

## Supplementary Material I

### Study Area Attributes

For example, Davis et al. (2019a) found that bear bile use was lower in southern Vietnam compared to northern Vietnam. In addition, it is theoretically possible that demand persists in areas that may not have bear farms, but that may have wild bear populations, such as Lao Cai. Finally, the presence of bear farms was included as theoretically bear bile will be more available and accessible in those areas, which may result in greater use of bear bile compared to other areas.

**Table S.1:** Study area attributes. “Y” = “Yes”, “N” = “No”, and “S” = “semi”.

Region	Study Area	Bear Farms?	Wild Bear Populations?	Urban?
North	Hai Phong	Yes	No	Yes
North	Lao Cai	No	Yes	No
Central	Da Nang	No	No	Yes
Central	Nghe An	Yes	Yes	Semi
Central	Quang Nam	Yes	es	Semi*
South	Dong Nai	No	Yes	Yes
South	Tay Ninh	No	No	Yes

\*Note: Although we sampled in rural areas of Quang Nam, it is a short drive from Da Nang, another study site and one of the main cities in Vietnam (**Figure 1**).

### Detail of Study Instrument

#### *Quantitative component*

The quantitative component (**Supplementary Material II**) was based on a questionnaire previously used in Cambodia (Davis et al., 2020a). Every question in Section A was multiple-choice, e.g. “What types of medicine have you used in the past year? A: Biomedicine, B: Traditional Vietnamese Medicine, etc”; apart from Likert-type scales used to measure beliefs. In separate questions, we directly asked respondents about their use of both farmed and wild bear bile, as well as the time frame of that use; e.g. “When did you last use farmed bear bile? A) within the last 6 months, B) 6-12 months ago, etc”. The SQTs were used to investigate bear bile use, compared against other wildlife-based medicinal products such as porcupine stomach. SQTs are theoretically more likely to result in accurate estimates of sensitive behavior that may be illegal and/or socially undesirable (Cerri et al., 2021). Based on our

previous research in Southeast Asia (Davis et al., 2019b) that showed low efficacy with randomized response technique (RRT), we decided to use unmatched count technique (UCT), choice experiments (discussed in greater detail in *Choice experiments* below), and nominative technique (NT). In UCT, the sample is divided into control and treatment groups and given a list of behavior items pertaining to the sensitive behavior of interest, in our case, the use of farmed bear bile, wild bear bile, and porcupine stomach as a comparative farmed, medicinal animal product (**Supplementary Material III**). Details about the theory behind, and methods of, UCT can be found in Cerri et al. (2021). In NT, respondents are asked two questions relating to their close friends and family's behavior (i.e., their social group); in our case, these were questions about the respondents' social group's use of bear bile/gallbladder. By asking about social group behavior versus individual behavior, the true behavior of the individual can be obscured, but the researcher can obtain sample-level estimates of the behavior prevalence. Further details of NT methodology can be found in Davis et al., (2020b).

The project team refined and piloted the instrument among the public in Vinh City ( $n = \sim 24$ ), as well as among researchers at the Center for Environment and Rural Development (CERD) at Vinh University, during enumerator training in the survey. The UCT section required additional piloting of the list items, to ensure that they were appropriate to the lived experiences of Vietnamese individuals, and to ensure that the test did not result in ceiling or floor effects, which negate the anonymity the technique gives; i.e. where individuals feel pressure to state that they have done every behavior (ceiling effect), or that they have done none of the behaviors, or only one (floor effects) (Cerri et al., 2021 and Hinsley et al., 2019). 54 list items were tested (**Supplementary Material IV**) on 100 members of the public in Vinh City, and the final items were chosen from this list based on the three categories of "low prevalence" (e.g. had a broken bone), "medium prevalence" (e.g. taken tiger balm) and "high prevalence" (e.g. had a head ache) in order to avoid floor and ceiling effects.

#### *Choice Experiments*

We used a labelled discrete choice experiment (DCE). The DCE consisted of four alternatives (natural bear bile or gallbladder, synthetic bear bile, porcupine stomach and none) and four attributes (source, type, travel time to vendor and price) (Table S.2). Labels were chosen to ensure that we were accurately capturing the preferences for the specific products of interest.

The two alternatives to bear bile represented potential product substitutes. By limiting the number of possible attribute combinations to these options we aimed to reduce cognitive burden on respondents, which increases inconsistencies in consumer choices (Caussade et al. 2005). A fourth ‘none’ alternative was added to offer a realistic scenario (Lancsar & Louviere 2008; Hoyos 2010) where respondents may choose to opt-out if none of the alternatives were satisfactory. While this results in loss of data, the presence of the opt-out option is preferable as it better aligns with consumer theory (Hoyos 2010) and as such is standard in DCE design.

**Table S.2.** Summary table of attributes and levels used in a Discrete Choice Experiment (DCE) on the use of bear bile for medicinal purposes in Vietnam

Attribute	Description	Levels	Rationale
<b>S</b>			
Source <sup>a β</sup>	The source of the bear bile	Farmed (0) Wild (1)	The origin of a product can influence preferences of bear bile consumers (Davis et al., 2016)
Type <sup>a</sup>	Form of the bile being consumed	Liquid (0) Gallbladder (1)	The form of a product can potentially influence preferences of bear bile consumers (Davis et al., <i>unpublished data</i> )
Travel time	Amount of time spent travelling from the respondent’s house to the location where the product is available	10 mins 30 mins 60 mins 120 mins	Differences in accessibility across different products might affect the purchasing decisions of consumers.
Price	Cost of acquiring the product	10 000đ <sup>α</sup> 100 000đ <sup>α</sup> 125 000đ <sup>π</sup> 150 000đ	Price influences purchasing behavior (e.g. Nuno et al., 2018). The range for the different products we investigated was based on prices known from

Vietnamese Dong (đ)	200 000đ <sup>β</sup> 250 000đ <sup>α β π</sup> 350 000đ <sup>β</sup> 400 000đ <sup>β</sup> 600 000đ <sup>α</sup> 1 000 000đ <sup>α</sup> 1 500 000đ <sup>α</sup>	conversations with bear farmers (Crudge et al., <i>unpublished data</i> ) as well as visits to several pharmacies in Vinh City and online stores. Estimates were used for illegal products, based on information provided by bear and porcupine farmers (e.g. Crudge et al., <i>unpublished data</i> and Mr T (full name omitted to protect identity), <i>pers comm.</i> ). Levels were constrained so that only relevant prices appeared for each option, and coded using 10 000 đ (Vietnamese dong) as the unit.
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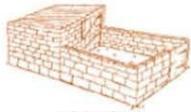
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<sup>α</sup> Restricted to the bear bile alternative

<sup>β</sup> Restricted to the porcupine stomach alternative

<sup>π</sup> Restricted to the synthetic alternative

Each round, the respondent would be presented with a different combination of attributes assigned to each alternative and was asked to select which product they would purchase based on the product's traits in that round. For example, in the choice set displayed in **Figure S.1**, the respondent is given the option of choosing wild bear gallbladder costing 600 000đ (đ = Vietnamese dong; ~\$26 USD), whereas the synthetic version costs 125 000đ (~\$5.4 USD) and a farmed porcupine stomach at 250 000đ (~\$11 USD). These are available respectively 60, 30 and 10 minutes away from the respondent's home.

