading across LMICs, they address the financial barrier to health care usage, yet coverage and awareness of the population often remain limited. The new measurement tool allows to quantify the existence and the interplay of uncertainties in the medical and financial dimension and show that they can pose an additional barrier to health care seeking.

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Appendix

A1. Additional tables

Table A1 Selection Criteria Health Scenarios

	Regional prevalence / burden of disease	**Type of disease**	**Severity of condition**	**Expected treatment costs**	**Recommended level of care**	**Population awareness (expert view)**
Acute Appendi-citis	not prevalent	NCD	severe + emergency	low (because likely surgery, so likely covered by HI)	any	awareness medium to high
Bone fracture	not prevalent	injury	severe + emergency	medium to high (depends whether surgery)	any	awareness high
Diarrea	prevalent (but less for adults)	CD	less severe	medium	primary (or any nearest)	awareness (rather) low
(High) fever	prevalent	CD	less severe	low to medium	primary (or any nearest)	awareness low (10%)
Heart disease	prevalent	NCD / CVD	(very) severe + emergency	medium to high (could be partially covered by HI)	Any for first contact, treatment at secondary	awareness medium to high
Stroke	prevalent	NCD / CVD	very severe + emergency	medium to high (could be partially covered by HI)	secondary/higher	awareness medium to high
Tubercu-losis	prevalent	CD	severe	free in designated tuberculosis facilities	tuberculosis facilities	high

Health problems that were considered for the health vignettes; sorted alphabetically

Table A2 Respondent and household characteristics

	Mean	SD	Min	Max	N
Age of respondent	52.95	14.37	17	96	307
Respondent female	0.30	0.46	0	1	308
Respondent educated	0.31	0.46	0	1	307
Respondent money decision-maker	0.71	0.45	0	1	308
Number of household members	6.73	3.00	1	21	308
Monthly household expenditure	44,247	20,390	1500	120,400	306

Monthly household expenditure in PKR

Table A3 Descriptive statistics risk and uncertainty day 1

	Public primary	Private primary	Public secondary	Private secondary
Heart disease				
Probability to get better	3.41	5.80	6.14	7.13
Expected costs	1,774.42	4,112.03	3,828.44	9,151.50
Medical uncertainty	4.70	4.78	4.99	4.88
Cost uncertainty	127.06	300.66	292.22	767.49
Belly pain				
Probability to get better	3.59	6.16	6.45	7.40
Expected costs	1,389.38	3,595.17	2,785.95	6,890.47
Medical uncertainty	4.49	4.76	4.95	4.79
Cost uncertainty	89.94	240.21	177.83	452.82
Light fever				
Probability to get better	4.46	6.40	6.65	7.38
Expected Costs	1,109.42	2,513.48	2,076.12	3,941.26
Medical uncertainty	4.67	4.70	4.87	4.77
Cost uncertainty	81.45	172.78	129.69	238.93

Probability to get better and medical uncertainty expressed scaled from 0 to 10 (10 corresponding to 100%); expected costs and cost uncertainty in PKR

Table A4 Descriptive statistics risk and uncertainty day 2

	Public primary	Private primary	Public secondary	Private secondary
Heart disease				
Probability to get better	3.51	5.96	6.34	7.34
Expected costs	1,571.91	4,073.18	4,216.69	9,113.93
Medical uncertainty	4.68	4.73	5.22	4.99
Cost uncertainty	107.46	283.61	318.20	714.66
Belly pain				
Probability to get better	3.75	6.10	6.57	7.42
Expected costs	1,416.53	3,628.70	2,911.87	7,026.05
Medical uncertainty	4.71	4.83	5.06	4.89
Cost uncertainty	93.30	251.05	196.65	462.42
Light fever				
Probability to get better	4.53	6.40	6.68	7.44
Expected costs	1,081.03	2,618.52	2,145.91	4,049.69
Medical uncertainty	4.84	4.86	4.92	4.78
Cost uncertainty	72.83	162.25	130.85	240.11

Probability to get better and medical uncertainty expressed scaled from 0 to 10 (10 corresponding to 100%); expected costs and cost uncertainty in PKR

Table A 5 Test-retest for expected benefits and medical uncertainty

	Med Unc.	N	Prob. to get better	N	Best case Prob.	N	Worst case Prob	N
Heart Disease Public Primary	0.7167***	117	0.7133***	117	0.7192***	117	0.7490***	127
Heart Disease Private Primary	0.6275***	126	0.5005***	126	0.5001***	126	0.5854***	131
Heart Disease Public Secondary	0.7088***	128	0.6420***	128	0.6146***	128	0.6325***	131
Heart Disease Private Secondary	0.5928***	126	0.6383***	127	0.4269***	126	0.5721***	130
Belly Pain Public Primary	0.6784***	125	0.7063***	125	0.6467***	125	0.6690***	130
Belly Pain Private Primary	0.5620***	127	0.6493***	127	0.6060***	127	0.4888***	128
Belly Pain Public Secondary	0.6417***	128	0.6885***	129	0.7161***	128	0.5439***	130
Belly Pain Private Secondary	0.4818***	129	0.7619***	129	0.4401***	129	0.4773***	130
Fever Public Primary	0.6342***	124	0.6392***	125	0.6343***	124	0.6736***	130
Fever Private Primary	0.4624***	127	0.6734***	127	0.6558***	127	0.3689***	129
Fever Public Secondary	0.5720***	131	0.6892***	131	0.6752***	131	0.4941***	131
Fever Private Secondary	0.5242***	128	0.7322***	128	0.5438***	128	0.4143***	130

Spearman's correlation coefficients between the same variables on day 1 and day 2;
* p < 0.1, ** p < 0.05, *** p < 0.01

Table A 6 Benchmarking of expected costs

	Expected costs (vignettes)	Actual costs (hh survey)
Heard disease	4,690 PKR	4,115 PKR
Belly pain	3,210 PKR	3,301 PKR
Light fever	2,310 PKR	1,605 PKR

Expected costs are weighted averages of cost estimates from the vignette tool (weighted with the proportions of actual visits in the household survey); Actual costs are averages of total costs reported in the household survey for most recent OPD visit within past month for health problems similar to the ones presented in the vignettes

Table A 7 Test-retest for expected costs and cost uncertainty

	Fin Unc	N	Mean costs	N	Min costs	N	Max costs	N
Heart Disease Public Primary	0.4127***	118	0.7456***	117	0.7740***	119	0.6700***	123
Heart Disease Private Primary	0.6206***	122	0.8265***	121	0.7922***	129	0.8279***	128
Heart Disease Public Secondary	0.3751***	123	0.7753***	126	0.8097***	128	0.7131***	130
Heart Disease Private Secondary	0.5216***	119	0.7465***	119	0.7678***	128	0.7280***	128
Belly Pain Public Primary	0.4416***	126	0.7341***	126	0.7358***	127	0.7154***	127
Belly Pain Private Primary	0.5243***	121	0.8163***	123	0.8069***	127	0.8124***	128
Belly Pain Public Secondary	0.3945***	126	0.8087***	123	0.7731***	129	0.7662***	129
Belly Pain Private Secondary	0.6572***	122	0.9091***	122	0.8575***	130	0.8786***	130
Light Fever Public Primary	0.5089***	124	0.7547***	124	0.8289***	123	0.7231***	126
Light Fever Private Primary	0.4291***	122	0.7310***	122	0.7328***	126	0.7178***	127
Light Fever Public Secondary	0.2148**	124	0.7758***	127	0.7852***	129	0.7326***	130
Light Fever Private Secondary	0.3122***	123	0.6667***	122	0.6984***	129	0.6832***	130

Spearman's correlation coefficients between the same variables on day 1 and day 2;
* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A 8 Heterogeneities in probability to get better for primary facilities

	Public Primary			Private Primary		
Prob. to get better	Heart disease	Belly pain	Light fever	Heart disease	Belly pain	Light fever
Age <=30	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Age 31-60	0.267	-0.808*	-0.230	0.00142	0.238	-0.239
	(0.427)	(0.431)	(0.437)	(0.390)	(0.442)	(0.428)
Age >60	0.237	-1.052**	-0.293	-0.0619	0.268	-0.436
	(0.479)	(0.480)	(0.486)	(0.431)	(0.490)	(0.475)
Female	0.0148	0.0992	-0.858***	-0.827***	-1.099***	-1.365***
	(0.282)	(0.279)	(0.278)	(0.257)	(0.295)	(0.281)
Educated	0.0428	-0.0364	0.0201	-0.216	0.0932	-0.167
	(0.271)	(0.276)	(0.272)	(0.250)	(0.289)	(0.275)
Sought care recently	-0.755**	-0.597*	-0.290	-0.0702	0.134	0.153
	(0.354)	(0.351)	(0.347)	(0.324)	(0.372)	(0.357)
Chitral	1.652***	1.402***	1.086***	-0.762***	-0.274	-0.370
	(0.325)	(0.322)	(0.319)	(0.285)	(0.325)	(0.311)
Kohat	0.800*	1.150***	1.754***	0.912**	1.920***	2.355***
	(0.413)	(0.412)	(0.410)	(0.374)	(0.430)	(0.416)
Malakand	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Mardan	1.778***	1.678***	1.552***	1.099***	1.745***	1.595***
	(0.333)	(0.323)	(0.325)	(0.289)	(0.331)	(0.316)
Constant	2.663***	3.912***	4.170***	6.175***	5.423***	6.393***
	(0.602)	(0.605)	(0.608)	(0.546)	(0.620)	(0.599)
N	264	275	276	293	294	292

Estimation results of equation 1; age categories based on years (reference: younger than 30 years); education indicates if respondent has at least primary education; recently sought care indicates whether respondent sought IPD care within past year and/or OPD care within past month; standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A 9 Heterogeneities in probability to get better for secondary facilities

	Public Secondary			Private Secondary		
Prob. to get better	Heart disease	Belly pain	Light fever	Heart disease	Belly pain	Light fever
Age <=30	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Age 31-60	0.0399	-0.366	-0.153	-0.342	-0.604**	-0.511
	(0.337)	(0.330)	(0.325)	(0.297)	(0.306)	(0.326)
Age >60	0.0806	-0.174	-0.121	-0.505	-0.482	-0.391
	(0.373)	(0.364)	(0.361)	(0.329)	(0.339)	(0.359)
Female	0.372*	-0.0678	-0.258	0.0311	-0.391*	-0.158
	(0.214)	(0.212)	(0.204)	(0.190)	(0.200)	(0.206)
Educated	-0.141	-0.000736	-0.109	-0.179	-0.171	0.0458
	(0.213)	(0.212)	(0.203)	(0.188)	(0.198)	(0.205)
Sought care recently	0.284	0.308	0.462*	0.161	0.216	0.676**
	(0.279)	(0.273)	(0.268)	(0.244)	(0.258)	(0.268)
Chitral	-0.495**	-1.027***	-0.965***	-2.127***	-2.242***	-1.823***
	(0.239)	(0.237)	(0.230)	(0.210)	(0.222)	(0.229)
Kohat	1.503***	1.174***	1.945***	0.544*	0.948***	1.272***
	(0.318)	(0.316)	(0.305)	(0.279)	(0.296)	(0.305)
Malakand	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Mardan	0.889***	0.822***	0.671***	-0.0984	0.260	0.345
	(0.243)	(0.238)	(0.232)	(0.215)	(0.225)	(0.234)
Constant	5.724***	6.599***	6.436***	8.293***	8.494***	7.693***
	(0.471)	(0.461)	(0.453)	(0.417)	(0.429)	(0.452)
N	294	297	296	293	300	297

Estimation results of equation 1; age categories based on years (reference: younger than 30 years); education indicates if respondent has at least primary education; recently sought care indicates whether respondent sought IPD care within past year and/or OPD care within past month; standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A 10 Heterogeneities in medical uncertainty for primary facilities

