Study protocol of yield, NNS and prevalence of screening for Diabetes and hypertension

1. Title of the study
Yield, NNS and prevalence of screening for DM/hypertension among tuberculosis index cases and contacts through single time screening: a contact tracing-based study.

2. Introduction
Recent data for the global burden of disease presented a large number of countries are confronted a huge burden of disease from both chronic non-communicable diseases (NCDs) and communicable diseases (CDs) [1]. NCDs and their risk factors play an important role at the population level in CDs transmissions, such as pulmonary tuberculosis (PTB) epidemics. The prevalence of NCDs, such as diabetes (DM), hypertension (HTN) increase at relatively high speed with the reasons of an aging population, rapid urbanization, changes in environmental factors and lifestyle changes[2].

The prevalence of DM and hypertension is consistently found to be higher among TB patients than among the general population. In India, the prevalence of diabetes was 7.5% for PTB patients and 4.5% for non-TB patients and that of hypertension was 24.5% and 17.3%, respectively[3]. In South Africa, 26.9% of people with TB had one and 25.3% had at least two chronic diseases[4]. In a study in China, the prevalence of DM in TB patients (6.3%) was 3-time higher than that in the non-TB controls (4.7%)[5].

DM and hypertension are usually considered as twin diseases with substantial overlap. They are frequently concurrent, which share a common pathway and risk factors such as obesity, physical inactivity, and unhealthy lifestyle[6]. A high comorbid diseases pattern was found for PTB patients, with 37% HTN and 12% DM according to a primary care study in South Africa based on the analysis of treatment prescriptions[7]. A similar finding was reported in a study of N Folb et al that considerable multi-morbidity was found and unmet treatment needs existing with 4% PTB prevalence in HTN group received no treatment or medicines, 6.5% in the DM group and 49.0% in the respiratory diseases group among NCDs patients[8]. In addition, some studies reported that substantial undiagnosed cases with the comorbidity of hypertension and DM were observed both in the general population and among PTB patients[9,10], which
indicates some NCDs patients are undiagnosed and untreated, probably leading to a lot of complications, even premature deaths. However, little is known about the precise size of the problem and the appropriate approach to deal with the burden is still unclear.

Disease screening is considered to produce yield both in the clinical field and public health. Yield is the measure of previously unrecognized disease, diagnosed as the result of screening and brought to treatment [11]. At the same time, clarifying how many people should be detected to save one life is important. The number needed to screen (NNS) is the number of people that needed to screen for a given duration to prevent one death or adverse event[12]. If the yield is of high value and the NNS is small, the screening is supposed to be relatively cost-effective. Both the yield and NNS of screening for DM and hypertension have rarely been evaluated in the settings of PTB control programs. Recently, screening for DM and hypertension in PTB patients is increasing[9,13,14]. It is important to clarify the magnitude of the yield and the NNS for screening DM and hypertension among the community people and PTB population. However, it is difficult to directly compare the problems between the PTB patients and the general population due to the limited actual conditions. In terms of the current well-established household contact tracing program for PTB patients, we assumed that the yield and NNS of screening in contacts of PTB cases are similar to that in the general population. Therefore, We will conduct a large-scale study based on household contact-tracing among TB households with a TB case.

3. Objective(s) of the study
To evaluate the yield, number needed to screen to prevent one death or adverse event (NNS) for screening DM and hypertension and assess the prevalence and contributors to DM and/or hypertension.

4. Research methodology
4.1 Study design
This is a cross-sectional study based on a PTB contact-trace program conducted from April 1, 2019 to October 30, 2020 in Guizhou, China, which is located in Guizhou province and stands the top 4 highest burdens of tuberculosis with high burden of NCDs in China.

4.2 Target population
Tuberculosis patients and their household contacts.
4.3 Research Subjects

4.3.1 Inclusion criteria

**PTB index cases:** Newly diagnosed TB cases aged 15 years or more and currently on treatment for a duration of 0-6 months and notified to the National Tuberculosis Program from the study site were consecutively retrieved.

**Household contact:** Aged 15 years or more, lived in the same house with an index TB patient for more than 6 hours per week [15] between 3 months earlier than the diagnosis of the TB index case and 14 days after the TB index case initiating anti-tuberculosis treatment.

4.3.2 Exclusion criteria

Pregnant women, mentally disabled persons, and those living alone were excluded from the analysis.

4.3.3 Discontinuation criteria

All the subjects are free to withdraw off this study if they do not to continue anymore. In addition, if they are not suitable to continue, such as other sudden illness or events or accidents occurring, they are free to withdraw off this study. It is unlikely to terminate unless there is a natural disaster or any other special events.