				None
Source	 WILD		 FARMED	
Type	 LIQUID			
Travel time	 60 MINUTES	 30 MINUTES	 10 MINUTES	
Price (VND)	 1,500,000	 20,000	 10,000	

**Figure S.1.** An example of a choice set from the Discrete Choice Experiment (DCE) on bear bile use for medicinal purposes in Vietnam. Alternatives are labelled across the top horizontal axis, while attributes for each alternative are labelled across the left vertical axis.

As shown in **Figure S.1**, each alternative consisted of three or four attributes. Price and travelling time to a vendor were considered generic attributes, implying that they were present in all the alternatives. Price is a typical attribute in DCE as it is used to measure willingness to pay. Travel time is included as an attribute as convenience often impacts consumer decisions (Farquhar & Rowley, 2009). Source and Type were alternative-specific attributes meaning they were applicable only to certain alternatives. Animal-based alternatives (bear bile and porcupine stomach) included the attribute source, as they can be obtained from wild or farmed animals, which may impact consumer preferences (Davis et al.,

2019a). Natural bear bile included the option for two forms, liquid bear bile and portion of gall bladder that may also impact consumer preferences, although grounding evidence is lacking.

The selection of the attributes was based on past literature. There has been a longstanding debate of the impacts of farming versus wild sourcing of products, and speculation that preferences differ between whole bear gallbladders and bear bile (Davis et al., *unpublished data*). The inclusion of travel time is based on studies on broader consumer preference that have uncovered the importance of opportunity costs such as those involved in the travel required to purchase a product or access a service, and which have recently started being used in the context of wildlife trade (Doughty et al., *in review*). In this study, we designed the choice experiment around hypothetical scenarios involving traveling to a vendor (rather than having the product sent) as travel time is an opportunity cost that is easily conveyed in a choice experiment.

Price is a key attribute in consumer research as consumers in a market place often need to trade-off desired product characteristics with price. Levels were set based on local knowledge derived from previous data collection (e.g. Crudge et al., *unpublished data*) and scoping within central Vietnam (e.g. the research team went to the local pharmacy and looked at synthetic bear bile prices) and online pharmacies. We decided to use a labelled DCE, where alternatives are described by labels detailing the categories of products being considered, to capture the many differences in overall perception that separate the different alternatives available to consumers, with porcupine stomach and synthetic bear bile being included as they are two key alternatives available to bear bile commonly available to consumers in Vietnam (e.g. Brooks et al., 2010).

We designed a pilot choice experiment using an efficient design (d-error 0.0002) built in Ngene 1.0.1 (ChoiceMetrics 2012), consisting of 16 choice sets, divided into four blocks of four choices. Following other studies of a similar nature, e.g. Hinsley et al. (2015) and Nuno et al. (2018), we chose this design type because it maximises statistical efficiency in estimating preference parameters while accounting for uncertainty. Blocking was performed in Ngene to minimize the correlation within each block. Participants for the pilot ( $n=24$ ) were chosen opportunistically and were not included in the final dataset. We made minor changes to wording in the survey as a result of the pilot. Respondents were asked to answer two blocks of DCE, one for each of the different medical scenarios:

- Your family member has a bruise and you wish to buy some medicine for them. Which medicine do

you choose of the following options?

- You sprain your ankle and want to buy some medicine to heal it. Which medicine do you choose of the following options?

These scenarios were chosen to represent how bear bile is used in Vietnam, with bear bile purchased as an implicit gift, often for relatives or other close social group members, as well as for personal medical use (Davis et al., 2019a and Ho et al., *in prep*).

#### *Qualitative component*

To gain greater insights into the closed-ended questions and choice experiment results, we asked a sample of known bear bile consumers in each study area a number of open-ended questions related to bear bile consumption and bear farming in Vietnam (**Appendix X**). The guide was designed to encourage reflection around the act of using and obtaining bile, as well as the state of bear farming in Vietnam (**Supplementary Material V**). This took the form of a semi-structured interview, with respondents given the opportunity to expand when and where appropriate, and otherwise guided in what information they were asked to provide (Bernard, 2017), such as the specific context of their bear bile use.

The interview guide was based on a previously designed guide used and adapted in research projects in Cambodia and Laos (Davis et al., 2020a,b). The guide was piloted among both the CERD research team and the public in Vinh City ( $n = 24$ ), with minor adjustments made as a result. Examples of refinements included, shifting the order of the questions so that respondents could more clearly understand what was being asked, e.g. the question “Did you know that bear farms are being phased out?” was moved to follow preceding questions about bear farms such as “Have you ever visited a bear farm?”.

## **Supp. Materials II: Baseline Questionnaire - Viet Nam**

ID: \_\_\_\_\_ Day \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_ Interviewer initials: \_\_\_\_\_  
District:..... Province:.....

Version **(A)**    **(B) [Circle one]**

### **[SECTION A: Questionnaire]**

#### **Please do NOT write respondent's name, address or contact details**

We are interested in people's attitude towards bears. Would you mind spending a few minutes to answer a short questionnaire? All your information will be treated as strictly confidential. We will not record any names or identifying information. At the end of the interview, we would like to give you a small gift to thank you for your support. You can refuse to answer any question or stop the interview at any time.

Do you agree to participate in this survey?

NO [IF No, complete the non-response data sheet]

Yes  [IF YES please proceed to the rest of the questionnaire]

1.     Gender     **Male**     **Female**

2.     What year were you born? \_\_\_\_\_

3.     What province do you live in?

Province: \_\_\_\_\_

4.     How long have you lived in there? \_\_\_\_\_ years

5.     What is the highest level of education you have completed? (*Tick one box*)

**None**

**Primary school**

**Secondary school**

**High school**

**College**

**Bachelor's Degree**

**Master's Degree**

**PhD**

6.     What is your nationality?  **Vietnamese**     **Other:** \_\_\_\_\_

## **Supp. Materials II: Baseline Questionnaire - Viet Nam**

ID: \_\_\_\_\_ Day \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_ Interviewer initials: \_\_\_\_\_  
District: ..... Province: .....

