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The Influence of Varying Cost Formats on Preferences

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Abstract

Background—Numerous studies have found that cost strongly influences patients' decision-making. The objective of this study was to explore the impact of varying cost formats on patients' preferences.

Methods—Mechanical Turk workers completed a choice based conjoint (CBC) analysis survey. The CBC survey was designed to examine stated preferences for second line agents used to treat diabetes using five attributes: route of administration, efficacy, risk of low blood sugar, frequency of checking blood sugar levels and cost. We developed seven versions of the CBC survey which were identical except for the cost attribute. We described cost in terms of: *Affordability*, *Monthly co-pay*, *Dollar Sign Rating*, *How Expensive* or *How Cheap* compared to other medications, *Monthly Co-pay*, *Working Hours Equivalent* (per month) and *Percent of Monthly Income*. The resulting part-worth utilities were used to calculate the relative importance of cost and to estimate treatment preferences for a sulfonylurea, exenatide and insulin.

Results—The relative impact of cost varied significantly across the seven formats. Cost had the greatest influence on participants' decisions when framed in terms of *Affordability* [mean (SD) relative importance = 37.3 (0.9)] and the lowest influence when framed in terms of *How Cheap* (compared to other drugs) [mean (SD) relative importance= 12.1 (0.9)]. A sulfonylurea was strongly preferred across four of the seven formats. Preference for insulin, the most effective, albeit riskiest option, was low across all cost formats.

Conclusions—The format used to describe cost influences how this attribute impacts patients' preferences. Individuals are most cost-sensitive when cost is framed in terms of affordability and least cost-sensitive when cost is described in terms of how cheap the medication is compared to others.

Numerous studies have found that out-of-pocket costs strongly influence patients' decision making. Goldman et al¹ and Cole et al² demonstrated that a 10% increase in cost sharing is associated with a 1% to 6% reduction in patients' prescription drug spending and decreased medication adherence. Shapiro et al³ showed that patients participating in a cost sharing program were less likely to seek medical care for minor symptoms and to be hospitalized for more serious symptoms compared to those receiving free care. Patients also consider cost when comparing available treatment options. Tseng et al⁴ found that of 5,085 diabetic patients across 10 health plans, at least two-thirds were willing to consider lower cost

medications with less efficacy, more frequent dosing, or a slightly higher chance of side effects. Despite the significant impact of cost on patient decision-making, medication expense is rarely discussed during medical encounters^{5,6} and, physicians often feel uncomfortable discussing costs with their patients⁶⁻⁹. Compounding the problem is that specific costs vary widely and are often difficult to access¹⁰. Healthcare providers and researchers' increasing awareness of cost as a possible treatment harm emphasizes the need to recognize cost as a specific attribute that should be weighed in parallel with other treatment characteristics¹¹⁻¹³. This stance is compatible with recent studies demonstrating that most patients want to know about out-of-pocket costs and feel comfortable discussing cost with their physicians¹⁴. However, little is known about how best to describe cost and whether different cost formats influence patients' preferences.

In a recent systematic review of decision aids, Blumenthal-Barby et al¹⁵ found that cost-related data were mentioned in 56% of the studies analyzed. Cost descriptions varied from the mere mention of cost to inclusion of specific prices. In this study, we sought to build on this work by examining the impact of specific cost formats on individuals' stated preferences. Formats were chosen in order to represent a spectrum of commonly used descriptions which could be described across specific levels. We included formats which presented costs in terms of absolute numbers (*Monthly Co-Pay*, *Working Hours Equivalent*, and *Percent of Monthly Income*), familiar symbols (*Dollar Sign Rating*), and relative verbal phrases (*How Expensive or Cheap* compared to other medications and degree of *Affordability*). In addition to these main contrasts, we were also interested in these particular formats because they would be expected to differ in their gist and affective reactions as well as their evaluability, each of which has been shown to strongly influence preferences¹⁶⁻¹⁸.