4.4 Sample size calculation

This is a cross-sectional study based on a TB contact-trace study, which will be conducted in Guizhou, China from April 1, 2019 to October 30, 2020. Totally, 116 villages/communities with high PTB incidence in Guizhou will be drawn as the study sites. We consider that the chances of having DM or HTN were more similar among household members than the general population. This requires adjusting of the sample size with design effect (deff) [16–18], the value of which is assumed as 2.0 in this study. Eventually, the minimum sample size would be computed using the infinite population proportion formula with a continuity correction as shown below.

\[ N = \left[ \frac{Z_{\alpha/2}^2 \times P \times (1-P)}{\text{deff}} \right] \times \frac{d^2}{d^2} \]

where \( p \) is the prevalence of DM and hypertension of the epidemiology survey with 7.6% and 27.8%, respectively in Guizhou in 2010[19], \( \text{deff} = 2, d = 25\% \times P \), and the type I error rate \( (\alpha) = 0.05. \)
The formula results in a sample size for DM of 1,495 and 409 for hypertension. With the consideration of a 10% rate of non-response, 1,661 people will be recruited for DM screening and 454 for hypertension screening.

4.5 Variables of the study

**Dependent and independent variables:** Confirmed HTN and/or DM

**Potential confounder variables:** Different non-communicable diseases may be confounder to each other.

**Method(s) to minimize bias(es) during study:** Inclusion criteria and exclusion criteria will be performed strictly to control selection of subjects. During fieldwork investigation, induced question will be avoided to obtain intentional answer. Obscure answer is required to clarify through phone call, Internet or other methods.

4.6 Study procedure

Initially, newly diagnosed PTB cases aged 15 years or more and notified to the National Tuberculosis Program from the study site will be consecutively retrieved according to the inclusion criteria.

During the eligible patients monthly visiting the hospital to obtain their medications, TB medical staff will contact the patients to obtain informed consent and make an appointment with them for home visits. 1-3 household contacts aged 15 years or more per household in home visits. Simple random sampling method will be used to select the contacts when there will be more than three adult contacts per household. Meanwhile, all the enumerated contacts will be surveyed if there were three or fewer contacts.

DM and/or hypertension will be screened by assessing systolic/diastolic (SBP/DBP) blood pressure and fasting plasma glucose/random plasma glucose (FPG/RPG) among all participants following the world health organization (WHO) standard criteria. Those with different diseases identified from the study will be transferred to the local hospitals to undergoing the related treatment based on their physical situation. Those with known diseases who have previously lapsed from treatment will be suggested to access their local hospital to continue medical services.

4.7 Statistical analysis
Data obtained from the questionnaires and medical record review will be entered into EpiData software and R software will be employed for the statistical analysis. Student’s t-test or ANOVA will be used to compare age, FPG/RPG and SBP/DBP among groups as appropriate and summarized using the mean and standard deviation. For continuous variables when data are not normally distributed, the nonparametric Mann-Whitney U test will be employed. Chi-square or Fisher exact tests will be applied for categorical variates where appropriate. The univariate analysis and the multivariate logistic regression model to determine the associated factors, and will be shown through forest plots[20]. The yield was calculated by dividing number of newly detected disease by the number of subject screened excluding those known to be diseased. NNS was computed as described somewhere[21],[22].

4.8 Ethical consideration
The proposal will be approved by both the Institutional Ethics Committee of Faculty of Medicine, Prince of Songkla University, Hat Yai, Thailand, as well as the Ethics Committee of Guizhou Provincial Center for Disease Prevention and Control before the study is conducted. All proposed patients or citizens will have the right to agree or disagree to participate in the study and present using the informed consent. The anonymity and confidentiality will be maintained stringently throughout the study.