	Public primary			Private Primary		
Medical Uncertainty	Heart disease	Belly pain	Light fever	Heart disease	Belly pain	Light fever
Age <=30	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Age 31-60	0.202	0.0991	0.829*	0.0929	0.561	0.545
	(0.448)	(0.447)	(0.432)	(0.388)	(0.385)	(0.367)
Age >60	0.443	0.141	0.789	0.194	0.744*	0.972**
	(0.502)	(0.498)	(0.481)	(0.430)	(0.427)	(0.407)
Female	-1.092***	-1.484***	-1.200***	-1.029***	-1.350***	-1.030***
	(0.295)	(0.289)	(0.277)	(0.251)	(0.257)	(0.241)
Educated	0.703**	0.553*	0.645**	0.481*	0.234	0.530**
	(0.284)	(0.286)	(0.270)	(0.246)	(0.252)	(0.235)
Sought care recently	-0.290	-0.392	-0.184	-0.370	-0.0541	-0.0871
	(0.371)	(0.364)	(0.344)	(0.316)	(0.324)	(0.306)
Chitral	1.899***	2.133***	2.411***	2.434***	2.700***	2.845***
	(0.340)	(0.334)	(0.317)	(0.279)	(0.283)	(0.268)
Kohat	3.374***	3.873***	3.775***	3.519***	3.286***	3.578***
	(0.433)	(0.428)	(0.407)	(0.366)	(0.374)	(0.357)
Malakand	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Mardan	2.051***	2.535***	2.613***	2.397***	2.906***	2.839***
	(0.349)	(0.335)	(0.324)	(0.284)	(0.289)	(0.272)
Constant	3.017***	3.205***	2.267***	3.182***	2.522***	2.275***
	(0.631)	(0.628)	(0.603)	(0.545)	(0.540)	(0.514)
N	264	275	275	292	294	291

Estimation results of equation 1; age categories based on years (reference: younger than 30 years); education indicates if respondent has at least primary education; recently sought care indicates whether respondent sought IPD care within past year and/or OPD care within past month; standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A 11 Heterogeneities in medical uncertainty for secondary facilities

	Public Secondary			Private Secondary		
Medical Uncertainty	Heart disease	Belly pain	Light fever	Heart disease	Belly pain	Light fever
Age <=30	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Age 31-60	0.195	0.525	0.677*	0.419	0.343	0.215
	(0.383)	(0.372)	(0.366)	(0.401)	(0.361)	(0.352)
Age >60	0.298	0.609	0.547	0.381	0.464	0.297
	(0.423)	(0.410)	(0.406)	(0.442)	(0.399)	(0.388)
Female	-0.981***	-1.165***	-0.907***	-0.606**	-0.637***	-0.649***
	(0.243)	(0.239)	(0.230)	(0.252)	(0.236)	(0.223)
Educated	0.676***	0.424*	0.294	0.413	0.398*	0.408*
	(0.242)	(0.238)	(0.229)	(0.251)	(0.234)	(0.221)
Sought care recently	-0.278	-0.0400	-0.178	-0.707**	-0.438	-0.649**
	(0.316)	(0.307)	(0.302)	(0.325)	(0.304)	(0.290)
Chitral	3.015***	2.752***	2.792***	3.408***	3.349***	3.648***
	(0.272)	(0.266)	(0.259)	(0.280)	(0.262)	(0.248)
Kohat	3.901***	3.491***	2.622***	2.677***	2.235***	2.027***
	(0.361)	(0.356)	(0.343)	(0.371)	(0.348)	(0.330)
Malakand	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Mardan	2.772***	2.677***	2.533***	2.141***	2.190***	2.561***
	(0.276)	(0.268)	(0.261)	(0.287)	(0.266)	(0.253)
Constant	3.105***	2.770***	2.742***	3.239***	3.017***	3.024***
	(0.535)	(0.519)	(0.510)	(0.558)	(0.506)	(0.489)
N	294	297	296	292	300	297

Estimation results of equation 1; age categories based on years (reference: younger than 30 years); education indicates if respondent has at least primary education; recently sought care indicates whether respondent sought IPD care within past year and/or OPD care within past month; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 12 Heterogeneities in expected costs for primary facilities

Mean costs	Public primary			Private Primary		
	Heart disease	Belly pain	Light fever	Heart disease	Belly pain	Light fever
Age <=30	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Age 31-60	155.0	102.7	104.1	206.0	162.2	394.3
	(286.6)	(226.8)	(179.6)	(750.2)	(626.1)	(361.7)
Age >60	342.9	414.7	268.4	571.5	1035.6	910.6**
	(316.7)	(252.0)	(200.0)	(822.3)	(691.4)	(400.3)
Female	161.0	-64.85	269.3**	-627.7	-1022.5**	-314.2
	(176.6)	(146.5)	(118.6)	(470.4)	(405.2)	(237.9)
Educated	172.0	98.33	64.22	129.1	317.5	472.3**
	(169.0)	(142.9)	(113.3)	(463.4)	(397.3)	(232.7)
Sought care recently	218.7	319.6*	59.92	1945.6***	1530.7***	790.0***
	(210.3)	(180.5)	(143.6)	(588.2)	(510.4)	(299.9)
Chitral	1256.7***	1448.3***	1107.1***	3758.1***	3362.9***	1887.2***
	(200.9)	(164.8)	(131.9)	(517.5)	(448.3)	(263.1)
Kohat	406.2	609.7***	135.4	1473.7**	1158.7*	209.8
	(258.1)	(216.2)	(174.3)	(699.7)	(592.7)	(347.8)
Malakand	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Mardan	656.0***	476.5***	192.7	1009.7*	734.4	699.6***
	(214.4)	(169.2)	(136.1)	(531.8)	(460.5)	(268.6)
Constant	366.8	204.4	318.2	440.4	564.4	484.2
	(394.5)	(311.7)	(247.6)	(1029.0)	(869.6)	(504.8)
N	266	279	275	288	291	293

Estimation results of equation 1; age categories based on years (reference: younger than 30 years); education indicates if respondent has at least primary education; recently sought care indicates whether respondent sought IPD care within past year and/or OPD care within past month; standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A 13 Heterogeneities in expected costs for secondary facilities

	Public Secondary			Private Secondary		
Mean costs	Heart disease	Belly pain	Light fever	Heart disease	Belly pain	Light fever
Age <=30	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Age 31-60	-43.33	137.2	136.5	-1234.8	613.8	-219.8
	(1022.9)	(378.4)	(268.3)	(1635.6)	(1115.8)	(493.8)
Age >60	433.6	368.1	339.6	-780.2	1562.1	-17.44
	(1131.6)	(418.1)	(297.0)	(1802.5)	(1232.8)	(543.2)
Female	911.4	-621.6**	144.0	-149.4	-2216.9***	-193.3
	(663.7)	(245.0)	(174.2)	(1059.6)	(700.2)	(308.8)
Educated	1166.5*	-61.43	233.4	981.6	584.1	373.5
	(661.9)	(243.4)	(173.0)	(1049.5)	(702.7)	(307.0)
Sought care recently	782.8	995.0***	307.9	4234.5***	3108.8***	512.5
	(865.9)	(319.5)	(228.7)	(1375.2)	(901.0)	(408.0)
Chitral	5359.5***	1999.2***	1478.9***	10437.3***	5395.4***	1668.1***
	(743.9)	(273.2)	(195.0)	(1186.4)	(782.8)	(344.6)
Kohat	987.2	1349.8***	646.1**	5273.7***	3898.8***	1015.2**
	(1009.2)	(364.2)	(259.3)	(1588.0)	(1028.9)	(471.5)
Malakand	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Mardan	1066.1	615.7**	943.0***	1182.2	1515.7*	456.2
	(745.2)	(275.5)	(197.2)	(1196.5)	(793.3)	(351.2)
Constant	605.1	1068.6**	751.7**	1633.2	1223.8	2879.1***
	(1437.0)	(531.2)	(377.9)	(2280.5)	(1541.7)	(686.1)
N	300	304	299	295	290	293

Estimation results of equation 1; age categories based on years (reference: younger than 30 years); education indicates if respondent has at least primary education; recently sought care indicates whether respondent sought IPD care within past year and/or OPD care within past month; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 14 Heterogeneities in cost uncertainty for primary facilities

	Public primary			Private Primary		
Cost uncertainty	Heart disease	Belly pain	Light fever	Heart disease	Belly pain	Light fever
Age <=30	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Age 31-60	13.70	15.56	18.13	-30.71	26.54	9.879
	(19.89)	(15.71)	(13.10)	(65.87)	(64.74)	(27.77)
Age >60	24.86	15.63	16.32	-7.675	63.49	16.02
	(21.98)	(17.46)	(14.59)	(72.19)	(71.49)	(30.73)
Female	9.030	9.410	20.51**	-102.4**	-121.1***	-35.68*
	(12.25)	(10.14)	(8.648)	(41.30)	(41.90)	(18.27)
Educated	3.288	23.37**	11.04	-21.65	48.08	26.39
	(11.73)	(9.902)	(8.262)	(40.69)	(41.09)	(17.86)
Sought care recently	1.807	-1.622	-7.456	164.3***	100.4*	54.21**
	(14.59)	(12.51)	(10.47)	(51.65)	(52.78)	(23.02)
Chitral	9.648	24.61**	5.043	144.1***	173.9***	69.02***
	(13.94)	(11.41)	(9.621)	(45.43)	(46.36)	(20.20)
Kohat	-2.695	-2.364	-30.05**	146.3**	107.6*	33.50
	(17.90)	(14.98)	(12.71)	(61.43)	(61.28)	(26.70)
Malakand	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Mardan	22.40	11.00	-6.618	17.77	63.59	45.03**
	(14.87)	(11.72)	(9.929)	(46.69)	(47.62)	(20.62)
Constant	76.61***	58.79***	58.12***	124.9	57.30	65.57*
	(27.37)	(21.59)	(18.06)	(90.34)	(89.92)	(38.75)
N	266	279	275	288	291	293

Estimation results of equation 1; age categories based on years (reference: younger than 30 years); education indicates if respondent has at least primary education; recently sought care indicates whether respondent sought IPD care within past year and/or OPD care within past month; standard errors in parentheses; * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Table A 15 Heterogeneities in financial uncertainties for secondary facilities

	Public Secondary			Private Secondary		
Cost uncertainty	Heart disease	Belly pain	Light fever	Heart disease	Belly pain	Light fever
Age <=30	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Age 31-60	14.34	25.38	8.516	-134.5	80.19	-90.02**
	(110.0)	(32.86)	(16.81)	(207.2)	(107.1)	(35.78)
Age >60	6.013	42.01	-2.446	-123.3	95.95	-92.80**
	(121.7)	(36.31)	(18.61)	(228.3)	(118.3)	(39.36)
Female	66.21	-66.25***	-1.417	1.275	-204.4***	-59.28***
	(71.36)	(21.28)	(10.92)	(134.2)	(67.20)	(22.38)
Educated	104.3	-11.76	9.061	145.3	121.5*	-1.722
	(71.16)	(21.14)	(10.84)	(132.9)	(67.44)	(22.24)
Sought care recently	90.46	91.74***	-0.252	435.5**	156.8*	7.838
	(93.10)	(27.75)	(14.33)	(174.2)	(86.48)	(29.56)
Chitral	422.7***	49.58**	14.88	941.2***	151.4**	-7.127
	(79.98)	(23.73)	(12.22)	(150.3)	(75.13)	(24.97)
Kohat	79.18	73.36**	13.75	292.2	102.8	18.15
	(108.5)	(31.63)	(16.25)	(201.1)	(98.75)	(34.16)
Malakand	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
Mardan	50.50	23.74	31.66**	27.32	41.43	-27.38
	(80.12)	(23.93)	(12.36)	(151.5)	(76.14)	(25.45)
Constant	11.60	80.31*	109.0***	42.65	195.6	343.1***
	(154.5)	(46.14)	(23.68)	(288.8)	(148.0)	(49.71)
N	300	304	299	295	290	293

Estimation results of equation 1; age categories based on years (reference: younger than 30 years); education indicates if respondent has at least primary education; recently sought care indicates whether respondent sought IPD care within past year and/or OPD care within past month; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 16 Heterogeneities in medical uncertainty for primary facilities