7. What is your ethnicity? (*Tick all that apply*)

**Kinh**

**Tày**

**Mường**

**Hmong**

**Dao**

**Other**  \_\_\_\_\_

8. What is your religion? (*Tick all that apply*)

**None**

**Ancestor spirits**

**Buddhist**

**Christian**

**Confucian**

**Jewish**

**Muslim**

**Taoist**

**Other** \_\_\_\_\_

9. Which one of these items do you have at home? (*Tick all that apply*)

**Tractor**

**TV**

**Mobile phone**

**Computer/Laptop**

**Fridge/Freezer**

**Bicycle**

**Motorbike**

**Car/Van**

**Boat**

**Air conditioner**

**Fan**

**Washing machine**

10. Which types of medical care have you used in the last 12 months (*Tick all that apply*)

**Western medicine**

**Animal-based Traditional Medicine**

**Herbal-based Traditional Medicine**

**Spiritual/Shaman**

**Other**  (please specify) \_\_\_\_\_

**None**

## **Supp. Materials II: Baseline Questionnaire - Viet Nam**

ID: \_\_\_\_\_ Day \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_ Interviewer initials: \_\_\_\_\_  
District:..... Province:.....

### **UCT**

Version **(A)**    **(B) [Circle one]**

*I am going to ask about activities people do. The method ensures that your answers are completely anonymous. Each time I will show you a card, and ask you to look at the list of things on it. I will then ask HOW MANY of these things you have done over the past 12 months. I don't want to know which ones, just how many.*

11. (i) This list is about transportation. In the past 12 months, how many forms of transportation on this list have you used? *Do not state which you have or have not used, just how many.*

1                  2                  3                  4                  5                  6

11. (ii) The next list is about and medical conditions and treatments. In the past 12 months, how many of the following have you done? *Do not state which you have or have not used, just how many.*

1                  2                  3                  4                  5                  6

11. (iii) The next list is about and medical conditions and treatments. In the past 12 months, how many of the following have you done? *Do not state which you have or have not used, just how many.*

1                  2                  3                  4                  5                  6

11. (iv) The next list is about and medical conditions and treatments. In the past 12 months, how many of the following have you done? *Do not state which you have or have not used, just how many.*

1                  2                  3                  4                  5                  6

## Supp. Materials II: Baseline Questionnaire - Viet Nam

ID: \_\_\_\_\_ Day \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_ Interviewer initials: \_\_\_\_\_  
District:..... Province:.....

12. Have you ever used bear bile/ bear gallbladder? (*circle the response*)

**Yes** \*

**No** [**If no, skip to Qt 17**]

13. IF YES: When was the most recent time you used FARMED bear bile/farmed gallbladder?  
(*Tick one option below.*)

- a) Within the last six months \*      b) Between the last 6 - 12 months \*  
c) Between 1-5 years ago       d) Between 6-10 years ago   
e) More than 10 years ago       f) Did NOT use FARMED bear bile   
g) Don't remember \*

14. \*IF 13 a, b, g: How often have you used farmed bear bile / farmed bear gallbladder in the last 12 months? (*Tick one option below*)

Once

2 to 5 times

6 to 10 times

Between 10 to 30 times

Between 30 to 50 times

More than 50 times

## **Supp. Materials II: Baseline Questionnaire - Viet Nam**

ID: \_\_\_\_\_ Day \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_ Interviewer initials: \_\_\_\_\_  
District:..... Province:.....

**15.** \*IF YES: When was the most recent time you used WILD bear bile/farmed gallbladder?  
*(Tick one option below.)*

- a) Within the last six months \*      b) Between the last 6 - 12 months \*  
c) Between 1-5 years ago       d) Between 6-10 years ago   
e) More than 10 years ago       f) Did NOT use WILD bear bile   
g) Don't remember \*

**16.** IF 15 a, b, g: How often have you used wild bear bile/ wild bear gallbladder in the last 12 months? *(Tick one option below)*

- Once       2 to 5 times   
6 to 10 times       Between 10 to 30 times       Between 30 to 50 times   
More than 50 times

**17.** Have you ever given bear bile/bear gallbladder to someone as a gift?

- Yes       No

**18.** Have you ever received a gift of bear bile/bear gallbladder from someone as a gift?

- Yes       No

## Supp. Materials II: Baseline Questionnaire - Viet Nam

ID: \_\_\_\_\_ Day \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_ Interviewer initials: \_\_\_\_\_  
District:..... Province:.....

**19. Please indicate the extent to which you agree or disagree with the following statements.  
(Circle only one response per row).**

Farmed bear bile has medicinal value	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Don't know
Wild bear bile/bear gallbladder has medicinal value	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Don't know
It is easy to find places to buy bear bile/bear gallbladder	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Don't know
A gift of bear bile shows respect	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Don't know
A gift of bear bile shows caring	Strongly Disagree	Disagree	Neither agree nor disagree	Agree	Strongly Agree	Don't know

## **Supp. Materials II: Baseline Questionnaire - Viet Nam**

ID: \_\_\_\_\_ Day \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_ Interviewer initials: \_\_\_\_\_  
District:..... Province:.....

### **[Section B: Choice Experiment]**

### **FIRST CHOICE EXPERIMENT AND THEN FOLLOWING QUALITATIVE QUESTIONS**

Definitions: Synthetic bear bile is bear bile medicine made in a lab. Wild bear bile/gallbladder is taken from wild bears that are hunted. Porcupine stomach is taken from porcupines that are farmed.

#### **Choice Experiment Response**

##### **SCENARIO 1.**

RESPONSE BLOCK [circle one]: (1) (2) (3)

Choice A. \_\_\_\_\_

Choice B. \_\_\_\_\_

Choice C. \_\_\_\_\_

Choice D. \_\_\_\_\_

##### **SCENARIO 2.**

RESPONSE BLOCK [circle one]: (1) (2) (3)

Choice A. \_\_\_\_\_

Choice B. \_\_\_\_\_

Choice C. \_\_\_\_\_

Choice D. \_\_\_\_\_

## **Supp. Materials II: Baseline Questionnaire - Viet Nam**

ID: \_\_\_\_\_ Day \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_ Interviewer initials: \_\_\_\_\_  
District:..... Province:.....