We used an online choice-based conjoint (CBC) survey to quantify how presentation of cost information influenced the importance that individuals attach to out-of-pocket costs and their preferences for specific treatment options. CBC is a widely used stated-preference method that has been shown to yield valuable insights across many health-related scenarios¹⁹. Participants' preferences are measured by their choices on a set of hypothetical options described by a predefined list of attributes. Responses generate a set of part-worth utilities that can be used to calculate the relative importance of each attribute and to predict preference for specified treatment options.

The survey was designed to elicit preferences for a range of medications used to treat diabetes mellitus. Diabetes was chosen because 1) this disease is a major public health issue in the U.S. resulting in substantial morbidity and mortality, 2) patients incur substantial costs to care for this chronic disorder, 3) costs vary substantially across treatment, and 4) the disease is familiar to the general public^{20,21}. We developed seven versions of the survey which were identical except for the format used to describe out-of-pocket cost. Given the known influence of format on patients' choices, we hypothesized that the relative importance of cost and stated treatment preferences would vary by format.

Methods

Subjects

We recruited 1500 participants from Amazon's Mechanical Turk (MTurk). MTurk is an online labor market. Its population is more demographically diverse than standard internet samples²². Participants on MTurk are internally motivated and produce psychometrically sound data^{23,24}. While, not representative of a patient population, MTurk is a valuable approach to examine the impact of manipulating factors using experimental designs. We included subjects currently living in U.S who were at least 20 years old. Participants were paid \$1.00.

Survey

We developed an educational overview of diabetic medication management, and an explanation of each of the attributes and levels included in the survey, using Qualtrics (see Appendix). At the end of the educational component, we provided subjects with a link to access one of the seven versions of the CBC survey using random assignment. Randomization was conducted by Qualtrics.

The CBC survey was designed, conducted and analyzed with Sawtooth Software, Choice Based Conjoint, Version 8.4.3. The survey included five attributes (see Table 1). Three levels were used in all attributes except for route of administration which included two levels. The attributes were selected based on the content of a previously published decision aid²⁵. We developed seven versions of the CBC survey. All seven versions were identical except for the cost attribute. We described cost in terms of: *Affordability*, *Monthly co-pay*, *Dollar Sign Rating*, *How Expensive* compared to other medications, *How Cheap* compared to other medications, *Monthly Co-pay*, *Working Hours Equivalent* (per month) and *Percent of Monthly Income* (Table 1). The level for *Affordability*, *Monthly co-pay*, *Dollar Sign Rating*, *How Expensive* compared to other medications, *How Cheap* compared to other medications and *Monthly Co-pay* were defined based on Blumenthal-Barby's review of decision-aids¹⁵. The levels for *Working Hours Equivalent* and *Percent of Monthly Income* were defined based on WHO reports on the affordability of medications and the median net compensation U.S. per capita^{26,27}.

Participants were asked to respond to 12 CBC choice sets, each including three unlabeled options. A "None" option was not included. An example of a choice set is provided Figure 1. We used the software's complete enumeration strategy to construct the 12 choice sets. This approach ensures that 1) each level is shown as few times as possible in a single task; 2) each level is shown approximately an equal number of times across the choice tasks; and 3) the level of one characteristic is chosen independently of the levels of other characteristics, so that each characteristic level's effect can be reliably estimated. The program was set to generate a design for 300 versions of the CBC survey in each group. The standard error for each level was 0.02 and the efficiencies reported were all 1.000. In addition to the 12 random CBC choice sets, two fixed tasks with a clear advantageous option were set to check participants' attention. After the respondents had completed the CBC survey, we collected

data on participants' age, gender, income, education level, health insurance, history of regular use of prescription medications, and whether or not they had diabetes.

Statistical Analysis

For each respondent, part-worth utilities (zero-centered values) were calculated for each level of each attribute using Hierarchical Bayes (HB) modeling (Sawtooth CBC/HB system for hierarchical Bayes estimation version 8.4.6). HB modeling has the advantage that it can better incorporate heterogeneity between respondents' choices²⁸. In HB modeling, the sample averages (prior information) are used to update the individual utilities in a number of iterations until the sample averages stop changing between iterations. After this convergence, the cycle is run several thousand more times and the estimates of each iteration are saved and averaged. We rescaled the utilities on a scale of 0 to 1, using the highest (i.e. least preferred) cost level as the reference (0).