4.9 Limitation(s) and barrier(s) of the study (If applicable)
To date, no limitations and barriers are found.

5. Principal investigators

| Name                     | Position               | E-mail address                  |
|--------------------------|------------------------|---------------------------------|
| Shengqiong Guo          | Investigator           | 179536921@qq.com               |
| Virasakdi Chongsuvivatwong | Supervisor & Investigator | cvirasak@medicine.psu.ac.th. |

6. Time schedule of the study

| Research activities | 2019 | 2020 |
|---------------------|------|------|
7. Budget detail of the study

☐ Funded by: No

Budget amount: 0(USD)

☒ Expecting funded from: Institution

Budget amount: 0(USD)

☒ Private fund

Budget amount: 4692 (Baht)

| Budget category                          | Unit cost in Ren Min Bi(CNY) | Multiplying factors                  | Total cost(CNY) |
|------------------------------------------|------------------------------|--------------------------------------|-----------------|
| **1. Personnel**                         |                              |                                      |                 |
| Interdepartmental collaboration          | 500                          | 2*500                                | 1000            |
| Investigators for data collection        | 100                          | 2 persons*120 days*100               | 24000           |
| Participants (Gift/money)                | 15                           | (116*2) persons*15                  | 3480            |
| Stationary and printing service         | 0.5(per page for copying), 3 for one paper file per person | 116*2*2            | 464             |
| **Personnel Total**                      |                              |                                      | **28944**       |
| 2. Travel | cost |
|-----------|------|
| Home visit | 200 | 2 persons *2 times*200 | 800 |
| Health centers visit | 200 | 2 persons *2 times*200 | 800 |
| Accommodation | 300 | 2 persons *2 times*300 | 1200 |
| **Travel Total** | | | **2800** |

**Total budget**

| Grand Total (CNY) | 31744 |
| Exchange rate: 1 CNY = 0.1478 (USD) | 4692(USD) |

8. References

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## Appendix 1

Structured questionnaire for study on yield, NNS and prevalence of screening for DM and hypertension

QID_________________

Start Time [    ] [    ]/ [    ] [    ]
Start Date (dd/mm/yy) [    ] [    ]/ [    ] [    ] [    ] [    ]

### Section 1  Background’s Information

| No. | Information       | Code |
|-----|-------------------|------|
| A1  | Index case ID     | id   |
| A2  | Household ID      | hid  |
| A3  | City              | cit  |
| A4  | County /district  | cou  |
| A5  | Village           | vil  |
| A6  | Postal code       | post |

### Section 2  Background’s characteristics

| No. | Question                      | Answer                                      | Code |
|-----|-------------------------------|---------------------------------------------|------|
| B1  | Subject type                  | 1. Index case 2. household contact          | subtype |
| B2  | Gender                        | 1. Male 2. Female                          | gen  |
| B3  | Age (completed year)          | _______year                                | age  |
| B4  | Ethnic (Single response)      | 1. Han 2. Biyi 3. Liz 4. Tujia 5. Miao 6. Gelao 7. Yi 8. Man 9. Hui 10. Yao 11. Other (specify) | eth  |
| B5  | Religion (Single response)    | 1. No 2. Buddhism 3. Muslim 4. Christian 5. Other (Specify) | reg  |
| B6  | Education level (Passed level)| 1. None 2. Read and write 3. Primary school 4. Middle school 5. High school 6. Graduate school | edu  |
| B7  | Occupation | 1. Civil servant  | 2. Factory worker  | 3. Casual employee  | 4. Shopkeeper/Retail  | 5. Dependent  | 6. Student  | 7. Other_________________ | occ [ ] |
| --- | ---------- | ----------------- | ------------------ | ------------------- | --------------------- |--------------|------------|-----------------------------|-------|
| B8  | Marital status | 1. Single  | 2. Marriage  | 3. Divorce  | 4. Separate  | 5. Widowhood  | 6. Cohabitation  | 7. Other(specify)____________| mars [ ] |
| B9  | Monthly income | _____________________CNY | inc [ ][ ][ ][ ] |
| B13 | Is there any history of DM in your family? | 0. No (Jump to B15)  | 1. | dmfam [ ] |
| B14 | If yes, who has DM in your family? | 1. Father  | 2. Mother  | 3. Sibling  | 4. Spouse  | 5. Grandpa  | 6. Grandma  | 7. Other(specify)____________ | dmfat [ ] |
|      |                              | 1. | dmmot [ ]  | dmsib [ ]  | dmspo [ ]  | dmgpa [ ]  | dmgma [ ]  | dmoth [ ] |
| B15 | Is there any history of HTN in your family? | 0. No (Jump to B17)  | 1. | htfam [ ] |
| B16 | If yes, who has HTN in your family? | 1. Father  | 2. Mother  | 3. Sibling  | 4. Spouse  | 5. Grandpa  | 6. Grandma  | 7. Other(specify)____________ | httfat [ ] |
|      |                              | 1. | htmot [ ]  | htsib [ ]  | htspo [ ]  | htgpa [ ]  | htgma [ ]  | htoth [ ] |
| B17 | Is there any history of COPD in your family? | 0. No (Jump to B19)  | 1. | htfam [ ] |
| B18 | If yes, who has COPD in your family? | 1. Father  | 1. | httfat [ ] |