	Public Primary			Private Primary		
Medical Uncertainty	Heart disease	Belly pain	Light fever	Heart disease	Belly pain	Light fever
Any Visit Public Primary	-0.398	-0.645	0.0617			
	(0.695)	(0.710)	(0.714)			
Any Visit Private Primary				-0.169	-0.202	0.296
				(0.298)	(0.309)	(0.307)
Constant	4.698***	4.736***	4.838***	4.769***	4.873***	4.799***
	(0.135)	(0.142)	(0.136)	(0.140)	(0.147)	(0.143)
N	265	276	276	294	296	292

standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 17 Heterogeneities in medical uncertainty for secondary facilities

	Public Secondary			Private Secondary		
Medical Uncertainty	Heart disease	Belly pain	Light fever	Heart disease	Belly pain	Light fever
Any Visit Public Secondary	-0.262	-0.259	-0.307			
	(0.282)	(0.271)	(0.255)			
Any Visit Private Secondary				-1.428***	-1.525***	-1.283***
				(0.464)	(0.434)	(0.447)
Constant	4.698***	4.736***	4.838***	5.108***	5.025***	4.883***
	(0.135)	(0.142)	(0.136)	(0.135)	(0.127)	(0.130)
N	295	299	298	294	301	298

standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 18 Heterogeneities in cost uncertainty for primary facilities

	Public Primary			Private Primary		
Cost uncertainty	Heart disease	Belly pain	Light fever	Heart disease	Belly pain	Light fever
Any Visit Public Primary	6.729	15.21	49.53***			
	(24.87)	(20.82)	(18.09)			
Any Visit Private Primary				6.347	21.74	21.76
				(40.65)	(42.36)	(18.03)
Constant	107.2***	92.71***	71.04***	282.2***	246.3***	157.4***
	(4.813)	(4.126)	(3.444)	(19.39)	(19.80)	(8.477)
N	267	280	276	290	293	294

standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 19 Heterogeneities in cost uncertainty for secondary facilities

	Public Secondary			Private Secondary		
Cost uncertainty	Heart disease	Belly pain	Light fever	Heart disease	Belly pain	Light fever
Any Visit Public Secondary	-115.8*	-1.865	-16.31*			
	(64.89)	(19.17)	(9.435)			
Any Visit Private Secondary				-40.27	-245.9**	-62.80*
				(209.8)	(103.2)	(32.28)
Constant	353.8***	197.2***	136.1***	718.1***	481.9***	245.7***
	(36.01)	(10.79)	(5.356)	(60.97)	(29.01)	(9.600)
N	302	306	301	296	291	294

standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 20 Prediction of health care choice by recent visits for heart disease

	(1) Public Primary	(2) Private Primary	(3) Public Secondary	(4) Private Secondary
Any Visit Public Primary	0	-0.160	-0.0433	0.230
	(.)	(0.465)	(0.403)	(0.553)
Any Visit Private Primary	-0.283	0.377*	-0.285	-0.0696
	(0.445)	(0.195)	(0.181)	(0.277)
Any Visit Public Secondary	-0.499	-0.410**	0.343**	-0.0543
	(0.421)	(0.194)	(0.167)	(0.245)
Any Visit Private Secondary	0	0.249	-0.274	0.119
	(.)	(0.293)	(0.266)	(0.387)
Constant	-1.689***	-0.879***	0.452***	-1.503***
	(0.172)	(0.110)	(0.0991)	(0.147)
N	271	308	308	308

Estimation results of equation 2; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 21 Prediction of health care choice by recent visits for belly pain

	(1) Public Primary	(2) Private Primary	(3) Public Secondary	(4) Private Secondary
Any Visit Public Primary	0.356	0.00352	-0.0498	0.388
	(0.577)	(0.423)	(0.393)	(0.588)
Any Visit Private Primary	-0.417	0.318*	-0.238	0.343
	(0.338)	(0.188)	(0.177)	(0.316)
Any Visit Public Secondary	0.0647	-0.426**	0.300*	-0.253
	(0.252)	(0.183)	(0.160)	(0.332)
Any Visit Private Secondary	-0.230	-0.0746	-0.0154	0.104
	(0.485)	(0.301)	(0.264)	(0.506)
Constant	-1.516***	-0.666***	0.203**	-1.905***
	(0.149)	(0.103)	(0.0959)	(0.194)
N	308	308	308	308

Estimation results of equation 2; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 22 Prediction of health care choice by recent visits for light fever

	(1) Public Primary	(2) Private Primary	(3) Public Secondary	(4) Private Secondary
Any Visit Public Primary	-0.165	-0.474	0.262	0.920
	(0.558)	(0.487)	(0.412)	(0.700)
Any Visit Private Primary	-0.258	0.691***	-0.671***	0.661
	(0.243)	(0.189)	(0.196)	(0.528)
Any Visit Public Secondary	-0.143	-0.411**	0.0899	0
	(0.207)	(0.190)	(0.160)	(.)
Any Visit Private Secondary	-0.644	-0.0137	0.335	0
	(0.467)	(0.303)	(0.264)	(.)
Constant	-0.994***	-0.838***	-0.233**	-2.521***
	(0.117)	(0.108)	(0.0966)	(0.357)
N	308	308	308	199

Estimation results of equation 3; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 23 Prediction of health care choice by number of recent OPD visits for heart disease

	(1) Public Primary	(2) Private Primary	(3) Public Secondary	(4) Private Secondary
Number OPD visits to Public Primary	0	0.253	-0.240	0.0622
	(.)	(0.191)	(0.186)	(0.240)
Number OPD visits to Private Primary	-0.260	0.137**	-0.112*	-0.00743
	(0.322)	(0.0656)	(0.0616)	(0.0926)
Number OPD visits to Public Secondary	-0.308	-0.230**	0.106*	0.0386
	(0.295)	(0.0904)	(0.0627)	(0.0920)
Number OPD visits to Private Secondary	0	0.0633	-0.0411	0
	(.)	(0.149)	(0.123)	(.)
Constant	-1.689***	-0.868***	0.477***	-1.517***
	(0.164)	(0.0989)	(0.0881)	(0.133)
N	270	302	302	280

Estimation results of equation 3; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 24 Prediction of health care choice by number of recent OPD visits for belly pain

	(1) Public Primary	(2) Private Primary	(3) Public Secondary	(4) Private Secondary
Number OPD visits to Public Primary	0.118	0.113	-0.0483	0.0717
	(0.232)	(0.179)	(0.170)	(0.291)
Number OPD visits to Private Primary	-0.221	0.132**	-0.0813	0.0343
	(0.194)	(0.0639)	(0.0604)	(0.102)
Number OPD visits to Public Secondary	0.0130	-0.208***	0.0748	-0.0110
	(0.0957)	(0.0804)	(0.0584)	(0.112)
Number OPD visits to Private Secondary	-0.0540	-0.00484	0.0442	-0.0361
	(0.222)	(0.158)	(0.130)	(0.274)
Constant	-1.504***	-0.690***	0.232***	-1.849***
	(0.136)	(0.0935)	(0.0855)	(0.166)
N	302	302	302	302

Estimation results of equation 3; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 25 Prediction of health care choice by number of recent OPD visits for light fever

	(1) Public Primary	(2) Private Primary	(3) Public Secondary	(4) Private Secondary
Number OPD visits to Public Primary	0	-0.0219	0.0913	0.272
	(.)	(0.211)	(0.176)	(0.283)
Number OPD visits to Private Primary	-0.0547	0.203***	-0.134*	0.121
	(0.0839)	(0.0681)	(0.0698)	(0.110)
Number OPD visits to Public Secondary	-0.0771	-0.257***	-0.00699	0
	(0.0884)	(0.0938)	(0.0592)	(.)
Number OPD visits to Private Secondary	-0.164	-0.0624	0.216	0
	(0.259)	(0.201)	(0.143)	(.)
Constant	-1.015***	-0.780***	-0.268***	-2.329***
	(0.105)	(0.0969)	(0.0859)	(0.266)
N	292	302	302	214

Estimation results of equation 3; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A26 Regression analysis decision heart disease scenario with individual coefficients

	(1) Public Secondary	(2) Public Secondary	(3) Public Secondary	(4) Public Secondary	(5) Public Secondary	(6) Public Secondary
Prob pub sec	0.0851				0.0795	0.0458
	(0.0573)				(0.0620)	(0.0637)
Prob priv prim	-0.142**				-0.137**	-0.143**
	(0.0561)				(0.0633)	(0.0631)
Log costs pub sec		-0.0215			0.0285	0.421*
		(0.121)			(0.132)	(0.231)
Log costs priv prim		0.314**			0.281*	0.252
		(0.136)			(0.146)	(0.246)
Prob uncertainty pub sec			-0.117*			-0.161**
			(0.0651)			(0.0711)
Prob uncertainty priv prim			0.113			0.123
			(0.0701)			(0.0773)
Log cost uncertainty pub sec				-0.142		-0.415**
				(0.107)		(0.192)
Log cost uncertainty priv prim				0.171		0.0323
				(0.113)		(0.202)
Constant	1.124***	-1.641	0.875***	0.531	-1.383	-1.730
	(0.424)	(1.025)	(0.256)	(0.633)	(1.114)	(1.150)
N	247	242	246	241	232	231

Estimation results of equation 4; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A27 Regression analysis decision belly pain disease scenario

	(1) Public Secondary	(2) Public Secondary	(3) Public Secondary	(4) Public Secondary	(5) Public Secondary	(6) Public Secondary
ΔProb	0.0888**				0.0847*	0.0807
	(0.0400)				(0.0503)	(0.0520)
ΔLog costs		-0.271			-0.276	-0.201
		(0.168)			(0.180)	(0.208)
ΔProb uncertainty			-0.00432			-0.0153
			(0.0527)			(0.0558)
ΔLog cost uncertainty				-0.192*		-0.101
				(0.116)		(0.143)
Constant	0.515***	0.470***	0.534***	0.496***	0.462***	0.466***
	(0.0862)	(0.0908)	(0.0873)	(0.0870)	(0.0936)	(0.0951)
N	239	235	239	235	226	226

Estimation results of equation 5; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A28 Regression analysis decision belly pain scenario with individual coefficients

	(1) Public Secondary	(2) Public Secondary	(3) Public Secondary	(4) Public Secondary	(5) Public Secondary	(6) Public Secondary
Prob pub sec	0.0646				0.101	0.0712
	(0.0541)				(0.0671)	(0.0693)
Prob priv prim	-0.107**				-0.161**	-0.158**
	(0.0485)				(0.0669)	(0.0663)
Log costs pub sec		0.240			0.237	0.357
		(0.193)			(0.206)	(0.242)
Log costs priv prim		0.658***			0.739***	0.936***
		(0.190)			(0.212)	(0.281)
Prob uncertainty pub sec			-0.0373			-0.0602
			(0.0566)			(0.0638)
Prob uncertainty priv prim			-0.0349			-0.0464
			(0.0585)			(0.0736)
Log cost uncertainty pub sec				0.0601		-0.0787
				(0.139)		(0.182)
Log cost uncertainty priv prim				0.365***		-0.214
				(0.130)		(0.201)
Constant	0.784*	-6.522***	0.909***	-1.653**	-6.757***	-6.997***
	(0.414)	(1.229)	(0.256)	(0.654)	(1.315)	(1.363)
N	239	235	239	235	226	226

Estimation results of equation 4; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 29 Probability to get better: Information seekers vs. not