We calculated the percentage of importance that respondents assigned to each attribute by dividing the range of part-worth utilities for each attribute by the sum of the ranges and multiplying by 100. We used Sawtooth Software Market Research Tools (SMRT) to estimate preferences for three potential second line medications for type 2 diabetes²⁹: insulin, sulfonylureas, and exenatide. For this simulation, sulfonylureas were assigned the lowest cost level, insulin the middle level, and exenatide the most expensive level. The levels assigned for all attributes to each of these treatment options are provided in Table 4. We also used SMRT to illustrate participants' price sensitivity for preferring insulin over exenatide as the cost for exenatide was fixed at \$350 per month, and out-of-pocket cost of insulin was decreased from \$350 to \$15 per month using Sawtooth's linear interpolating function.

We excluded subjects who did not answer either of the attention-check questions correctly: 48 participants failed to correctly answer both attention-check questions and 122 failed to answer one correctly. We subsequently excluded an additional 77 participants who completed the survey in less than 3.5 minutes (the 5th percentile). The average (SD) time to complete the survey was 7.2 (3.5) minutes.

Preference data were imported into SAS Version 9.3 and merged with the respondents' characteristics. We compared participants' characteristics across the seven versions, using the chi-square test for categorical data and ANOVA for continuous data. We compared the relative importance of the cost attribute across the seven formats using ANOVA and Tukey's method to correct for multiple comparisons. We examined whether subjects' characteristics [age, gender, annual income (< \$25,000 vs. ≥ \$25,000), college graduate (yes/no), covered by health insurance (yes/no), regular use of prescription medications (yes/no), diabetes (yes/no)] were associated with the relative importance of cost for each format using separate multiple linear regression models. The study was approved by the Human Investigation Committee at our institution.

Results

Participants

1163 eligible participants were included in the final analyses. Participants' age ranged from 18 to 73 years, with a mean of 35.3 years (SD, 11.5 years). Most participants had finished high school (99.5%), 37.6% earned less than \$25,000 per year, and 34.2% took prescription medications regularly. Characteristics were similar across the seven versions of the CBC survey (Table 2).

Cost Utilities and Relative Importance

Figure 2 plots the rescaled utilities for each level of cost across the seven formats. Lowering cost from the high to medium level had a larger impact compared to lowering cost from the medium to lowest level for all formats. This difference was most evident for the *Affordability* and *Percent of Monthly Income* formats. Increasing cost from the lowest to the medium level had the greatest impact in the *Monthly Co-pay* and *Percent of Monthly Income* formats.

The relative importance of cost differed significantly across the seven cost formats (Table 3, Figure 3). Cost had the greatest influence on participants' decisions when framed in terms of degree of *Affordability*, with the relative importance of cost in this version being significantly higher than in the remaining six. In contrast, cost had the least influence on participants' decisions when framed as *How Cheap*. Cost was the most influential of the five attributes when framed using the *Affordability*, *Monthly Co-pay* or *Percentage of Monthly Income* formats.

We found no statistically significant associations between subjects' characteristics and the relative importance of cost across formats, with the following exceptions: increasing age was associated with greater importance of cost when described in terms of *Affordability* ($t=2.69$, $p=0.008$), current use of prescription medications was associated with greater importance of cost when described in terms of *Monthly Copay* ($t=2.96$, $p=0.004$), higher income was associated with lower importance of cost when described using the *Dollar Sign Rating* format ($t=-3.35$, $p=0.001$), and higher education level was associated with lower importance of cost when described using the *How Cheap* format ($t=-2.64$, $p=0.009$).