**IF the participant answered YES in using bear bile/ gallbladder at least once in their life, please ask the below question:**

1. Have you ever used any other bear parts? What, when, why?

## **Supp. Materials II: Baseline Questionnaire - Viet Nam**

ID: \_\_\_\_\_ Day \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_ Interviewer initials: \_\_\_\_\_  
District:..... Province:.....

[ASK EVERYBODY the following closed questions (1 – 8)]:

1. In the past 12 months have you used synthetic bile?      Yes       No
2. In the past 12 months have you used porcupine stomach?      Yes       No
3. In the past 12 months have you used loris parts?      Yes       No
4. In the past 12 months have you used bear bile plant?      Yes       No
5. In the past 12 months have you used pangolin scales?      Yes       No
6. In the past 12 months have you used medicine made from tiger bones?      Yes       No
7. In the past 12 months have you used rhino horn?      Yes       No
8. In the last 12 months have you used serow?      Yes       No

## **Supp. Materials II: Baseline Questionnaire - Viet Nam**

ID: \_\_\_\_\_ Day \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_ Interviewer initials: \_\_\_\_\_  
District:..... Province:.....

### **[Section C: Qualitative]**

**See for the moment separate document...**

#### **Extra demographic:**

1. Occupation(s): \_\_\_\_\_
2. Income: Would you mind indicating your income last month? [Please tick the suitable answer]
  - a. Between 0 and 10 million VND
  - b. Between 11 and 20 million VND
  - c. Between 21 and 40 million VND
  - d. Between 41 and 60 million VND
  - e. Between 61 and 80 million VND
  - f. Between 81 and 100 million VND
  - g. More than 100 million VND
  - h. Would rather not say

## **Supp. Materials II: Baseline Questionnaire - Viet Nam**

ID: \_\_\_\_\_ Day \_\_\_\_\_ Month \_\_\_\_\_ Year \_\_\_\_\_ Interviewer initials: \_\_\_\_\_  
District:..... Province:.....

i.

3. How many members of your closest family and friends do you know for certain have used/consumed bear bile or gall bladder in the last 12 months?

**Answer:**\_\_\_\_\_ (*if 0, write the number and skip to end. If  $\geq 1$ , write response and go to question 4 below.*)

*Note: Write the initials of every individual on separate pieces of paper. If the interviewee knows 100 people that have used bear bile or gall bladder for medicinal purposes in the last 12 months then you will need 100 pieces of paper. Then ask the interviewee to randomly select one piece of paper to identify the nominated friend. The pieces of paper will be disposed of.*

4. Other than you, how many other people do you believe know that the nominated friend has used bear parts or products in the last 12 months?

**Answer:**\_\_\_\_\_

### **THANK YOU FOR YOUR PARTICIPATION**

#### **Additional interviewer/note taker comments:**

For Example: Was this interviewee reliable?

Was anyone else present during the interview?

Is there any reason to doubt any responses?

Other comments?

# Supp. Materials III

(A)

11. (i)

Đi xe máy



Lái xe máy trong khi  
không đội mũ bảo hiểm



Xịt lốp



Đi xe buýt



Đi xe lửa



(A)

11. (ii)

Take medicine for malaria



Take medicine for fever



Dùng paracetamol / acetiminophan



Take farmed mật gấu



Take ginseng



Have a headache



(A)

11. (iii)

Take medicine for  
stomach ache



Take antibiotics



Take a vitamin



Take wild mật gấu



Use plaster for fever/Dán  
thuốc cao trị sốt



Have a chest infection



(A)

11. (iv)

Have a sore throat



Have a flu



Use herbal medicine



Take porcupine stomach



Have a tooth removed



Have an ear infection



(B)

11. (i)

Đi xe máy



Đi xe xích lô



Xịt lốp



Đi xe buýt



Đi xe lửa



(B)

11. (ii)

Take medicine for malaria



Take medicine for fever



Dùng paracetamol / acetaminophen



Take ginseng



Have a headache



(B)

11. (iii)

Take medicine for  
stomach ache



Take antibiotics



Take a vitamin



Use plaster for fever/Dán  
thuốc cao trị sốt



Have a chest infection



(B)

11. (iv)

Have a sore throat



Have a flu



Use herbal medicine



Have a tooth removed



Have an ear infection



**SUPP MATERIALS IV****TUỔI****GIỚI TÍNH**

Trong vòng 12 tháng qua, bạn đã làm những việc nào sau đây?

		<b>Yes</b>	<b>No</b>
1	Hành vi / ốm đau		
2	Dùng dầu hổ		
3	Uống vitamin		
4	Dùng paracetamol / acetiminophan		
5	Kháng sinh		
6	Đi đến bệnh viện ở Bangkok		
7	Đi bệnh viện ở Hà Nội		
8	Đi đến bệnh viện ở Nga		
9	Dùng thuốc sốt rét		
10	Đến bác sĩ		
11	Đến nha sĩ		
12	Nhổ răng		
13	Phẫu thuật tim		
14	Phẫu thuật mắt		
15	Bị gãy xương		
16	Có một vết sưng trên đầu		
17	Đau họng		
18	Đứt da		
19	Nhiễm trùng tai		
20	Nhiễm trùng ngực		
21	Bầm tím		
22	Chuyền tĩnh mạch		
23	Rửa vết cắt bằng nước		
24	Cảm lạnh		
25	Cảm cúm		
26	Dán thuốc cao trị sốt		
27	Dùng thuốc hạ sốt		
28	Cào vết muỗi cắn		
29	Phẫu thuật đầu gối		
30	Thuốc thảo dược		
31	Đặt băng cá nhân lên vết cắt		
32	Dùng thuốc mật gấu		
33	Sử dụng sừng tê giác		
34	Thuốc xoa mật gấu lên da		
35	Uống thuốc mật gấu		
36	Dùng nhân sâm		
37	Bị đau đầu		
38	Bị đau lưng		
39	Bị đau bụng		
40	Bị đau cơ		
41	Bị đau khớp		
42	Cổ tay bị bong gân		

43	Đi xe máy
44	Đi xe xích lô
45	Đi xe buýt
46	Đi xe lửa
47	Bay máy bay
48	Bay trực thăng
49	Lái xe đẹp trong khi không đội mũ bảo hiểm
50	Xịt lốp
51	Có liên quan đến một vụ tai nạn giao thông nhỏ
52	Có liên quan đến một vụ tai nạn giao thông lớn
53	Vô tình làm đau mình
54	Vô tình tự cắt mình