	Day 1		Day 2	
	No Info	Info	No Info	Info
Public primary heart disease	0.33	0.35	0.34	0.36
	(0.21)	(0.19)	(0.18)	(0.20)
Public primary belly pain	0.37	0.35	0.38	0.37
	(0.21)	(0.20)	(0.19)	(0.20)
Public primary light fever	0.48	0.42**	0.48	0.43**
	(0.19)	(0.21)	(0.18)	(0.20)
Private primary heart disease	0.61	0.55***	0.63	0.57**
	(0.17)	(0.21)	(0.16)	(0.20)
Private primary belly pain	0.65	0.59**	0.66	0.57***
	(0.17)	(0.22)	(0.19)	(0.23)
Private primary light fever	0.67	0.61***	0.69	0.60***
	(0.17)	(0.21)	(0.18)	(0.24)
Public secondary heart disease	0.64	0.59**	0.66	0.61***
	(0.16)	(0.16)	(0.16)	(0.16)
Public secondary belly pain	0.68	0.62***	0.69	0.63***
	(0.16)	(0.18)	(0.16)	(0.17)
Public secondary light fever	0.71	0.63***	0.70	0.64***
	(0.16)	(0.18)	(0.16)	(0.17)
Private secondary heart disease	0.73	0.70	0.75	0.72*
	(0.17)	(0.20)	(0.15)	(0.18)
Private secondary belly pain	0.76	0.72**	0.77	0.72**
	(0.17)	(0.18)	(0.17)	(0.19)
Private secondary light fever	0.77	0.71**	0.77	0.72**
	(0.16)	(0.20)	(0.17)	(0.19)
N	141	167	141	167

Results of two sample t-test; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 30 Medical uncertainty: Information seekers vs. not

	Day 1		Day 2	
	No Info	Info	No Info	Info
Public primary heart disease	0.46	0.48	0.48	0.46
	(0.23)	(0.22)	(0.21)	(0.22)
Public primary belly pain	0.46	0.44	0.49	0.46
	(0.24)	(0.24)	(0.24)	(0.22)
Public primary light fever	0.50	0.44**	0.50	0.47
	(0.21)	(0.24)	(0.22)	(0.22)
Private primary heart disease	0.51	0.45**	0.49	0.45*
	(0.20)	(0.22)	(0.21)	(0.21)
Private primary belly pain	0.49	0.46	0.51	0.46**
	(0.20)	(0.23)	(0.21)	(0.23)
Private primary light fever	0.49	0.45*	0.52	0.46**
	(0.18)	(0.21)	(0.20)	(0.22)
Public secondary heart disease	0.54	0.46***	0.56	0.49***
	(0.21)	(0.22)	(0.21)	(0.23)
Public secondary belly pain	0.52	0.48*	0.52	0.49
	(0.20)	(0.23)	(0.21)	(0.22)
Public secondary light fever	0.51	0.47*	0.51	0.47*
	(0.19)	(0.23)	(0.18)	(0.23)
Private secondary heart disease	0.51	0.47	0.53	0.47**
	(0.19)	(0.24)	(0.20)	(0.24)
Private secondary belly pain	0.49	0.47	0.50	0.48
	(0.18)	(0.24)	(0.19)	(0.24)
Private secondary light fever	0.49	0.46	0.48	0.47
	(0.19)	(0.24)	(0.18)	(0.25)
N	141	167	141	167

Results of two sample t-test; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 31 Expected costs: Information seekers vs. not

	Day 1		Day 2	
	No Info	Info	No Info	Info
Public primary heart disease	1,619.41	1,920.25	1,730.04	1,419.60**
	(1,219.45)	(2,882.87)	(1,219.03)	(1,161.78)
Public primary belly pain	1,450.90	1,334.14	1,560.79	1,284.12**
	(1,164.28)	(1,582.46)	(1,196.59)	(1,068.14)
Public primary light fever	1,184.31	1,038.84	1,224.45	947.64**
	(920.86)	(973.98)	(984.88)	(800.15)
Private primary heart disease	4,260.62	3,983.11	4,712.86	3,516.04***
	(3,151.40)	(4,028.99)	(3,696.14)	(3,314.03)
Private primary belly pain	3,781.36	3,437.81	4,287.85	3,065.51***
	(2,652.01)	(3,289.59)	(3,583.91)	(2,713.79)
Private primary light fever	2,607.89	2,433.97	2,875.64	2,394.15**
	(1,483.92)	(1,776.69)	(2,024.98)	(1,641.84)
Public secondary heart disease	3,706.44	3,928.26	3,493.38	4,817.25**
	(2,871.62)	(5,361.59)	(2,633.92)	(6,378.41)
Public secondary belly pain	2,894.55	2,697.76	3,236.79	2,637.85***
	(1,716.48)	(2,501.09)	(2,084.04)	(1,789.48)
Public secondary light fever	2,263.99	1,920.72**	2,431.50	1,907.34***
	(1,245.38)	(1,363.18)	(1,467.25)	(1,163.97)
Private secondary heart disease	9,365.46	8,976.57	8,969.60	9,231.70
	(9,005.84)	(8,943.37)	(6,944.22)	(9,523.17)
Private secondary belly pain	7,226.33	6,618.09	8,229.16	6,041.00***
	(5,636.51)	(5,412.35)	(6,058.78)	(4,782.50)
Private secondary light fever	4,114.33	3,798.48	4,322.75	3,821.00*
	(2,142.95)	(2,310.31)	(2,438.69)	(2,006.36)
N	141	167	141	167

Results of two sample t-test (in PKR); standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 32 Balance table information seekers vs. not

	No Info	Info	p-value of t-statistic
Age of respondent	53.23	52.71	0.75
	(15.56)	(13.31)	
Respondent female	0.34	0.27	0.16
	(0.47)	(0.44)	
Respondent educated	0.28	0.34	0.21
	(0.45)	(0.48)	
Money decision-maker	0.68	0.73	0.32
	(0.47)	(0.44)	
Number of household members	7.27	6.27***	0.00
	(3.36)	(2.57)	
Monthly household expenditure	45,779.79	42,954.40	0.23
	(21,747.32)	(19,141.05)	
N	142	166	

Results of two sample t-test; standard errors in parentheses; * p < 0.1, ** p < 0.05, *** p < 0.01

Table A 33 Correlation between cost expectations for bi-triangular and log-normal distributions

	Mean cost day 1	N	Mean cost day 2	N	Fin Unc day 1	N	Fin Unc day 2	N
Heart Disease Public Primary	0.9998***	262	0.9999***	267	0.9645***	262	0.9689***	267
Heart Disease Private Primary	0.9999***	282	0.9998***	289	0.9738***	282	0.9753***	289
Heart Disease Public Secondary	0.9998***	300	0.9998***	302	0.9639***	300	0.9663***	302
Heart Disease Private Secondary	0.9997***	288	0.9999***	296	0.9858***	288	0.9860***	296
Belly Pain Public Primary	0.9999***	279	0.9998***	280	0.9564***	279	0.9378***	280
Belly Pain Private Primary	0.9998***	286	0.9999***	293	0.9751***	286	0.9713***	293
Belly Pain Public Secondary	0.9998***	299	0.9999***	306	0.9514***	299	0.9384***	306
Belly Pain Private Secondary	0.9998***	297	0.9998***	291	0.9753***	297	0.9794***	291
Light Fever Public Primary	0.9796***	270	0.9999***	276	0.9661***	270	0.9642***	276
Light Fever Private Primary	0.9998***	279	0.9999***	292	0.9633***	279	0.9670***	292
Light Fever Public Secondary	0.9998***	296	0.9999***	301	0.9290***	296	0.9237***	301
Light Fever Private Secondary	0.9997***	291	0.9998***	293	0.9647***	291	0.9682***	293

Spearman's correlation coefficients between the same variables for bi-triangular vs. lognormal cost distribution;
* p < 0.1, ** p < 0.05, *** p < 0.01

Table A 34 Choice of public secondary over a private primary facility in the heart disease scenario with costs assumed to be log-normally distributed

	(1) Public secondary	(2) Public secondary	(3) Public secondary	(4) Public secondary	(5) Public secondary	(6) Public secondary
ΔProb	0.115**				0.114**	0.0952*
	(0.0456)				(0.0501)	(0.0501)
ΔLog costs		0.0302			-0.0507	0.239
		(0.0674)			(0.0960)	(0.201)
ΔProb uncertainty			-0.116*			-0.127*
			(0.0632)			(0.0651)
ΔLog cost uncertainty				-0.202**		-0.347**
				(0.0928)		(0.160)
Constant	0.770***	0.725***	0.850***	0.668***	0.735***	0.777***
	(0.0904)	(0.0877)	(0.100)	(0.0903)	(0.0917)	(0.105)
N	247	248	246	241	235	231

Results from Probit regression of equation 5; standard errors in parentheses; * p<0.1, **p<0.05, *** p<0.01

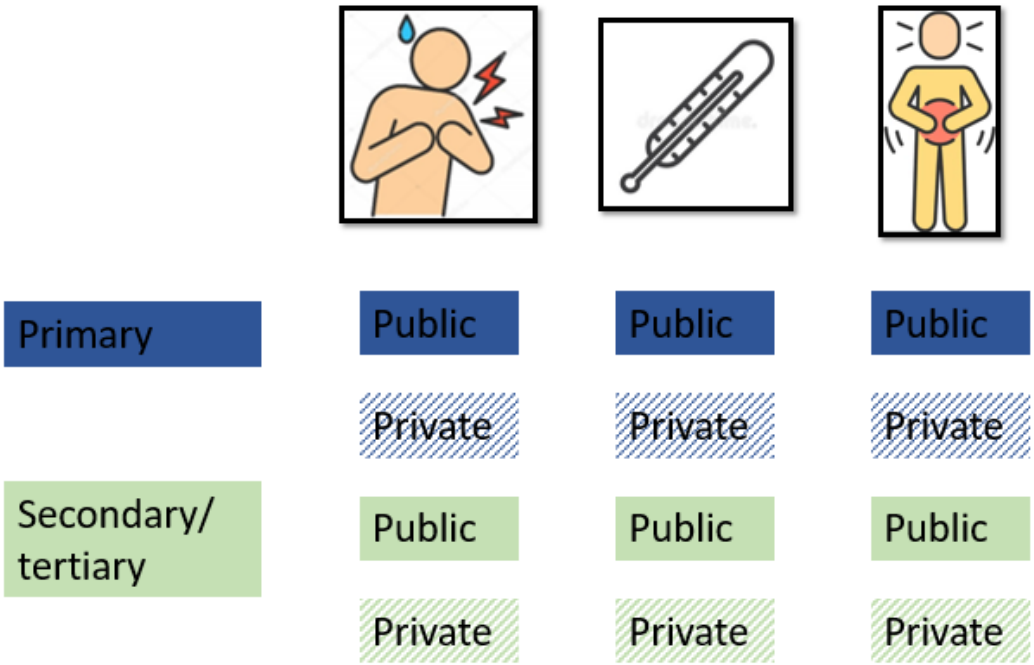
Table A 35 Choice of public secondary over a private primary facility in the heart disease scenario with absolute spread as cost uncertainty

	(1) Public secondary	(2) Public secondary	(3) Public secondary	(4) Public secondary	(5) Public secondary	(6) Public secondary
ΔProb	0.115**				0.106**	0.0964*
	(0.0456)				(0.0504)	(0.0500)
ΔLog costs		-0.135			-0.0994	0.120
		(0.110)			(0.119)	(0.203)
ΔProb uncertainty			-0.116*			-0.124*
			(0.0632)			(0.0649)
ΔLog cost Uncertainty				-0.163*		-0.225
				(0.0918)		(0.161)
Constant	0.770***	0.694***	0.850***	0.693***	0.723***	0.787***
	(0.0904)	(0.0891)	(0.100)	(0.0893)	(0.0928)	(0.104)
N	247	242	246	246	232	231

Results from Probit regression of equation 5; cost uncertainty measured as absolute spread between minimum and maximum expected costs; standard errors in parentheses; * p<0.1, **p<0.05, *** p<0.01