Treatment Preferences

Predicted preferences for insulin, exenatide, and a sulfonylurea are described in Figure 4. A sulfonylurea is strongly preferred across four of the cost formats. Exenatide is strongly preferred when cost is described using the *How Cheap* format. In this format the risk of low blood sugar is the most important attribute (Table 3), and this risk is substantially lower with exenatide than a sulfonylurea. A similar pattern is seen with the *How Expensive* format. Preference for insulin, the most effective, albeit the riskiest option, is low across all cost formats.

Figure 5 reveals the estimated preferences for insulin over exenatide (held fixed at \$350 per month) as out-of-pocket costs of insulin are decreased from \$350 to \$15 per month. When

described in terms of *Percent of Monthly Income* or *Monthly Co-pay*, preference for insulin supersedes that of exenatide once the cost of insulin is lower than \$60 per month. When described in terms of *Working Hours Equivalent*, insulin is never preferred over exenatide, even at the lowest copays.

Discussion

In this study, we explored whether and how varying cost presentation formats influence individuals' stated preferences. Our results demonstrate that the relative importance of cost and treatment preference are sensitive to the manner in which cost is described. We found that cost had the largest impact when described in terms of *Affordability* and the lowest impact when described by *How Cheap* the medication is, compared with other options.

The formats studied differed in several respects. *Affordability* may have had the largest impact on subjects' choices because the lowest level "Hard to afford" likely evoked a greater negative affective reaction than the other formats. Interestingly, describing the medication using the verbal phrase: "Much more expensive compared to others", had a much lower impact, perhaps because "Hard to afford" invoked uniformly negative affective reactions regardless of personal income, whereas "Much more expensive" invoked more variable responses depending on one's finances and experience purchasing "expensive" items. In addition, some may have interpreted more expensive to reflect higher quality or potency^{30,31}.

According to Fuzzy-trace theory, people generally rely on gist versus verbatim representations to make decisions^{16,17}. It follows that the differences observed may also have been due to differences in the gist extracted from each format. For example, *Percent of Monthly Income* and *Working Hours Equivalent* had very different impacts on subjects' preferences despite being monetarily equivalent. Fifteen percent may seem larger than three days because when being compared, subjects may have focused on the numerical values rather than on the unit of measurement. In addition, subjects may have had a more negative reaction to *Percent of Monthly Income* than *Working Hours Equivalent*, because the former term may be more closely associated with scenarios describing a loss of income (e.g. deductions for social security). This explanation would also be in keeping with prospect theory's emphasis on the influence of loss aversion^{32,33}.

The observed variability in subjects' responses may also be in part explained by differences in evaluability. Hsee suggested that attributes which are easier to evaluate have a larger impact on choice¹⁸. Of the three formats described using numerical values *Working Hours Equivalent* had the smallest impact on preferences, perhaps because it is relatively harder to calculate thus less evaluable than *Monthly Co-pays* and *Percent of Monthly Income*. Similarly, this hypothesis may also explain why *Affordability*, a concept familiar and relevant to all and therefore likely more evaluable than the other formats, had the greatest impact on preferences. The importance of evaluability is also supported by the finding that subjects currently taking prescription medications, and thus familiar with monthly co-pays, were more impacted by the format *Monthly Co-pays* compared to their counterparts.

The differences in the impact of cost over the formats studied translated into differences in preferred treatment options. Despite being less effective and more likely to cause hypoglycemia than insulin, sulfonylureas (the least expensive option) are preferred across four of the seven formats in which cost had the largest impact. Exenatide, the most expensive option, is preferred in the remaining three formats, most notably when using the *How Cheap* format. This finding has potentially important clinical implications, as varying terminology may influence patients in a manner which could alter treatment decisions. Thus, future research should determine if alternative formats impact on patients' decisions in clinical settings. This study may also have implications for other health decisions such as on patients' choices of health plans and/or healthcare providers^{34,35}.