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| B19 | Is there any history of DLP in your family? | 0. No (Jump to B21) | 1. dlpfam [ ] |
|-----|------------------------------------------|---------------------|---------------|
| B20 | If yes, who has DLP in your family?      | 1. Father           | dlpfat [ ]    |
|     |                                          | 2. Mother           | dlpmot [ ]    |
|     |                                          | 3. Sibling          | dlpsib [ ]    |
|     |                                          | 4. Spouse           | dlpspo [ ]    |
|     |                                          | 5. Grandpa          | dlpnga [ ]    |
|     |                                          | 6. Grandma          | dlpgma [ ]    |
|     |                                          | 7. Other (specify)  | dlpoth [ ]    |
| B21 | Is there any history of HD in your family? | 0. No (Jump to B23) | 1. hdfam [ ] |
| B22 | If yes, who has HD in your family?       | 1. Father           | hdfat [ ]     |
|     |                                          | 2. Mother           | hdmot [ ]     |
|     |                                          | 3. Sibling          | hdsib [ ]     |
|     |                                          | 4. Spouse           | hdsop [ ]     |
|     |                                          | 5. Grandpa          | hdgpa [ ]     |
|     |                                          | 6. Grandma          | hdgma [ ]     |
|     |                                          | 7. Other (specify)  | hdgoth [ ]    |
| B23 | Is there any history of bronchitis in your family? | 0. No (Jump to B25) | 1. brofam [ ] |
| B24 | If yes, who has bronchitis in your family? | 1. Father           | brofat [ ]    |
|     |                                          | 2. Mother           | bromot [ ]    |
|     |                                          | 3. Sibling          | brosib [ ]    |
|     |                                          | 4. Spouse           | brospo [ ]    |
|     |                                          | 5. Grandpa          | bropga [ ]    |
|     |                                          | 6. Grandma          | brogma [ ]    |
|     |                                          | 7. Other (specify)  | brooth [ ]    |
| B25 | Is there any history of asthma in your family? | 0. No (Jump to B27) | 1. asthfat [ ] |
| B26 | If yes, who has asthma in your family?   | 1. Father           | asthfat [ ]   |
|     |                                          | 2. Mother           | asthmot [ ]   |
|     |                                          | 3. Sibling          | asthsib [ ]   |
|     |                                          | 4. Spouse           | asthsop [ ]   |
|     |                                          | 5. Grandpa          | asthgpa [ ]   |
|     |                                          | 6. Grandma          | asthgamma [ ] |
|     |                                          | 7. Other (specify)  | asthoth [ ]   |
| B27 | Is there any history of Cancer in your family? | 0. No (Jump to B29) | 1. cafat [ ] |
| B28 | If yes, who has Cancer in your family?   | 1. Father           | cafat [ ]     |
|     |                                          | 2. Mother           | camot [ ]     |
|     |                                          | 3. Sibling          | casib [ ]     |
|     |                                          | 4. Spouse           | caspo [ ]     |
|     |                                          | 5. Grandpa          | cagpa [ ]     |
|     |                                          | 6. Grandma          | cagma [ ]     |
|     |                                          | 7. Other (specify)  | caoth [ ]     |
| B29 | Is there any history of CRD in your family? | 0. No (Jump to B31) | 1. htfam [ ] |
| B30 | If yes, who has CRD in your family?      | 1. Father           | htfat [ ]     |
### Section 3  Health related characteristics