GENDER
<b>Behaviour/Ailment</b>
<b>2</b> Taken tiger balm
<b>3</b> Taken a vitamin
<b>4</b> Taken paracetamol/acetiminophan
<b>5</b> Taken an anti-biotic
<b>6</b> Went to hospital in Bangkok
<b>7</b> Went to hospital in Hanoi
<b>8</b> Went to hospital in Russia
<b>9</b> Taken malaria medicine
<b>10</b> Visited a doctor
<b>11</b> Visited a dentist
<b>12</b> Had a tooth removed
<b>13</b> Had heart surgery
<b>14</b> Had eye surgery
<b>15</b> Had a broken bone
<b>16</b> Got a bump on the head
<b>17</b> Had a sore throat
<b>18</b> Had cut skin
<b>19</b> Had an ear infection
<b>20</b> Had a chest infection
<b>21</b> Had a bruise
<b>22</b> Had an intravenous Drip
<b>23</b> Rinse a cut with water
<b>24</b> Had a cold
<b>25</b> Had a flu
<b>26</b> Use plaster for fever
<b>27</b> Taken medicine for fever
<b>28</b> Scratched a mosquito bite
<b>29</b> Had knee surgery
<b>30</b> Used herbal medicine
<b>31</b> Put a bandaid on a cut
<b>32</b> Use bear bile medicine
<b>33</b> Use rhino horn
<b>34</b> Rubbed bear bile medicine on skin
<b>35</b> Drank bear bile medicine
<b>36</b> Used ginseng
<b>37</b> Had a head ache
<b>38</b> Had back ache
<b>39</b> Had a stomach ache
<b>40</b> Had muscle pain
<b>41</b> Had joint pain
<b>42</b> Sprained wrist
<b>43</b> Ride on a motorbike
<b>44</b> Ride in a cyclo
<b>45</b> Ride in a bus
<b>46</b> Ride on a train

<b>47</b>	Fly in a plane
<b>48</b>	Fly in a helicopter
<b>49</b>	Drive a bike while not wearing a helmet
<b>50</b>	Get a flat tire
<b>51</b>	Be involved in a small traffic accident
<b>52</b>	Be involved in a big traffic accident
<b>53</b>	Hurt yourself by accident
<b>54</b>	Cut yourself by accident

Interview ID		1	2	3	4
Age		56	19	18	18
Gender	Nam	Nam	Nam	Nu	
Dùng dầu hổ	0	0	0	0	0
Uống vitamin	0	1	0	1	
Dùng paracetamol / acetiminophan	0	1	1	0	
Kháng sinh	0	1	0	1	
Đi đến bệnh viện ở Bangkok	0	0	0	0	
Đi bệnh viện ở Hà Nội	0	0	0	0	
Đi đến bệnh viện ở Nga	0	0	0	0	
Dùng thuốc sốt rét	0	0	0	1	
Đến bác sĩ	0	1	1	1	
Đến nha sĩ	0	0	1	0	
Nhổ răng	1	0	0	0	
Phẫu thuật tim	0	0	0	0	
Phẫu thuật mắt	0	0	0	0	
Bị gãy xương	0	0	0	0	
Có một vết sưng trên đầu	0	0	0	0	
Đau họng	1	1	0	0	
Đứt da	0	1	1	0	
Nhiễm trùng tai	0	0	1	0	
Nhiễm trùng ngực	0	0	0	0	
Bầm tím	0	1	1	0	
Chuyền tĩnh mạch	0	0	1	0	
Rửa vết cắt bằng nước	1	1	1	0	
Cảm lạnh	0	1	1	0	
Cảm cúm	0	1	1	1	
Dán thuốc cao trị sốt	0	0	0	0	
Dùng thuốc hạ sốt	0	1	1	0	
Cào vết muỗi cắn	1	1	1	0	
Phẫu thuật đầu gối	0	0	0	0	
Thuốc thảo dược	0	0	0	0	
Đặt băng cá nhân lên vết cắt	0	1	1	0	
Dùng thuốc mật gấu	0	0	0	0	
Sử dụng sừng tê giác	0	0	0	0	
Thuốc xoa mật gấu lên da	0	0	0	0	
Uống thuốc mật gấu	0	0	0	0	
Dùng nhân sâm	0	0	0	0	
<b>Bị đau đầu</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>0</b>	
Bị đau lưng	1	1	1	1	
Bị đau bụng	1	1	1	1	
Bị đau cơ	1	1	1	0	
Bị đau khớp	1	1	1	na	
Cổ tay bị bong gân	1	0	0	0	
<b>Đi xe máy</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>	
Đi xe xích lô	0	0	0	0	
Đi xe buýt	1	1	1	1	
Đi xe lửa	1	1	0	0	

<b>Bay máy bay</b>	0	1	0	0
<b>Bay trực thăng</b>	0	0	0	0
<b>Lái xe đẹp trong khi không đội mũ bảo hiểm</b>	1	1	1	0
<b>Xịt lốp</b>	0	1	1	0
<b>Có liên quan đến một vụ tai nạn giao thông nhỏ</b>	0	0	0	0
<b>Có liên quan đến một vụ tai nạn giao thông lớn</b>	0	0	0	0
<b>Vô tình làm đau mình</b>	1	1	1	0
<b>Vô tình tự cắt mình</b>	0	1	1	0