To the best of our knowledge, this is the first study to explore the impact of varying cost formats on subjects' preferences. We used a randomized, between-subjects, experimental design, which enabled us to isolate the effect of the manipulated variable. In addition, CBC enabled us to quantify the relative importance of cost as an attribute, to compare differences in subjects' reactions to increasing the cost from a low to medium level versus a medium to high level, and to estimate preferences for competing treatment options. There are also several limitations of the study. First, as with other studies using simulated scenarios, stated preferences may not reflect the actual decision-making process in a clinical setting which involves many other important issues. While we discuss the role of affect, we did not explicitly measure affective reactions to the different formats presented. Furthermore, although we designed the surveys based on a pre-established decision-aid for escalation of diabetic care, patients may consider other attributes when making treatment decisions. In addition, the study was conducted online using MTurk workers, and further research is required to examine the effects of varying cost presentation in patients. Lastly, future studies should test the possible explanations described in the discussion and explore additional reasons underlying the variability observed in this study.

In summary, we found that the format by which cost is described has a significant impact on respondents' choices. Participants in this study were most cost-sensitive when considering how affordable a medication is, and least influenced by cost when considering how cheap a medication is compared to other options. When using actual numerical values to describe co-pays, *Working Hours Equivalent* has less impact than either *Monthly Co-pays* or the *Percent of Monthly Income*. Clinicians and researchers should be aware of the potential impact of variable presentation formats on preferences. These results support the need to evaluate the impact of presentation of cost on preferences in clinical contexts.

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Appendix

Diabetes is a major health problem in the US. This survey is designed to help us understand how patients feel about blood sugar medications. Before we start the survey, we will provide you with some essential information about this disease.

What happens if diabetes isn't well controlled?

People with diabetes have increased levels of sugar in their blood. Over time, diabetes leads to an increased risk of heart disease, strokes, kidney disease, vision problems and neurologic disease.

How is diabetes treated?

Blood sugars levels can be controlled with different types of medications. The main side effect of all of these medications is low blood sugar.

Low blood sugar is a condition that can cause symptoms ranging from sweating and feeling hungry to passing out, when the blood sugar level is too low. Low blood sugar is treated by administering sugar either in the form of food (example juice) or if necessary by an infusion.

How do patients make sure their blood sugar is at the correct level?

People with diabetes prick their skin to get a drop of blood. The drop of blood is put into a blood sugar monitor which displays the blood sugar level.

This survey is designed to help us understand how patients feel about medications.

Please imagine that you have diabetes and need to choose a medication.

The computer program will show you made-up treatment options for diabetes and then will ask you to pick the one you prefer. Take your time to read through each question. There are no right or wrong answers.

Each medication will be described using 5 pieces of information:

1. The way the medication is taken
2. The frequency of checking your blood sugar level
3. How well the medication works
4. Risk of low blood sugar
5. The cost to you

The next few pages will give you some more detail about each of these 5 facts:

There are 2 ways that these medications can be taken:

1. As a **pill twice a day**: Half are taken in the morning and half in the evening.
2. As an **injection (shot) under the skin**: You give yourself an injection once a day.

How well the medication works:

The medications will be described as either:

Extremely effective: Extremely effective means that most patients' blood sugar levels decrease to the ideal range.

Moderately effective: Moderately effective means that most patients' blood sugar levels decrease significantly. But, some patients will need a second medication to keep their blood sugar in the ideal range.

Mildly effective: Mildly effective means that while the medication does help decrease blood sugar levels, almost every patient needs another medication to keep their blood sugar in the ideal range.

Low blood sugar is a **side effect** of many diabetes medications. Most diabetes medications help patients lower their blood sugar to the ideal level, but some of them often **go too far** and cause **this side effect of lower blood sugar**.

Mild symptoms of low blood sugar include feeling sweaty, dizzy, and trembling. If the blood sugar level is extremely low, people can become sleepy or confused, and may develop blurry vision and have trouble walking. Medications vary in **how frequently** diabetes medications cause this side effect.

3 risk levels of low blood sugar will be shown in this survey.

1. **1% risk**: This means that **1% or 1 per 100 people** who take this medication experience **the side effect of low blood sugar**.