| No. | Question                                                                 | Answer                                                                 | Code |
|-----|--------------------------------------------------------------------------|------------------------------------------------------------------------|------|
| C1  | Smoking                                                                  | 1. Current smoker                                                      | smok [ ] |
|     |                                                                          | 2. Smoked in the past (Jump to C4)                                     |      |
|     |                                                                          | 3. Never smoker (Jump to C5)                                           |      |
| C2  | If smoker, number of cigarettes per day                                   | _______________cigarettes                                              | neig [ ] |
| C3  | Duration of smoking                                                      | _______________years                                                  | dura [ ] |
| C4  | If ex-smoker, when stopped smoking?                                      | _______________years                                                  | exsmo [ ] |
| C5  | Passive smoker                                                           | 1. No                                                                 | passmo [ ] |
|     |                                                                          | 2. Very few times in week                                             |      |
|     |                                                                          | 3. Few times in week                                                  |      |
|     |                                                                          | 4. Very few times daily                                               |      |
|     |                                                                          | 5. Few times daily                                                    |      |
|     |                                                                          | 6. Most of times daily                                                |      |
| C6  | Drinking                                                                 | 1. Current drinker                                                    | drin [ ] |
|     |                                                                          | 2. Never drinker (Jump to C9)                                         |      |
|     |                                                                          | 3. Drunk in the past (Jump to C10)                                    |      |
| C7  | Duration of drinking                                                     | _______________years                                                  | drindura [ ] |
| C8  | If current drinker, frequency of drinking during 1 year                  | 1. Daily                                                              | drinfreq [ ] |
|     |                                                                          | 2. 5-6 days / week                                                    |      |
|     |                                                                          | 3. 3-4 days / week                                                    |      |
|     |                                                                          | 4. 1-2 days / week                                                    |      |
|     |                                                                          | 5. 2-3 times / month                                                  |      |
|     |                                                                          | 6. Once a month                                                       |      |
| C9  | If ex-drinker, when stopped drinking?                                    | _______________years                                                  | exdrin [ ][ ] |
| C10 | Do you know how many grams of salt an adult can eat at most per day?     | 1. Yes                                                                | saltkn [ ] |
|     |                                                                          | 0. No (Jump to C12)                                                   |      |
| C11 | If yes, how many grams of salt an adult can eat at most per day?         | 1. 5g                                                                 | saltgr [ ] |
|     |                                                                          | 2. 6g (If not correct, inform the value to the participant)            |      |
|     |                                                                          | 3. 7g 4. 8g 5. 9g                                                     |      |
| C12 | Do you know how many grams of edible oil an adult can eat at most per day| 1. Yes                                                                | oilkn [ ] |
|     |                                                                          | 0. No (Jump to C14)                                                   |      |
| C13 | If yes, how many grams of edible oil an adult can eat at most per day?   | 1. 25-30g (If not correct, inform the value to the participant)       | oilgr [ ] |
|     |                                                                          | 2. 30-35g 3. 35-40g                                                   |      |
|     |                                                                          | 4. 40-45g 5. 45-50g                                                   |      |
| C14 | How often do you eat fruits / vegetables?                                | 1. Daily                                                              | fruitfreq [ ] |
|     |                                                                          | 2. 5-6 days / week                                                    |      |
|     |                                                                          | 3. 3-4 days / week                                                    |      |
|     |                                                                          | 4. 1-2 days / week                                                    |      |
### Section 4  History relevant to NCDs