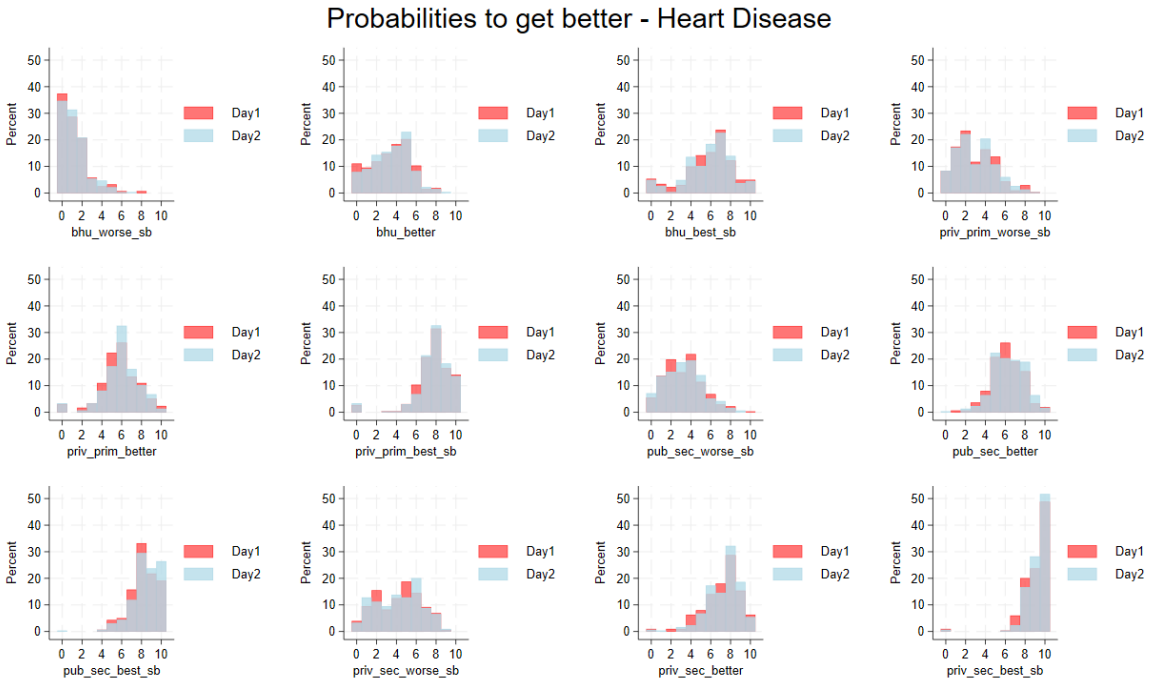
A2. Additional figures

Figure A 1: Scenario-Facility-Combinations



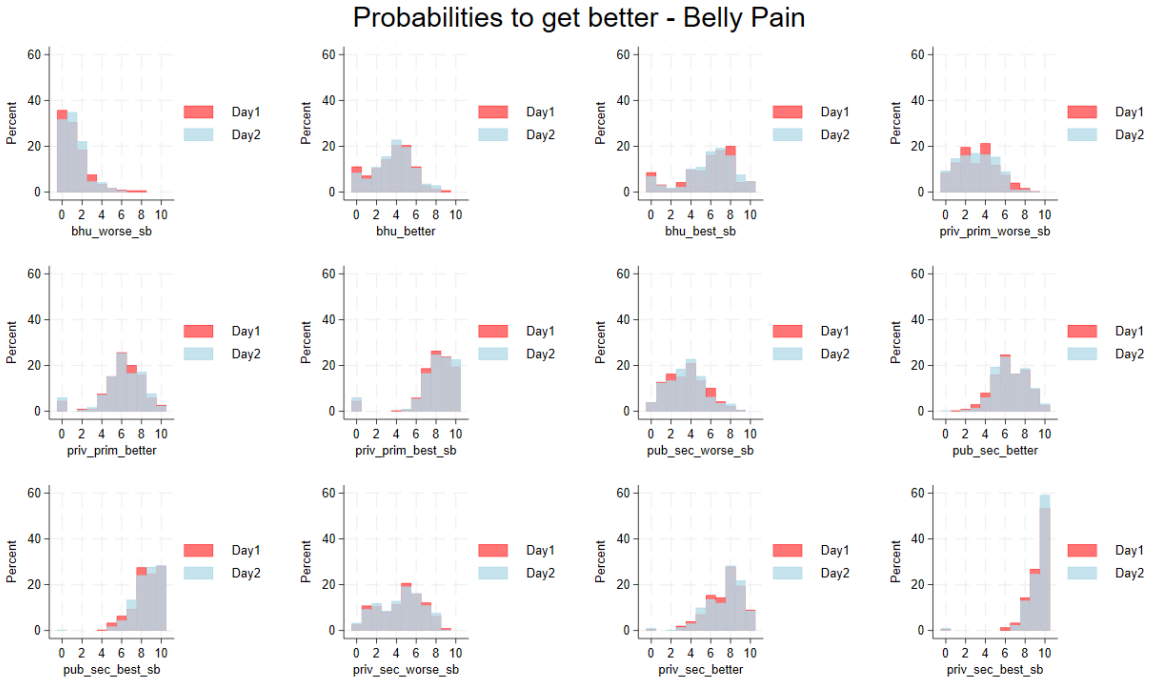
Graphical overview of all 12 scenario-facility-combinations in a 3x4-matrix; health scenarios: heart disease, light fever, belly pain; health facility categories: primary and secondary public and higher-level health providers

Figure A 2: Bunching around focal responses for probabilities to get better (heart disease)



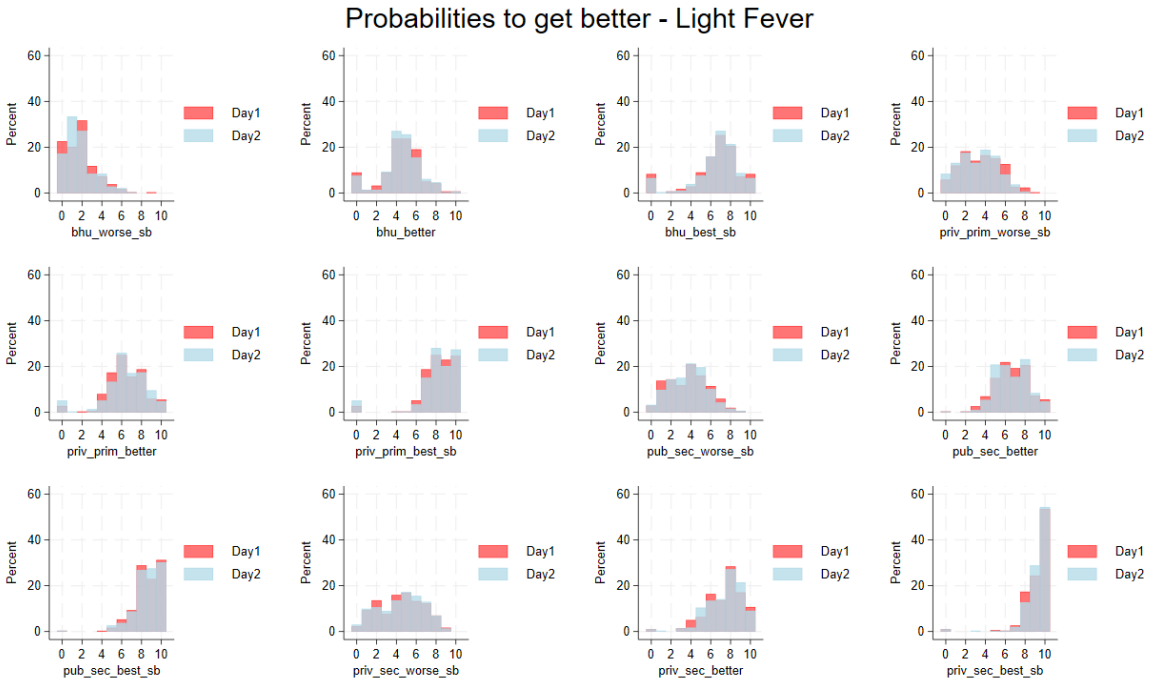
Probability density plots of probability to get better; day 1 results in red, day 2 results in grey

Figure A 3: Bunching around focal responses for probabilities to get better (belly pain)



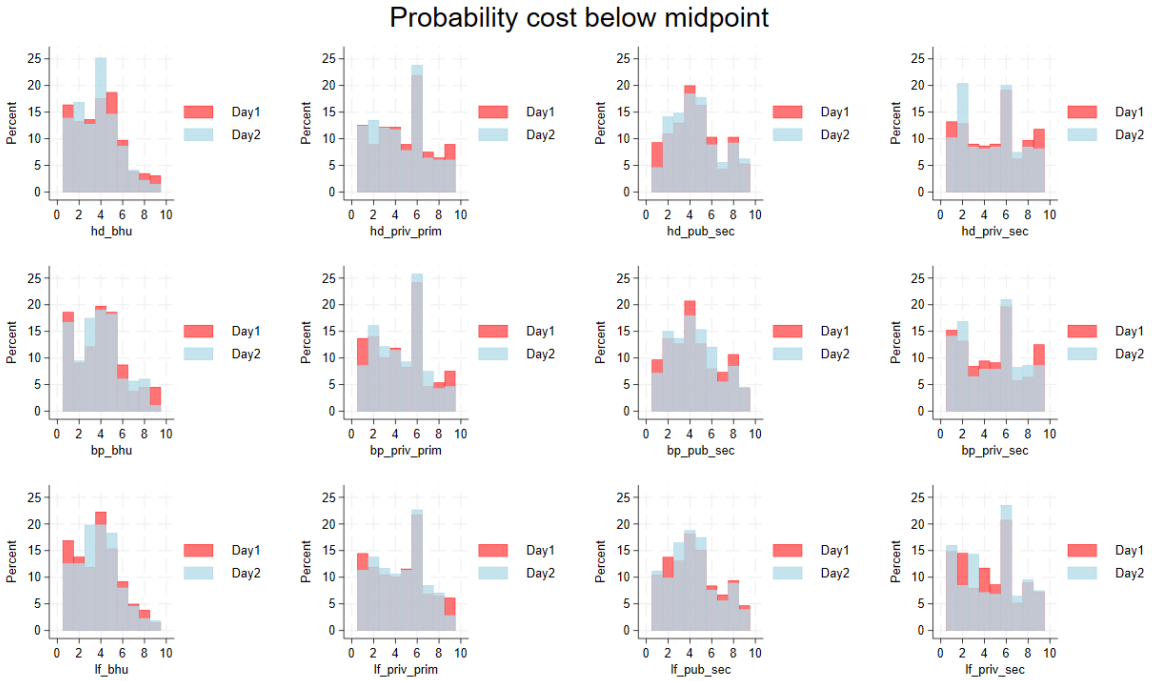
Probability density plots of probability to get better; day 1 results in red, day 2 results in grey

Figure A 4: Bunching around focal responses for probabilities to get better (light fever)



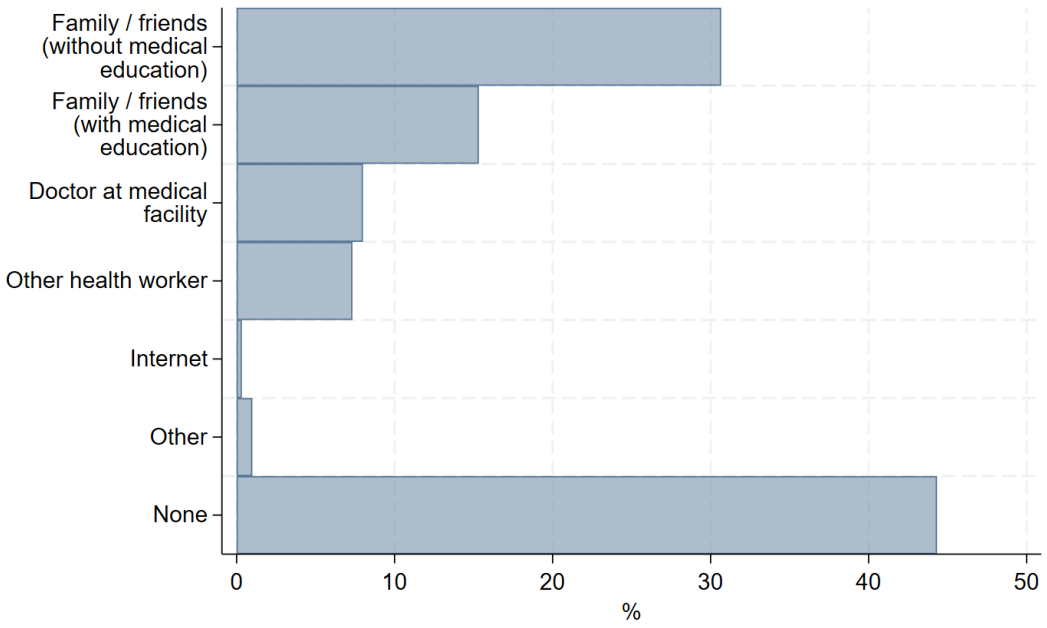
Probability density plots of probability to get better; day 1 results in red, day 2 results in grey