#### SUPP MATERIALS IV

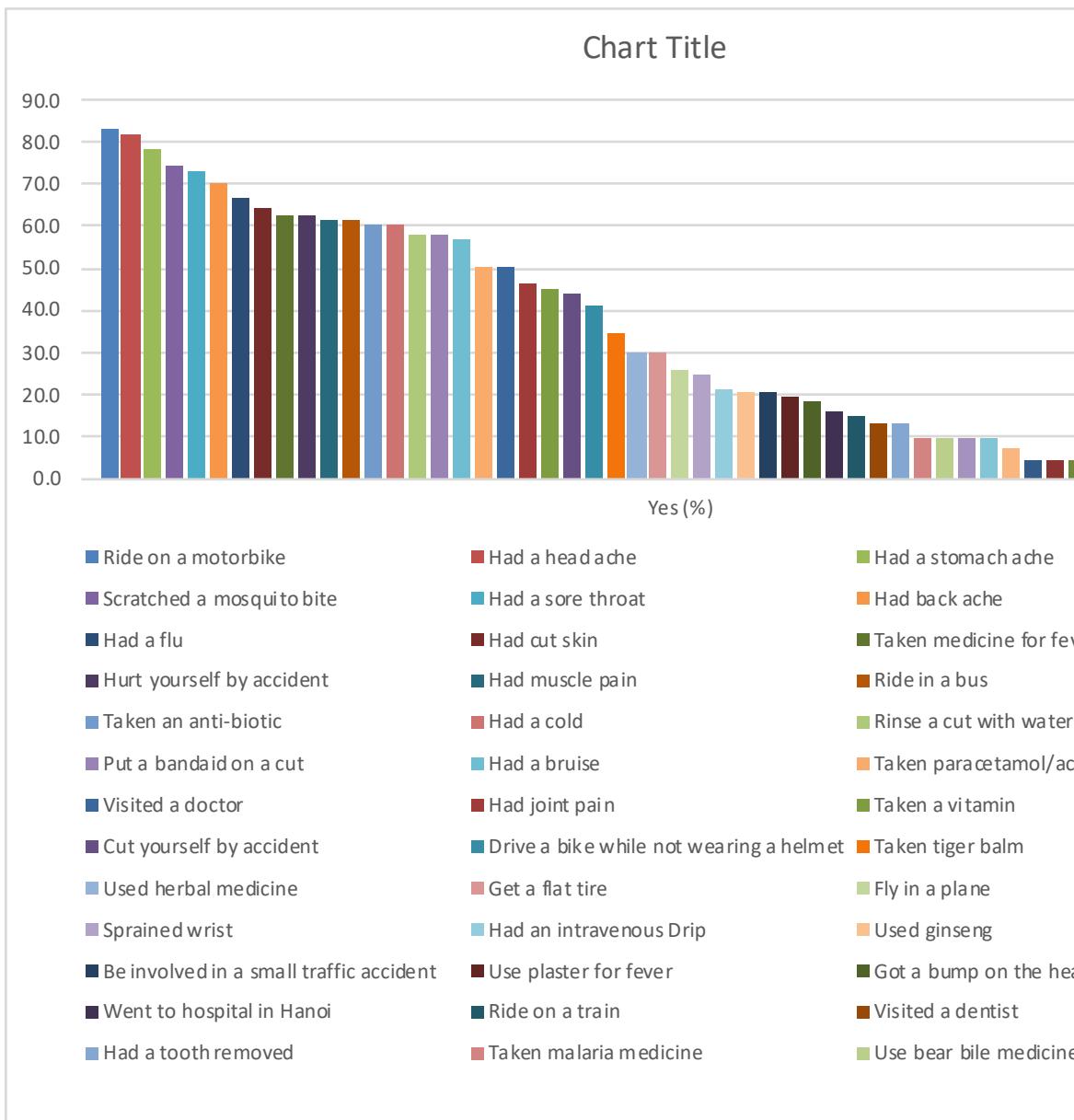
Behaviour/Ailment	Yes (%)	
Ride on a motorbike	82.8	High Prevalence
Had a head ache	81.7	
Had a stomach ache	78.5	Medium Prevalence
Scratched a mosquito bite	74.2	
Had a sore throat	73.1	Low Prevalence
Had back ache	69.9	Sensitive
Had a flu	66.7	
Had cut skin	64.5	
Taken medicine for fever	62.4	
Hurt yourself by accident	62.4	
Had muscle pain	61.3	
Ride in a bus	61.3	
Taken an anti-biotic	60.2	
Had a cold	60.2	
Rinse a cut with water	58.1	
Put a bandaid on a cut	58.1	
Had a bruise	57.0	
Taken paracetamol/acetiminophan	50.5	
Visited a doctor	50.5	
Had joint pain	46.2	
Taken a vitamin	45.2	
Cut yourself by accident	44.1	
Drive a bike while not wearing a helmet	40.9	
Taken tiger balm	34.4	
Used herbal medicine	30.1	
Get a flat tire	30.1	
Fly in a plane	25.8	
Sprained wrist	24.7	
Had an intravenous Drip	21.5	
Used ginseng	20.4	
Be involved in a small traffic accident	20.4	
Use plaster for fever	19.4	
Got a bump on the head	18.3	
Went to hospital in Hanoi	16.1	
Ride on a train	15.1	
Visited a dentist	12.9	
Had a tooth removed	12.9	
Taken malaria medicine	9.7	
Use bear bile medicine	9.7	
Rubbed bear bile medicine on skin	9.7	
Ride in a cyclo	9.7	
Had a broken bone	7.5	
Had an ear infection	4.3	
Had a chest infection	4.3	
Had knee surgery	4.3	
Use rhino horn	4.3	

Drank bear bile medicine	<b>3.2</b>
Be involved in a big traffic accident	<b>3.2</b>
Went to hospital in Bangkok	<b>1.1</b>
Went to hospital in Russia	<b>1.1</b>
Had eye surgery	<b>1.1</b>
Fly in a helicopter	<b>1.1</b>
Had heart surgery	<b>0.0</b>

**Test****UCT 1**

Ride on a motorbike	Had a head ache
Ride in a bus	Taken medicine for fever
Get a flat tire	Taken paracetamol/acetimind
Ride on a train	Used ginseng
Ride in a cyclo	Taken malaria medicine
Drive a bike while not wearing a helmet	Use bear bile medicine

UCT 2	UCT 3
Had a stomach ache	Had a sore throat
Taken an anti-biotic	Had a flu
Taken a vitamin	Used herbal medicine
Use plaster for fever	Had a tooth removed
Had a chest infection	Had an ear infection
Use loris parts	Use porcupine stomach



ID: \_\_\_\_\_ Ngày \_\_\_\_ Tháng \_\_\_\_ Năm \_\_\_\_\_ Tên viết tắt của người phỏng vấn: \_\_\_\_\_  
Huyện: \_\_\_\_\_ Tỉnh: \_\_\_\_\_