2. **20% risk:** This means that **20% or 20 per 100 people** who take this medication experience **the side effect of low blood sugar.**
3. **30% risk:** This means that **30% or 30 per 100 people** who take this medication experience **the side effect of low blood sugar.**

All patients with diabetes need to check their blood sugar levels regularly. This is done by pricking your skin to get a drop of blood as shown in the picture. A special monitor then displays the blood sugar level. Medication doses can then be adjusted based on the blood sugar levels.

How often blood sugar levels need to be checked depends on the medication you take.

Attention: The frequency of checking blood sugar level is different from the frequency of taking medication.

The survey includes 3 options:

1. **No monitoring necessary:** This means that no blood sugar level monitoring is required while taking the medication.
2. **3 times per week:** This means that you need to check your blood sugar levels 3 times per week (every other day) while taking the medication. For example, you can do it every Monday, Wednesday and Friday or every Tuesday, Thursday, and Saturday.
3. **1 time per day:** This means that you need to check your blood sugar levels once each day. You can do it in the morning, afternoon or evening.

7 formats of cost

Affordability

Lastly you will also see some information on the **cost of the medication**. Here we are talking about the cost you need to pay out of pocket (whether or not you have insurance).

The survey will include 3 estimates of cost:

1. **Easily affordable:** This means that you don't need to make **any** changes in your budget in order to be able to pay for the medication.
2. **Somewhat affordable:** This means that you need to make **some** changes in your budget in order to be able to pay for the medication.
3. **Hard to afford:** This means that you need to make **major** changes in your budget in order to be able to pay for the medication.

Assume you have no other costs such as a deductible.

Monthly Co-pay

Lastly you will also see some information on the **cost of the medication**. Here we are talking about the cost you need to pay out of pocket (whether or not you have insurance).

The survey will include 3 estimates of cost:

1. **\$350 for a one month's supply:** This means that you need to pay \$350 for a one month's supply of medication.
2. **\$120 for a one month's supply:** This means that you need to pay \$120 for a one month's supply of medication.
3. **\$15 for a one month's supply:** This means that you need to pay \$15 for a one month's supply of medication.

Assume you have no other costs such as a deductible.

Dollar Sign

Lastly you will also see some information on the **cost of the medication**. Here we are talking about the cost you need to pay out of pocket (whether or not you have insurance).

The survey will include 3 estimates of cost:

1. **\$\$\$:** This means that you need to pay \$350 for a one month's supply of medication.
2. **\$\$:** This means that you need to pay \$120 for a one month's supply of medication.
3. **\$:** This means that you need to pay \$15 for a one month's supply of medication.

Assume you have no other costs such as a deductible.

How Cheap (compared to other medication)

Lastly you will also see some information on the **cost of the medication**. Here we are talking about the cost you need to pay out of pocket (whether or not you have insurance).

The survey will include 3 estimates of cost:

1. This medicine is **cheaper** compared to others
2. This medicine is **somewhat cheaper** compared to others
3. This medicine is **much cheaper** compared to others

Assume you have no other costs such as a deductible.

How Expensive (compared to other medication)

Lastly you will also see some information on the **cost of the medication**. Here we are talking about the cost you need to pay out of pocket (whether or not you have insurance).

The survey will include 3 estimates of cost:

1. This medicine is **not more expensive** compared to others
2. This medicine is **somewhat more expensive** compared to others
3. This medicine is **much more expensive** compared to others

Assume you have no other costs such as a deductible.

Percentage of Monthly Income

Lastly you will also see some information on the **cost of the medication**. Here we are talking about the cost you need to pay out of pocket (whether or not you have insurance).

The survey will include 3 estimates of cost:

15% of monthly income for a one month's supply:

This means that a 1 month's supply of medication may cost you 15% of monthly income.

5% of monthly income for a one month's supply:

This means that a 1 month's supply of medication may cost you 5% of monthly income.

1% of monthly income for a one month's supply:

This means that a 1 month's supply of medication may cost you 1% of monthly income.