Figure A 5: Bunching around focal responses for probabilities cost below midpoint



Probability density plots of probability that costs are below midpoint; day 1 results in red, day 2 results in grey

Figure A 6: Sources of information seeking on health scenarios

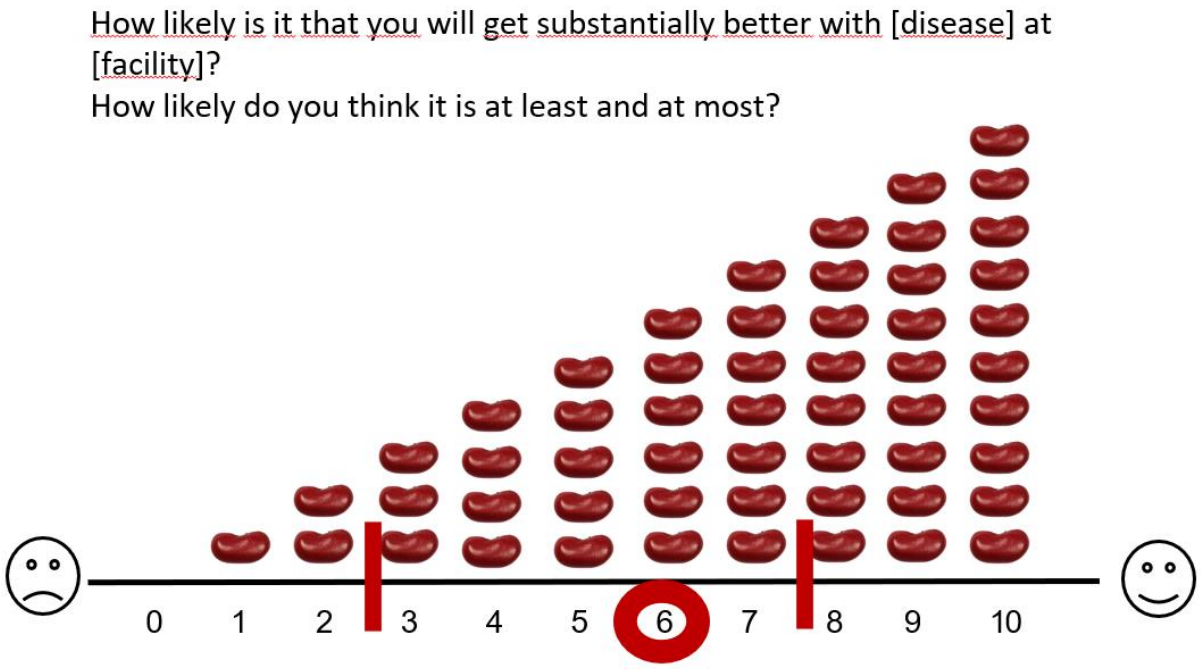


Reported information-seeking sources in percent; multiple information-seeking sources possible

Figure A 7: Example of visualizations for adapted health care seeking options (district Swabi)

Local language: Pashto (in Roman writing)

Figure A 8: Adapted visual aids for eliciting medical uncertainty (in English)



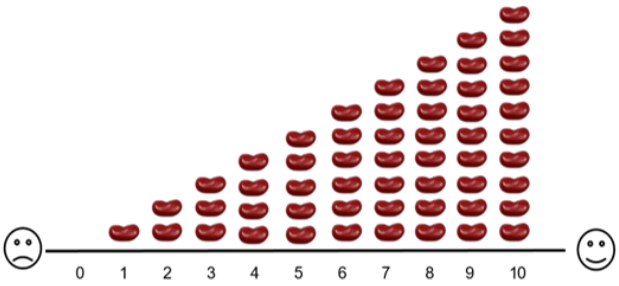
Illustrative example for expected probability to get better is 60%, minimum expected probability is 30% and maximum expected probability 80%; enumerators marked respondent answers in a booklet with erasable pen

Figure A 9: Example of adapted visual aids for heart disease scenario at public secondary facility (in Pashto)

Kafi had pory behtari razi:

1: da sehat pa manzr nammay pa de sahoolati markaz k stasu da sehat kafi had pora da kha kidu sumra imkan da.

2: Stasu pa khayal kam az kam o zyat na zyat suna imkan de.



kharcha

Pa de haspatal ke aw da sehat da manzarnama ye nu stasu pa khyal kam az kam aw zyat na zyat ba pe sumra kharcha razi?

Kam na kam	Zeyat na zeyat

Stasu pa khyal k da dy khabari sumra emkan dy che kharcha ba da kam az kam aw zyat na zyat pa darmeyan k mandarajzil point na ba kama we?

kam	zeyat

A3. Simulation: Deriving hypotheses for the empirical analysis

We simulate choices made during our vignette experiment to predict choices and derive hypotheses about the influence of cost and probability uncertainty. We focus on the "heart disease" scenario, which we also study in our empirical analysis. Table A 36 shows the parameters used for simulating choices under the heart disease scenario, reflecting the empirically elicited numbers as much as possible in the initial scenario. To derive hypothesis about the influence of cost and probability uncertainty, we successively increase the spread of possible costs and probabilities for one of the provider choices (public secondary facilities).

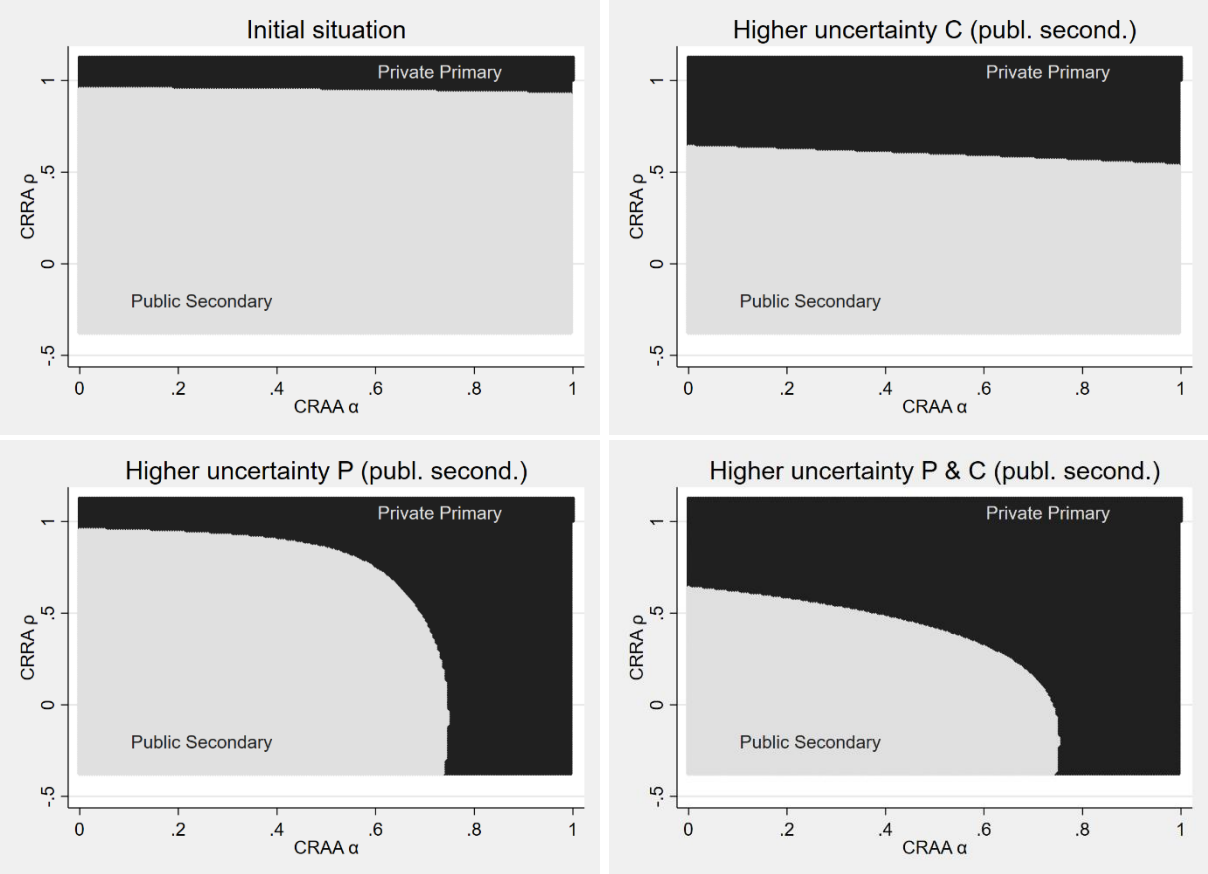
Table A 36 Parameters for simulation of heart disease scenario

	Private primary (k=1)	Public secondary (k=2)
h_{bad}, h_{good}	$4750, 24750$	$4750, 24750$
$E_\gamma[p(\gamma)]$	0.596	0.634
$E_\gamma[c(\gamma)]$	4073	4217
		Initial scenario:
γ_1	$p = 0.496, c = 3873$	$p = 0.484, c = 3917$
γ_2	$p = 0.496, c = 4273$	$p = 0.484, c = 4517$
γ_3	$p = 0.696, c = 3873$	$p = 0.784, c = 3917$
γ_4	$p = 0.696, c = 4273$	$p = 0.784, c = 4517$
		High uncertainty $p(\gamma)$:
		$p = 0.384, c = 3917$
		$p = 0.384, c = 4517$
		$p = 0.884, c = 3917$
		$p = 0.884, c = 4517$
		High uncertainty $c(\gamma)$:
		$p = 0.484, c = 3717$
		$p = 0.484, c = 4717$
		$p = 0.784, c = 3717$
		$p = 0.784, c = 4717$
		High uncertainty $p(\gamma), c(\gamma)$:
		$p = 0.384, c = 3717$
		$p = 0.384, c = 4717$
		$p = 0.884, c = 3717$
		$p = 0.884, c = 4717$

Note: Expected costs and probabilities are sample average responses from the heart disease scenario from our first application of the measurement tool. The ranges of possible costs and probabilities in the initial scenario reflect that we elicited both cost and probability uncertainty to be slightly higher in public secondary facilities.

Figure A 10 shows the ranges of risk and ambiguity aversion under which each of the providers is preferred. It is clearly visible that higher uncertainty in both cost and probability of the public secondary provider reduces the range of risk and ambiguity averse individuals choosing this option.

Figure A 10 Simulated choices in the heart disease scenario



A4. Survey tool description

a. Script Introduction (Day 1 & 2)

Except for instructions in […], all text is read to the respondent by the enumerator.

I would like to tell you about some health problems and am interested about your thoughts around it. They are health problems that your household might have experienced in the past or, God forbid, might potentially experience in the future. Try to imagine that the described situation would occur to you/ your household (even if it never has).

We will start with a practice round and you can ask me questions if anything is unclear to you anytime.

[Instruction: Take time to do the practice round [scenario Z] and explain the concepts to the respondent carefully. Only move on to the real first scenario when you are sure that the respondent understands the concept and questions. Practice a second time if necessary.]

b. Script for practice round (Day 1 & 2)

[Instruction: Read and show material.]