### PHẦN C: Hướng dẫn phỏng vấn

- 1) Tình huống khi bạn sử dụng mật gấu là gì? // What was the situation when you used bear bile?
- 2) Bạn có thể mô tả về lần gần đây nhất bạn sử dụng mật gấu không? // Can you describe the last time you used bear bile?
- 3) Bạn có nhớ lần đầu tiên bạn sử dụng mật gấu không? Khi nào? Hoàn cảnh là gì? // Do you remember the first time you used bear bile? When? What is the situation?
- 4) Bạn có sử dụng mật gấu thường xuyên kể từ lần đầu tiên bạn sử dụng, cho đến gần đây nhất? // Have you used bear bile regularly since you first used it, until most recently?
- 5) Làm thế nào bạn có được mật? (ví dụ: mua nó từ một trang trại, từ một cửa hàng, một món quà từ người thân?) // How did you get the bile? (Example: buying it from a farm, from a store, a gift from a loved one?)
- 6) Bạn đã sử dụng mật gấu để làm gì? Có hiệu quả không? Tại sao? // What did you use bear bile for? Is it effective? Why?
- 7) [nếu họ cũng sử dụng mật gấu hoang dã] Bạn nghĩ hình thức mật gấu nào hiệu quả hơn? // [if they also use wild bear bile] Which form of bear bile do you think is more effective?
- 8) [nếu họ ngừng sử dụng] Tại sao bạn ngừng sử dụng mật gấu? // [if they stop using] Why did you stop using bear bile?
- 9) Làm thế nào bạn có thể biết đó là mật gấu mà không phải loại khác? // How can you tell if it's authentic bear bile and not a fake?
- 10) Bạn hoặc bất cứ ai bạn biết đã từng bị tác dụng phụ sau khi sử dụng mật gấu chưa? Chuyện gì đã xảy ra? // Have you or anyone you know experienced any side effects after taking bear bile? What happened?
- 11) Bạn có biết có hoặc đã từng có trang trại gấu ở khu vực này không? // Did you know there is or has been a bear farm in this area?
- 12) Bạn đã bao giờ đến thăm một trang trại gấu? Hoàn cảnh? // Have you ever visited a bear farm? What was the situation?
- 13) Bạn nghĩ gấu ở trang trại đến từ đâu? // Where do you think farmed bears come from?
- 14) Bạn có biết rằng các trang trại gấu đang bị loại bỏ [có thể giải thích rằng sẽ không còn trang trại nào nữa cho đến năm 2022]? // Did you know that bear farms are being phased out [can be explained that there won't be any more after 2022]?
- 15) Bạn sẽ làm gì khi họ đóng cửa? [nếu trại gấu đã đóng cửa trong khu vực] Bạn đã làm gì khi trại gấu ngừng hoạt động? // What will you do when they close? [if the bear farm is closed in the area] What did you do when the bear farm was shut down?

## **Supp Materials V**

16) Bạn đã bao giờ sử dụng bộ phận khác của gấu? Bạn đã dùng gì? Khi nào? Tại sao bạn sử dụng nó? // Have you ever used another bear part? What did you use? When? Why would you use it?

***Người phỏng vấn bổ sung / người ghi chú nhận xét:***

*Người được phỏng vấn này có đáng tin cậy không?*

*Có ai khác có mặt trong cuộc phỏng vấn không?*

*Có lý do nào để nghi ngờ câu trả lời không?*

*Những bình luận khác?*

# Supp Materials VI - UCT\_double\_dist

E.O. Davis

5/25/2021

```
#' This function calculates a confidence interval from two distributions.

#' This is especially useful if, for example, you are creating a confidence interval
# for unmatched count technique (UCT) estimates.
#' @param dataframe Input a two distribution dataframe
#' @keywords UCT confidence intervals
#' @export
#' @examples
#' southjetty()

uct_double_dist <- function(df) {
  require(tidyverse)
  x1 <- df %>% dplyr::filter(treat == "A") %>% summarize(x1 = mean(y))
  x2 <- df %>% dplyr::filter(treat == "B") %>% summarize(x2 = mean(y))
  sd1 <- df %>% dplyr::filter(treat == "A") %>% summarize(sd1 = sd(y))
  sd2 <- df %>% dplyr::filter(treat == "B") %>% summarize(sd2 = sd(y))
  num1 <- df %>% dplyr::filter(treat == "A") %>% summarize(num1 = n())
  num2 <- df %>% dplyr::filter(treat == "B") %>% summarize(num2 = n())
  sd1s <- (sd1^2)/num1
  sd2s <- (sd2^2)/num1
  diff <- x1 - x2
  srs <- sqrt(sd1s + sd2s)
  me <- srs * 1.96
  upper.ci <- diff + me
  lower.ci <- diff - me
  newlist <- list(diff, lower.ci, upper.ci)
  return(newlist)
}
```

## Supplementary Material VII

### Demographics

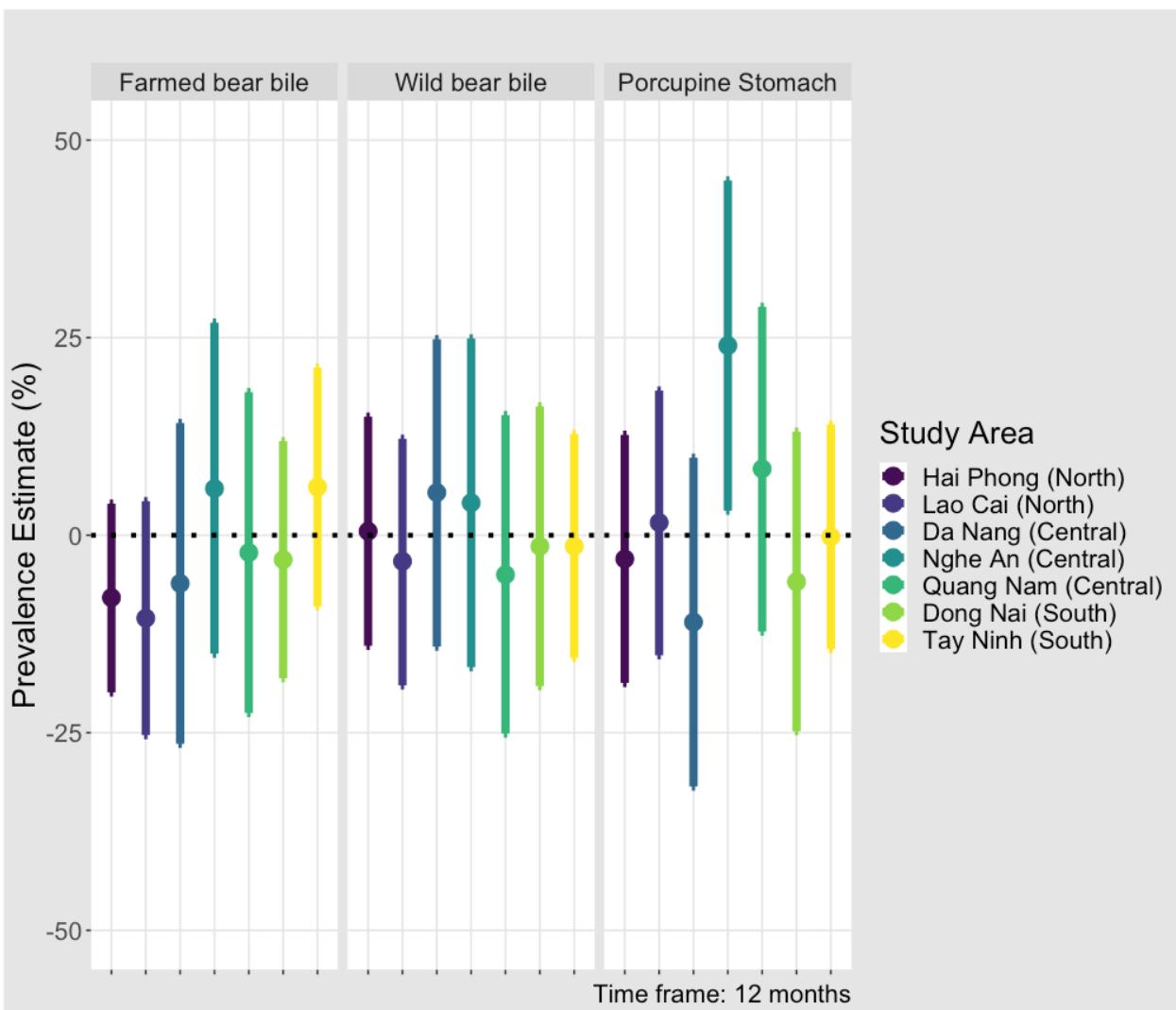
**Table S.2:** Demographics of the Vietnam sample. Women were underrepresented across sites, and ages skewed older. Individuals had generally lived in the province most of their life, had a high school education, were Kinh, worshipped ancestor spirits, and stated that they made between 0 to 10 million dong (\$434 USD) a month.