Assume you have no other costs such as a deductible.

Working Hours Equivalent

Lastly you will also see some information on the **cost of the medication**. Here we are talking about the cost you need to pay out of pocket (whether or not you have insurance).

The survey will include 3 estimates of cost:

1. **3 days of work for a one month's supply:**

This means that the cost of one month's supply of medication is the same as what you earn for 3 days of work.

2. 1 day of work for a one month's supply:

This means that the cost of one month's supply of medication is the same as what you earn for 1 day of work.

3. 2 hour of work for a one month's supply:

This means that the cost of one month's supply of medication is the same as what you earn for 1 hour of work.

Assume you have no other costs such as a deductible.

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	Option 1	Option 2	Option 3
How you take the medication	Injection (shot) under the skin once a day	Injection (shot) under the skin once a day	1 pill twice a day
How well the medication lowers your blood sugar	Extremely effective	Moderately effective	Extremely effective
Risk of low blood sugar	30%	20%	1%
How often you need to monitor your blood sugar level	3 times per week	No monitoring necessary	1 time per day
How affordable the medication is to you	Easily affordable	Somewhat affordable	Hard to afford

Figure 1.
An example of one of the choice sets

Figure 2.
Cost utilities for each level across the seven formats

Figure 3.
Relative importance of attributes across cost formats

Figure 4.
Estimated preference among exenatide, sulfonylureas and insulin

Figure 5.
Estimated probability of choosing insulin over exenatide as the cost of insulin is decreased.

Table 1

Attributes and Levels Included in the Choice-Based Conjoint Survey

Versions	Levels
Route of administration	1 pill twice a day Injection (shot) under the skin once a day
Efficacy	Mildly effective (usually need another medication) Moderately effective (may need another medication) Extremely effective (this medication is enough)
Risk of low blood sugar	1% risk 20% risk 30% risk
Frequency of checking blood sugar levels	No monitoring necessary 3 times per week 1 time per day
Cost	
Affordability	Easily affordable Somewhat affordable Hard to afford
Monthly co-pay	\$15 for a one month's supply \$120 for a one month's supply \$350 for a one month's supply
Dollar sign rating	\$ \$\$ \$\$\$
How expensive	This medicine is not more expensive compared to others This medicine is somewhat more expensive compared to others This medicine is much more expensive compared to others
How cheap	This medicine is much cheaper compared to others This medicine is somewhat cheaper compared to others This medicine is not cheaper compared to others
Percentage of monthly income	0.6% of monthly income for a one month's supply 5% of monthly income for a one month's supply 15% of monthly income for a one month's supply
Working hours equivalent	1 hour of work for a one month's supply 1 day of work for a one month's supply 3 days of work for a one month's supply

Table 2

Description of the Sample According to the Group of Participants^a

Characteristic	Randomized Versions						p ^c
	Affordability (N=176) ^b	Monthly Co-pay (N=162) ^b	Dollar Sign Rating (N=169) ^b	How Cheap (N=165) ^b	How Expensive (N=170) ^b	Percentage of Monthly Income (N=169) ^b	Working Hours Equivalent (N=152) ^b
Age (years)	36.7 ± 12.6	35.0 ± 11.7	34.8 ± 11.8	34.2 ± 11.2	35.4 ± 11.7	36.4 ± 11.7	34.4 ± 9.7
Female	79 (44.9%)	77 (47.5%)	90 (53.3%)	89 (53.9%)	86 (50.6%)	81 (47.9%)	74 (48.7%)
Education level							
Lower than college	86 (48.9%)	72 (44.4%)	77 (45.6%)	74 (44.8%)	68 (40.0%)	77 (33.1%)	63 (41.4%)
College graduate or higher	90 (51.1%)	90 (55.6%)	92 (54.4%)	91 (55.2%)	102 (60.0%)	92 (54.4%)	89 (58.6%)
Annual Income > \$25,001	102 (58.0%)	103 (63.6%)	113 (66.9%)	95 (57.6%)	99 (58.2%)	114 (67.5%)	99 (65.1%)
Has health insurance	142 (80.7%)	131 (80.9%)	135 (79.9%)	146 (85.9%)	144 (87.3%)	144 (85.2%)	124 (81.6%)
Diabetic	10 (5.7%)	10 (6.2%)	8 (4.7%)	8 (4.9%)	10 (5.9%)	10 (5.9%)	5 (3.3%)
Takes prescription medication(s) regularly	64 (36.4%)	48 (29.6%)	56 (33.1%)	53 (32.1%)	57 (33.5%)	59 (34.9%)	61 (40.1%)
Cost influences decision to try a medication ^d							
Never	18 (28.1%)	14 (29.2%)	15 (26.8%)	11 (20.8%)	14 (24.6%)	14 (23.7%)	14 (23.0%)
Often	33 (51.6%)	27 (56.3%)	27 (48.2%)	31 (58.5%)	25 (43.9%)	35 (59.3%)	37 (60.7%)
Always	13 (20.3%)	7 (14.6%)	14 (25.0%)	11 (20.8%)	18 (31.6%)	10 (17.0%)	10 (16.4%)