| No. | Question                  | Answer    | Code  |
|-----|---------------------------|-----------|-------|
| D1  | Weight loss               | 0. No     | 1. Yes| weiloss [ ] |
| D2  | Loss appetite             | 0. No     | 1. Yes| appede [ ]  |
| D3  | Increasing appetite       | 0. No     | 1. Yes| appein [ ]  |
| D4  | Intake more water         | 0. No     | 1. Yes| watem [ ]   |
| D5  | Eat more food             | 0. No     | 1. Yes| foodm [ ]   |
| D6  | Urinate more              | 0. No     | 1. Yes| urinm [ ]   |
| D7  | Repeated infection        | 0. No     | 1. Yes| urinm [ ]   |
| D8  | Limb ulceration           | 0. No     | 1. Yes| urinm [ ]   |
| D9  | Renal function impairment | 0. No     | 1. Yes| urinm [ ]   |
| D10 | Blurred vision            | 0. No     | 1. Yes| urinm [ ]   |
| D11 | Headache                  | 0. No     | 1. Yes| headac [ ]  |
| D12 | Dizziness                 | 0. No     | 1. Yes| dissy [ ]   |
| D13 | irritability              | 0. No     | 1. Yes| irrita [ ]  |
| Question                                                                 | No   | Yes  | Code   |
|-------------------------------------------------------------------------|------|------|--------|
| D14 Palpitations                                                        | 0. No| 1. Yes| palpi  |
| D15 Nausea                                                              | 0. No| 1. Yes| nausea |
| D16 Vomiting                                                            | 0. No| 1. Yes| vomi   |
| D17 Chronic cough                                                       | 0. No| 1. Yes| coug   |
| D18 Expectororation                                                     | 0. No| 1. Yes| expe   |
| D19 Chest tightness                                                     | 0. No| 1. Yes| chestt |
| D20 Breathlessness                                                      | 0. No| 1. Yes| breat  |
| D21 Dyspnea                                                             | 0. No| 1. Yes| dysp   |
| D22 Have you ever been diagnosed as HTN?                                | 0. No| 1. Yes| htn    |
| D23 If you have ever been diagnosed as HTN, how long?                   |      |      | hntim  |
| D24 If yes, have you ever controlled HTN?                               | 0. No| 1. Yes| htncont|
| D25 Where were you diagnosed as HTN?                                    | 1. Government hospital | 2. Registered private clinic | 3. Traditional healer | 4. Other (specify) | htnplace |
| D26 Have you ever been diagnosed as DM?                                 | 0. No| 1. Yes| dmtim  |
| D27 If you have been diagnosed as DM, how long?                         |      |      |       |
| D28 If yes, have you ever controlled DM?                                | 0. No| 1. Yes| dmcont |
| D29 Where were you diagnosed as DM?                                     | 1. Government hospital | 2. Registered private clinic | 3. Traditional healer | 4. Other (specify) | dmplace |
| D30 Have you ever been diagnosed as COPD?                               | 0. No| 1. Yes| copddia|
| D31 If you have ever been diagnosed as COPD, how long?                  |      |      | copdtim|
| D32 If yes, have you ever controlled COPD?                              | 0. No| 1. Yes| copdcont|
| D33 Where were you diagnosed as COPD?                                   | 1. Government hospital | 2. Registered private clinic | 3. Traditional healer | 4. Other (specify) | copdplace |
| D34 Have you ever been diagnosed as DLP?                                | 0. No| 1. Yes| dlptim |
| D35 If you have been diagnosed as other DLPs, how long?                  |      |      | dlpcont|
| D36 If yes, have you ever controlled DLP?                               | 0. No| 1. Yes| dlpplace|
| D37 Where were you diagnosed as DLP?                                    | 1. Government hospital | 2. Registered private clinic | 3. Traditional healer | 4. Other (specify) | dlplace |
| D38 Have you ever been diagnosed as HD?                                 | 0. No| 1. Yes| hddia  |
| D39  | If you have been diagnosed as other HD, how long? | hdtim          |
|------|--------------------------------------------------|----------------|
|      | _______________________________________________ | _______________|
| D40  | If yes, have you ever controlled HD?             | hdcont         |
|      | 0. No                                           |                |
|      | 1. Yes                                          |                |
| D41  | Where were you diagnosed as HD?                  | hdplace        |
|      | 1. Government hospital                          |                |
|      | 2. Registered private clinic                     |                |
|      | 3. Traditional healer                           |                |
|      | 4. Other (specify) _____________________________|                |
| D42  | Have you ever been diagnosed as cancer?          | cadia          |
|      | 0. No (Jump to D48)                             |                |
|      | 1. Yes                                          |                |
| D43  | If you have been diagnosed as other cancer, how long? | catim          |
|      | _______________________________________________ | _______________|
| D44  | If yes, have you ever controlled cancer?         | cacont         |
|      | 0. No                                           |                |
|      | 1. Yes                                          |                |
| D45  | Where were you diagnosed as cancer?              | dlplace        |
|      | 1. Government hospital                          |                |
|      | 2. Registered private clinic                     |                |
|      | 3. Traditional healer                           |                |
|      | 4. Other (specify) _____________________________|                |
| D46  | Have you ever been diagnosed as CRD?             | crddia         |
|      | 0. No (Jump to E1 )                             |                |
|      | 1. Yes                                          |                |
| D47  | If you have been diagnosed as CRD, how long?     | crdtim         |
|      | _______________________________________________ | _______________|
| D48  | If yes, have you ever controlled CRD?            | crdcont        |
|      | 0. No                                           |                |
|      | 1. Yes                                          |                |
| D49  | Where were you diagnosed as CRD?                 | crdplace       |
|      | 1. Government hospital                          |                |
|      | 2. Registered private clinic                     |                |
|      | 3. Traditional healer                           |                |
|      | 4. Other (specify) _____________________________|                |

**Extra Characteristics for Household Contacts**

| E1   | Did you share a room with your TB family member in the past 3 months? | sharoo      |
|------|-----------------------------------------------------------------------|-------------|
|      | 0. No                                                                 |              |
|      | 1. Yes                                                                |              |
| E2   | Did you care your TB family member in the past 3 months?               | carefa      |
|      | 0. No                                                                 |              |
|      | 1. Yes                                                                |              |

**The end**

Thank you for your participation.

End time [ ] [ ] [ ] [ ] [ ] [ ] [ ]

End Date (dd/mm/yy) [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ] [ ]

Signature of investigator_________________________