> I will now ask you several questions about the chance or likelihood that certain events are going to happen. There are 10 beans in the cup. I would like you to choose some beans out of these 10 beans and put them on the green and red fields to express what you think the likelihood or chance is of a specific event happening.

- One bean represents the chance of 1 out of 10.
- Zero beans on the green field and 10 on the red one means that you think you will not get substantially better FOR SURE.
- 1-2 beans on the green field mean that you could get substantially better but it is not very likely.
- 5 beans on each field means that it is just as likely that you get substantially better or not.
- 6 beans on the green field mean that it is slightly more likely that you get substantially better compared to not.
- 10 beans on the green field means you are sure to get substantially better.

Now imagine, God forbid, that…

You are at home, carrying some heavy and bulky bags when you suddenly slip and fall down the stairs/ladder. You have injured your leg and you are feeling severe pain in your right lower leg. You are trying to get up, but you cannot put weight on your leg or walk properly such that other household members have to help you getting up and carry you to a seat. The affected part of your leg is swelling you notice that the leg is slightly bent.

0.1.1. How likely is it overall that you will get substantially better when you go to [public primary care facility (rural health center, BHU)] for medical advice with [leg injury]?

[Instruction: remind the respondent again what the fields represent i.e. going to [public primary care facility (rural health center, BHU)] for medical advice in the described situation will lead to him/her getting substantially better versus not.]

_____[integer number, Check: number between 0 and 10, 99, 88]
[Instruction: Write down number of beans on green field]

0.1.2. In the worst thinkable case, how likely is it that you will get substantially better when you go to [public primary care facility (rural health center, BHU)] for medical advice with [leg injury]?
_____[integer number, Check: number between 0 and 10, 99, 88]
[Instruction: Write down number of beans on green field]

0.1.3. In the best thinkable case, how likely is it that you will get substantially better when you go to [public primary care facility (rural health center, BHU)] for medical advice with [leg injury]?
_____[integer number, Check: number between 0 and 10, 99, 88]
[Instruction: Write down number of beans on green field]

0.1.4. How much will the minimum costs of seeking medical advice with [leg injury] at [public primary care facility (rural health center, BHU)] be?
_____ PKR [integer numbers, Check: >0 &<900,000, 99, 88]

0.1.5. How much will the maximum costs of seeking medical advice with [leg injury] at [public primary care facility (rural health center, BHU)] be?
_____PKR [integer numbers, Check: >0 &<900,000, 99, 88]

[Tablet: Calculate Midpoint M between 0.1.4 & 0.1.5 and display as [M] in the following]

[Instruction: provide again the cup with 10 beans and point to the right part of the playboard]

[Instruction: Read]

Soon I will ask you to place the beans on the red and green field again.

- Like before, one bean represents the chance of 1 out of 10.
-1-2 beans on the green field mean that the costs could be below [M] but it is not very likely.
- 5 beans on each field means that it is just as likely the health care visit will cost more than [M] or less than [M].
- 6 beans on the green field mean that it is slightly more likely that the costs will be below [M] compared to higher than [M].

0.1.6. How likely is it that the costs of seeking medical advice with [leg injury] at [public primary care facility (rural health center, BHU)] will be below M?
_____[integer number, Check: number between 0 and 10, 99, 88]

[Instruction: Write down number of beans on green field = probability that costs are below [M]]

c. Main questions for medical and cost uncertainty (Day 1 & 2)

These questions are repeated for each scenario-facility-combination (same as in practice round, but without the additional explanations)
Iterations for [facility] placeholder: public primary, private primary, public secondary, private secondary
Iterations for [disease]: pressure in chest and pain in shoulder (=heart disease), belly pain (=appendicitis), light fever

1.1.1. How likely is it overall that you will get substantially better when you go to [facility] for medical advice with [disease]?

_____[integer number, Check: number between 0 and 10, 99, 88]

[Instruction: Write down number of beans on green field]

1.1.2. In the worst thinkable case, how likely is it that you will get substantially better when you go to [facility] for medical advice with [disease]?

_____[integer number, Check: number between 0 and 10 (on green paper), 99, 88]

[Instruction: Write down number of beans on green field]

1.1.3. In the best thinkable case, how likely is it that you will get substantially better when you go to [facility] for medical advice with [disease]?

_____[integer number, Check: number between 0 and 10 (on green paper), 99, 88]

[Instruction: Write down number of beans on green field]

1.2.1. How much will the minimum costs of seeking medical advice with [disease] at [facility] be?

_____ PKR [integer numbers, Check: >0 &<900,000, 99, 88]

1.2.2. How much will the maximum costs of seeking medical advice with [disease] at [facility] be?

_____PKR [integer numbers, Check: >0 &<900,000, 99, 88]

[Tablet: Calculate Midpoint M between 1.2.1 & 1.2.2 and display as [M] in the following]

[Instruction: provide again the cup with 10 beans and point to the right part of the playboard]

1.2.3. How likely is it that the costs of seeking medical advice with [disease] at [facility] will be below M?

_____[integer number, Check: number between 0 and 10, 99, 88]

[Instruction: Write down number of beans on green field = probability that costs are below [M]]

d. Script Health Scenarios (Day 1 & 2)

Heart disease:

You have noticed over the last weeks that when doing chores or walking stairs, you sometimes are easily short of breath and get tired quickly. One day, you feel a crushing pressure in your chest and pain in your shoulder and arms. You are short of breath and sweating.

Appendicitis:

It is a normal week filled with activities that you do during an ordinary week. Although not having eaten anything unusual, you have been suffering from strong abdominal stomach pain for several hours. It has been a sudden, constant, and non-radiating pain around your navel. However, over the last hours the pain has worsened. You have furthermore noticed that the pain is aggravated by coughing and that you occasionally feel nauseous.

Light fever:

It is a normal week filled with activities that you do during an ordinary week. For about a day you recognize that you have light fever and do not notice other symptoms.

In addition to the scenario texts, visual representations were presented to the respondents (see Figure A 1).

e. Script Information Seeking (Day 2)

0.1. Where did you search for information on the health scenarios? Which sources did you use to gather information on the health scenarios? [do not read, multiple select]
1- Family / friends (without medical education)
2- Family / friends (with medical education)
3- Doctor at medical facility
4- other health worker
5- Internet
6- Telemedicine
7- other, specify: _____
8- None/ did not search for information

0.2. [if 1,2,3,4,5,6 and/or 7 & more than one option selected 0.1] Which of the sources you just mentioned do you trust in/ rely on most? [do not read, single select]
1- Family / friends (without medical education)
2- Family / friends (with medical education)
3- Doctor at medical facility
4- other health worker
5- Internet

6- Telemedicine
7- other, specify: _____

f. Script Hypothetical Health care Decisions (Day 2)

0.2.1. Would you go seek professional medical advice in this situation?
1- yes
2- no

0.2.2. [if yes in 0.2.1] Where would you go to seek medical advice? [do not read, single select]
1- Public primary care facility (rural health center, BHU)
2- Private primary care facility (clinics, doctors)
3- Public secondary/tertiary care facility (DHQ, THQ, specialized hospitals)
4- Private secondary/tertiary care facility (private hospitals)
5- other, please specify:
99- don't know

0.2.3. [if yes in 0.2.1] When would you seek medical advice in this situation? [do not read, single select]
1- immediately
2- Within three to six hours
3- Next day
4- Within next three days
5- Within next week
6- Within next month
99- don't know

0.2.4. [if no in 0.2.1] What would you do instead? [do not read, multiple select]
1- Self-medication with modern medicine
2- Home remedies
3- Hakeem (Unani medicine practitioner)
4- Homeopathic practitioner
5- Islamic spiritual healer (pir or fakeer)
6-Pray
7- Nothing
8- Other, specify
99- Don't know

A5. Survey tool adaptions

a. Adapted health care seeking options

In addition to different health scenarios, there will also be and more care seeking options [show facility overview sheet]:

- You have already seen the board for "doing nothing", which means that you do not go to any health facility and also do not seek any informal advice or self-medicate[14]

[14] Changes made to the previous tool version are highlighted in grey.

- The second situation is that you either self-medicate with medication that you have at home or seek informal advice, for example at a pharmacy. It also includes local remedies / herbal medicine and hakim visits.
- Then, there are four groups of health facilities: you have already seen the public primary category, which comprises BHUs and RHCs
- The second facility category is private primary facilities, which means private doctors practices
- Third, we have public secondary / tertiary facilities, i.e. public hospitals [name examples form the area]
- The final category is private secondary / tertiary facilities, i.e. private hospitals [name examples from the area]

b. Definition of "getting substantially better"

For each facility type, I will first ask you about the likelihood to get substantially better when you imagine going to that facility.

Now I will tell you how we define "getting substantially better" in this interview: By Getting substantially better we mean that your health state improves as compared to the situation in the scenario, to the degree that at least the symptoms are sufficiently relieved for you to lead your everyday life. Remember this concept, it will be repeated in the following questions and throughout the survey.

c. Adapted questions medical uncertainty

Example of the adapted questions on expected benefits and medical uncertainty for the "no care" option:

0.1.1. How likely is it overall that you will get substantially better when you neither seek any form of medical advice nor self-medicate with [disease]?

[Instruction: let him / her point to / select the number on the scale]

[Instruction: say out loud how many beans were selected on the scale (to get substantially better e.g. 5 out of 10), and enter number in tablet]

_____[integer number, Check: number between 0 and 10, 99, 88]

0.1.2. When people are asked how likely something is, sometimes they give exact answers and sometimes they are uncertain/not sure about the chances. You may also give a range of how likely it is at least and at most to get substantially better. You may for example say something like "between 2 and 6 out of 10" or "at least 4 and at most 8 out of 10".
You said you think the likelihood is [integer from 0] out of 10 that you will get substantially better when you neither seek any form of medical advice nor self-medicate with [disease]. Which other likelihoods could you imagine? How likely is it at least? And at most?

If you are very sure about how likely you will get substantially better, you can also say the same number as before also for the minimum and maximum likelihood.

Min _____[integer number, Check: number between 0 and 10, 99, 88]

Max _____[integer number, Check: number between 0 and 10, 99, 88]

[instruction: if the participant is sure and does not want to give a range, enter the same number which was his/her answer to 1. for the upper and lower bound]

[Instruction: say out loud the numbers chosen on the scale and enter number in tablet]

d. Adapted hypothetical health care decisions including ranking

Thanks for all your answers, which provide valuable insights to us. Now I would like to talk to you about what you would do if you would face the health problem, which I presented to you [disease].

0.1.3. Would you go seek professional medical advice in this situation?
1- yes
2- no

0.1.3.1. [if yes in 0.1.3] Where would you go to seek medical advice? [do not read, single select]
1- Public primary care facility (rural health center, BHU)
2- Private primary care facility (clinics, doctors)
3- Public secondary/tertiary care facility (DHQ, THQ, specialized hospitals)
4- Private secondary/tertiary care facility (private hospitals)
5-No formal care (self-medication incl. herbal medicine, pharmacy)
6- other, please specify:
99- don't know

0.1.3.2. [if yes in 0.1.3] When would you seek medical advice in this situation? [do not read, single select]
1- immediately
2- Within three to six hours
3- Next day
4- Within next three days
5- Within next week
6- Within next month
99- don't know

0.1.3.3. [if no in 0.1.3] What would you do instead? [do not read, multiple select]
1- Self-medication with modern medicine
2- Home remedies
3- Hakeem (Unani medicine practitioner)
4- Homeopathic practitioner
5- Islamic spiritual healer (pir or fakeer)
6-Pray
7- Nothing
8- Other, specify
99- Don't know

0.1.3.4. [if yes in 0.1.3] You said that you would go to seek care at [faculty chosen in 0.1.3.1] in the described situation. Remember, there are also other care seeking options. At which of these other options where you next likely would seek care?
1- Self-medication with modern medicine
2- Home remedies
3- Hakeem (Unani medicine practitioner)
4- Homeopathic practitioner
5- Islamic spiritual healer (pir or fakeer)
6-Pray
7- Nothing
8- Other, specify
99- Don't know

0.1.3.5. [if yes in 0.1.3 and answer 1 to 6 in 0.1.3.4] You said that your first choice to seek care is: [faculty chosen in 0.1.3.1] and your second choice is: [faculty chosen in 0.1.3.5] in the described situation. Which of the following would be your 3rd choice?