^aTable values are mean ± SD for continuous variables and n (column %) for categorical variables.

^bPercentages may not sum to 100% due to rounding.

^cP-value is for F-test (continuous variables) or χ^2 test (categorical variables).

^dQuestions were answered only by participants who takes prescription medication(s) regularly.

Table 3

Relative Importance of Each Attribute across the Seven Cost Formats

Attributes	Cost Format							<i>P</i> ^f
	Affordability	Monthly Co-pay	Dollar Sign Rating	How Cheap	How Expensive	Percentage of Monthly Income	Working Hours Equivalent	
Route of administration	11.3 ± 0.9 ^a	13.1 ± 1.0 ^{a, b}	10.5 ± 0.9 ^a	15.4 ± 1.0 ^b	12.4 ± 0.9 ^a	12.4 ± 0.9 ^a	12.2 ± 1.0 ^a	0.01
Efficacy	22.7 ± 1.0 ^d	27.7 ± 1.0 ^{b, c}	32.5 ± 1.0 ^a	30.1 ± 1.0 ^{a, b}	31.5 ± 1.0 ^a	25.4 ± 1.0 ^c	31.6 ± 1.0 ^a	<.0001
Risk of low blood sugar	23.1 ± 0.9 ^c	19.7 ± 1.0 ^d	23.5 ± 1.0 ^c	33.8 ± 1.0 ^a	28.3 ± 1.0 ^b	22.8 ± 1.0 ^c	28.9 ± 1.0 ^b	<.0001
Frequency of checking blood sugar levels	5.7 ± 0.4 ^c	6.7 ± 0.4 ^{b, c}	7.1 ± 0.4 ^b	8.7 ± 0.4 ^a	8.8 ± 0.4 ^a	6.5 ± 0.4 ^{b, c}	6.5 ± 0.4 ^{b, c}	<.0001
Cost	37.3 ± 0.9 ^a	32.8 ± 0.9 ^b	26.3 ± 0.9 ^c	12.1 ± 0.9 ^e	19.1 ± 0.9 ^d	33.0 ± 0.9 ^b	20.8 ± 1.0 ^d	<.0001

^{a, b, c, d, e}LS Means with the same letter are not significantly different.

^f*P*value is for F-test.

Table 4

Description of Medications Used to Estimate Preferences

Medications	Route of Administration	Efficacy	Risk of Low Blood Sugar	Frequency of Checking Blood Sugar Levels	Cost
Insulin	Injection (shot) under the skin once a day	Extremely effective (this medication is enough)	30% risk	1 time per day	Level 2 (Medium)
Sulfonylurea	1 pill twice a day	Moderately effective (may need another medication)	20% risk	3 times per week	Level 1 (Low)
Exenatide	1 pill twice a day	Moderately effective (may need another medication)	1% risk	No monitoring necessary	Level 3 (High)