Vietnam Sample Demographics								
Area	n	Gender Ratio (F)	Mean Age	Mean Years Lived in Province	Highest Level of Education	Level of Kinh	Most Common Religion	Most Common Income Level
All	2463	46%	42	36	THPT <sup>1</sup>	83%	Ancestor Spirits	From 0 to 10 million dong a month
Da Nang	194	48%	40	31	Bachelor's Degree	100%	Ancestor Spirits	From 0 to 10 million dong a month
Dong Nai	426	47%	41	35	Bachelor's Degree	100%	Ancestor Spirits	From 0 to 10 million dong a month
Hai Phong	402	46%	41	37	THPT	100%	Ancestor Spirits	From 0 to 10 million dong a month
Lao Cai	383	48%	39	32	THPT	46% <sup>2</sup>	Ancestor Spirits	From 0 to 10 million dong a month
Nghe An	435	46%	43	39	Bachelor's Degree	98%	Ancestor Spirits	From 0 to 10 million dong a month
Quang Nam	200	49%	42	41	Primary school	0% <sup>3</sup>	Ancestor Spirits	From 0 to 10 million dong a month
Tay Ninh	423	43%	46	37	THPT	99%	Ancestor Spirits	From 0 to 10 million dong a month

<sup>1</sup> THPT is the Vietnamese acronym for high school/secondary school.

<sup>2</sup> The sample was otherwise 21% Dao, 16% Hmong, 16% Thai, 0.5% Tay, and 0.3% Chinese.

<sup>3</sup> The sample was 100% Cotu.



**Figure S.2:** Confidence intervals of UCT estimates by study area, for three products: farmed bear bile, wild bear bile, and porcupine stomach ( $n = 2,463$ ).

## Supplementary Material VIII

**Table S.3:** Random Parameter Logit estimates of utility function for each attribute in Scenario 1, with standard errors for Discrete Choice Experiment (DCE) on use of bear bile for medicinal purposes in Vietnam. Significance levels: \* P < 0.05, \*\* P < 0.01, \*\*\* P < 0.001. McFadden Pseudo R-squared = 0.348. ASC stands for Alternative Specific Constant. Attribute reference levels: 'Source: Farmed', 'Type: Liquid', Gender: 'Female'.

Attribute	Coefficient	Standard Error
Synthetic ASC	2.054 ***	0.059
Porcupine stomach ASC	-3.076***	0.138
No Choice ASC	0.993***	0.066
Source <sup>a</sup>	1.427 ***	0.24
Type <sup>a</sup>	0.413 ***	0.091
Travel time	0.0004	0.0004
Price <sup>b</sup>	-0.003 **	0.001
Source * Nghe_An	1.654 ***	0.236
Source * Hai_Phong	-0.059	0.245
Source * Lao_Cai	0.423	0.238
Source * Da_Nang	0.042	0.241
Source * Dong_Nai	0.191	0.241
Source * Kinh	-1.088 ***	0.142
Source * Ancestral Spirits	-0.06	0.12
Source * Education Level	-0.131 **	0.04
Source * Age	-0.001	0.003
Source * Gender	0.195 *	0.085
Source * Past Use	0.021	0.131
Type * Past Use	-0.212	0.161
Travel * Past Use	0.0003	0.001
Price * Past Use	0.002	0.001

<sup>a</sup> Defined as random parameters

<sup>b</sup> Unit used: 1 000 ₫

**Table S.4:** Random Parameter Logit estimates of utility function for each attribute in Scenario 2, with standard errors for Discrete Choice Experiment on use of bear bile for personal medicinal purposes in Vietnam. Significance levels: \* P < 0.05, \*\* P < 0.01, \*\*\* P < 0.001. McFadden Pseudo R-squared = 0.397. ASC stands for Alternative Specific Constant. Attribute reference levels: ‘Source: Farmed’, ‘Type: Liquid’, Gender: ‘Female’.

Attribute	Coefficient	Standard Error
Synthetic ASC	2.14***	0.062
Porcupine stomach ASC	-2.877***	0.152
No Choice ASC	0.948***	0.071
Source <sup>a</sup>	-0.036	0.409
Type <sup>a</sup>	0.278*	0.104
Travel time	-0.001	0.0004
Price <sup>b</sup>	-0.003***	0.001
Source * Nghe_An	0.482*	0.234
Source * Hai_Phong	-0.127	0.242
Source * Lao_Cai	0.258	0.239
Source * Da_Nang	-0.302	0.266
Source * Dong_Nai	-0.404	0.256
Source * Kinh	0.155	0.187
Source * Ancestral Spirits	0.293*	0.135
Source * Education Level	-0.031	0.047
Source * Age	-0.009*	0.004
Source * Gender	-0.02	0.1
Source * Past Use	-0.16	0.147
Type * Past Use	-0.225	0.188
Travel * Past Use	0.0022	0.001
Price * Past Use	0.001	0.002

<sup>a</sup> Defined as random parameters

<sup>b</sup> Unit used: 1 000 ₫