1- Self-medication with modern medicine
2- Home remedies
3- Hakeem (Unani medicine practitioner)
4- Homeopathic practitioner
5- Islamic spiritual healer (pir or fakeer)
6-Pray
7- Nothing
8- Other, specify
99- Don't know

0.1.3.6. [if no in 0.1.3] You said that you would not seek professional medical advice in the described situation. Remember, there are also other care seeking options. At which of these other options where you next likely would seek care?

1- Self-medication with modern medicine
2- Home remedies
3- Hakeem (Unani medicine practitioner)
4- Homeopathic practitioner
5- Islamic spiritual healer (pir or fakeer)
6-Pray
7- Nothing
8- Other, specify
99- Don't know

0.1.3.7. [if no in 0.1.3 and answer 1 to 6 in 0.1.3.6] You said that your first choice to seek care is not seeking care and your second choice is: [faculty chosen in 0.1.3.6] in the described situation. Which of the following would be your 3rd choice?

1- Self-medication with modern medicine
2- Home remedies
3- Hakeem (Unani medicine practitioner)
4- Homeopathic practitioner
5- Islamic spiritual healer (pir or fakeer)
6-Pray
7- Nothing
8- Other, specify
99- Don't know

A6. Additional tools of qualitative pre-studies

a. Interview guide focus group discussion with health experts

Questions concerning the scenarios [ask for each scenario separately]:

- Does the vignette represent the health scenario appropriately?
    i. What kind of diagnosis is possible from the scenario? Does this match the condition/illness we are aiming at describing?
    ii. How could the scenario be improved? (concerning the descriptions, wording etc.)
    iii. Is it better to present the scenario in first person or third person? (e.g. if symptoms are very severe, decision-making by a household member might be more realistic than making the decision on one's own)
    iv. Individual probes for scenarios 1 and 4 [only ask if not already came up in discussion]
        - For 1) Fever
            - Would you recommend to use both "high fever" and "hard to leave bed for two days" as description? Or only one of the two? Which one?
        - For 4) Stroke
            - Do you think there too many symptoms included in this scenario? If so, which ones should be left out?

- From a medical perspective, what is the recommended kind of (initial) care for the scenario?
    i. How certain/clear is the recommendation? What are the alternatives?
    ii. Do you know to what degree the population is aware of this recommendation?
- How likely is it to get substantially better when suffering from the described condition and then visiting the following facility options?
        - #1: Public primary facility (BHU)
        - #2: Private primary facility (private clinic)
        - #3: Public secondary/tertiary facility (public hospital: DHQ, THQ…)
        - #4: Private secondary facility (private hospital)
- What costs would you expect for the user at each facility option? [rough estimate of total costs that the facility would charge, including admission fees etc., irrespective of what insurance might cover]

        #1: Public primary facility (BHU)

        #2: Private primary facility (private clinic)

        #3: Public secondary/tertiary facility (public hospital: DHQ, THQ…)

        #4: Private secondary facility (private hospital)

    i. Would the main recommended kind of care be covered by health insurance (Sehat Sahulat Program)?
    ii. How much would the recommended kind of care approximately cost out of pocket in each of the facility options?
        - #1: Public primary facility (BHU)
        - #2: Private primary facility (private clinic)

        - #3: Public secondary/tertiary facility (public hospital)
        - #4: Private secondary facility (private hospital)

- To what degree do you expect that medical uncertainty (i.e. uncertainty of the patient whether s/he is sick and how severe the condition is) plays a role in the decision to seek care and potentially unmet need for care?
- To what degree do you expect that cost uncertainty (i.e. uncertain costs faced when seeking health care) plays a role in decision to seek care and potentially unmet need for care?

Questions concerning the overall selection of scenarios:

- Does the selection of health conditions seem representative and relevant for Pakistan, especially Khyber Pakhtunkhwa?
    i. Is any important health condition missing? Is one of the scenarios from our selection "useless", i.e. not sensible to include?
    ii. Are scenarios that are tailored to a specific disease or more general scenarios (i.e. scenarios with symptoms matching several diseases) more useful?
- For which health conditions in particular do you expect that medical uncertainty (i.e. uncertainty of the patient whether s/he is sick and how severe the condition is) plays a role in the decision to seek care and potentially unmet need for care?
- For which health conditions in particular do you expect that cost uncertainty (i.e. uncertain costs faced when seeking health care) plays a role in the decision to seek care and potentially unmet need for care?
- ONLY for 5) Intestinal Flu

[First discuss the scenario as it is using the two days and then just ask the additional question about how changing the number of days affects the answers]

- How would the answers to the questions before change if the condition had not improved…
    i. …in one day?
    ii. ….in more than two days?

b. Interview guide in-depth-interviews with population

Demographics

- What is your age (estimated in years)?
- Gender?
    - Male
    - Female
- What is your highest education?
    - None
    - Primary
    - Secondary
    - Higher

- Are you the household head?
    - If no: what is your relation to the household head?
    - How many members does your household have?
        - Who are the members?

Introductory paragraph:

I would like to tell you about some health problems and am interested about your thoughts around it. They are health problems that your household might have experienced in the past or, God forbid, might potentially experience in the future. Try to imagine that the described situation would occur to you/ your household (even if it never has).

Now imagine, God forbid, that…

Questions concerning the scenarios:

Scenario 1:

It is a normal week, when one morning you have started feeling sick and developed a high fever [more than 102 degrees Fahrenheit (39 degrees Celsius)]. Due to the fever, it has been hard for you to leave the bed for two days and the condition has not improved within those two days.

- Do you understand the scenario well?
    - What part(s) seem(s) unclear to you? Why?
    - Which part of the scenario is hard to understand? How so?
    - Are there any words/expressions that you do not understand? If yes, which ones?
    - Can you imagine that the scenario happens/will happen to you in real life? Why (not)?
    - [if no] What could be changed such that it becomes more realistic?
    - What kind of disease would you think the scenario describes?

Scenario 2:

Now imagine, God forbid, that…

You are at home, carrying some heavy and bulky bags when you suddenly slip and fall down the stairs/ladder. You have injured your leg and you are feeling severe pain in your right lower leg. You are trying to get up, but you cannot put weight on your leg or walk properly such that other household members have to help you getting up and carry you to a seat. The affected part of your leg is swelling you notice that the leg is slightly bent.

- Do you understand the scenario well?
    - What part(s) seem(s) unclear to you? Why?
    - Which part of the scenario is hard to understand? How so?
    - Are there any words/expressions that you do not understand? If yes, which ones?
    - Can you imagine that the scenario happens/will happen to you in real life? Why (not)?
    - [if no] What could be changed such that it becomes more realistic?
    - What kind of disease would you think the scenario describes?

Scenario 3:

Now imagine, God forbid, that…

You have noticed over the last weeks that when doing chores or walking stairs, you sometimes are easily short of breath and get tired quickly. One day, you feel a crushing pressure in your chest and pain in your shoulder and arms. You are short of breath and sweating.

2. Do you understand the scenario well?
    - What part(s) seem(s) unclear to you? Why?
    - Which part of the scenario is hard to understand? How so?
    - Are there any words/expressions that you do not understand? If yes, which ones?
    - Can you imagine that the scenario happens/will happen to you in real life? Why (not)?
    - [if no] What could be changed such that it becomes more realistic?
    - What kind of disease would you think the scenario describes?

Now imagine the presented scenario happened to you. What would you do?

- Would you seek professional medical advice in this situation?
    - [if no] Why not? What would you do instead?
    - [if yes] Why do you think it will be beneficial to seek medical advice?
- When would you seek medical advice?
- Where would you seek medical advice?
- Would you expect to get substantially better when going to seek medical advice there?
    - How likely is it overall that you will get better when going there?
- How much will it (approximately) cost to seek medical advice there?
    - Do you think the treatment costs would be covered by the Sehat Insaf Card/Program?
        - How much of the costs would be covered? All of them? Or just a part? (Which part?)

Scenario 4:

Now imagine, God forbid, that…

Three days ago, you went out for dinner. Since then, you have been experiencing pain/cramps in your lower belly and occasionally felt nauseous and fatigued. Furthermore, you had diarrhea (loose, watery stool) several times per day. The condition has not improved during the last two days. Other members in your household have started to show similar symptoms.

3. Do you understand the scenario well?
    - What part(s) seem(s) unclear to you? Why?

- Which part of the scenario is hard to understand? How so?
- Are there any words/expressions that you do not understand? If yes, which ones?
- Can you imagine that the scenario happens/will happen to you in real life? Why (not)?
- [if no] What could be changed such that it becomes more realistic?
- What kind of disease would you think the scenario describes?

Now imagine the presented scenario happened to you. What would you do?

- Would you seek professional medical advice in this situation?
  - [if no] Why not? What would you do instead?
  - [if yes] Why do you think it will be beneficial to seek medical advice?
- When would you seek medical advice?
- Where would you seek medical advice?
- Would you expect to get substantially better when going to seek medical advice there?
  - How likely is it overall that you will get better when going there?
- How much will it (approximately) cost to seek medical advice there?
  - Do you think the treatment costs would be covered by the Sehat Insaf Card/Program?
    - How much of the costs would be covered? All of them? Or just a part? (Which part?)

Scenario 5:

Now imagine, God forbid, that…

It is a normal week filled with activities that you do during an ordinary week. Although not having eaten anything unusual, you have been suffering from strong abdominal [belly/stomach] pain for several hours. It has been a sudden, constant, and non-radiating pain around your navel. However, over the last hours the pain has worsened. You have furthermore noticed that the pain is aggravated by coughing and that you occasionally feel nauseous.

4. Do you understand the scenario well?
   - What part(s) seem(s) unclear to you? Why?
   - Which part of the scenario is hard to understand? How so?
   - Are there any words/expressions that you do not understand? If yes, which ones?
   - Can you imagine that the scenario happens/will happen to you in real life? Why (not)?
   - [if no] What could be changed such that it becomes more realistic?
   - What kind of disease would you think the scenario describes?

Now imagine the presented scenario happened to you. What would you do?

- Would you seek professional medical advice in this situation?
    - [if no] Why not? What would you do instead?
    - [if yes] Why do you think it will be beneficial to seek medical advice?
- When would you seek medical advice?
- Where would you seek medical advice?
- Would you expect to get substantially better when going to seek medical advice there?
    - How likely is it overall that you will get better when going there?
- How much will it (approximately) cost to seek medical advice there?
    - Do you think the treatment costs would be covered by the Sehat Insaf Card/Program?
        - How much of the costs would be covered? All of them? Or just a part? (Which part?)

Scenario 6:

Now imagine, God forbid, that…

It is a normal week filled with activities that you do during an ordinary week. For about a day you recognize that you have light fever and do not notice other symptoms.

5. Do you understand the scenario well?
    - What part(s) seem(s) unclear to you? Why?
    - Which part of the scenario is hard to understand? How so?
    - Are there any words/expressions that you do not understand? If yes, which ones?
    - Can you imagine that the scenario happens/will happen to you in real life? Why (not)?
    - [if no] What could be changed such that it becomes more realistic?
    - What kind of disease would you think the scenario describes?

Now imagine the presented scenario happened to you. What would you do?

- Would you seek professional medical advice in this situation?
    - [if no] Why not? What would you do instead?
    - [if yes] Why do you think it will be beneficial to seek medical advice?
- When would you seek medical advice?
- Where would you seek medical advice?
- Would you expect to get substantially better when going to seek medical advice there?
    - How likely is it overall that you will get better when going there?
- How much will it (approximately) cost to seek medical advice there?

- Do you think the treatment costs would be covered by the Sehat Insaf Card/Program?
    - How much of the costs would be covered? All of them? Or just a part? (Which part?)