cities changing diabetes

SHANGHAI
China

DIABETES VULNERABILITY ASSESSMENT

HOW-TO GUIDE

novo nordisk®

REGION H Steno Diabetes Center Copenhagen

UCL

CITIES ARE A FOCAL POINT FOR **TACKLING DIABETES**

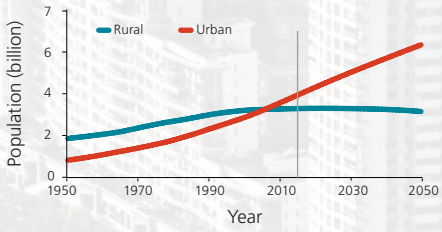
415 MILLION PEOPLE HAVE DIABETES WORLDWIDE[1]

2/3 OF PEOPLE WITH DIABETES **LIVE IN CITIES**[1]

BY 2040, **642 MILLION PEOPLE** WILL HAVE DIABETES[1]

74% OF THEM WILL LIVE IN CITIES[1]

URBANISATION IS ONE OF THE **MOST SIGNIFICANT DEMOGRAPHIC SHIFTS** OF THE PAST CENTURY[2]



SHANGHAI, China

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INTRODUCTION

THE INCREASE IN DIABETES IS ONE OF TODAY'S MAJOR HEALTH CHALLENGES, A GLOBAL EMERGENCY IN SLOW MOTION.

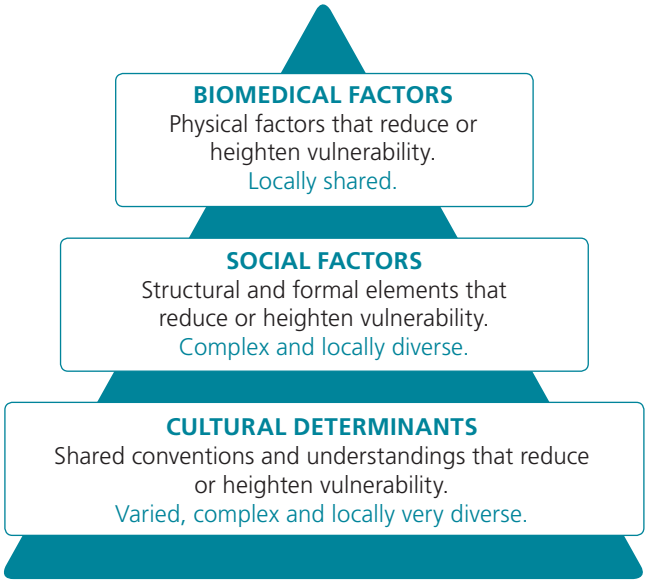
Worldwide, 415 million people are living with diabetes.[1] Without concerted action this is estimated to rise to 642 million by 2040.[1] Today, more than half of the world's population live in urban areas,[2] including two-thirds of people with diabetes.[1] This makes cities an important focal point for studying and tackling diabetes. However, taking action requires a better understanding of what drives diabetes in urban areas.

DRIVERS OF THE DIABETES PANDEMIC

Although each person starts out with their own genetic health profile, several social factors and cultural determinants come into play in an individual's overall health throughout their life (Figure 1). Together, these factors impact the way people live their lives and their risk for developing type 2 diabetes, as well as influence the outcome of treatment and care of people who already have diabetes.

Increasingly, social factors and cultural determinants are recognised for their relationship with the soaring incidence of type 2 diabetes, as well as the opportunities they present for us to counter it.

FIGURE 1 THE UNDERLYING DRIVERS OF THE DIABETES PANDEMIC[3]



CITIES CHANGING DIABETES PROGRAMME

Cities Changing Diabetes is a commitment to push for urgent action against diabetes on a global scale. The programme is mapping the extent of the urban diabetes challenge in cities and working to generate an understanding of the drivers behind this pandemic.

The aim of the programme is to map the problem, share solutions and drive concrete actions to fight the diabetes challenge in cities around the world.

RESEARCH METHODS

RULE OF HALVES
QUANTITATIVE METHOD FOR MAPPING THE EXTENT OF THE CHALLENGE
The Rule of Halves analysis is a quantitative estimation of the diabetes burden in a specific population or community.

DIABETES VULNERABILITY ASSESSMENT
QUALITATIVE METHOD FOR UNVEILING THE SOCIAL FACTORS AND CULTURAL DETERMINANTS
The Diabetes Vulnerability Assessment identifies the social factors and cultural determinants of diabetes among people living with type 2 diabetes.

URBAN DIABETES RISK ASSESSMENT
MIXED METHOD FOR PRIORITISING SOCIAL FACTORS AND CULTURAL DETERMINANTS FOR INTERVENTION
The Urban Diabetes Risk Assessment is a comprehensive data collection and analysis instrument developed to explore priorities, attitudes, and shared points of view about diabetes, health, and wellbeing of people living with diabetes.

INFOBOX 1 A MULTI-PARTNER INITIATIVE

Cities Changing Diabetes is a partnership programme to address the urban diabetes challenge. Initiated by Novo Nordisk in 2014, the programme is a response to the dramatic rise of urban diabetes. The programme has been developed in partnership with University College London and Steno Diabetes Center Copenhagen, as well as a range of local partners including the diabetes and public health community, city governments, academic institutions and city experts from a variety of fields and civil society organisations.

To learn more about the Cities Changing Diabetes programme visit CitiesChangingDiabetes.com

DIABETES VULNERABILITY ASSESSMENT

The Diabetes Vulnerability Assessment is an in-depth qualitative data collection and analysis instrument developed to explore both characteristics of vulnerability to diabetes and the condition's underlying socio-cultural drivers in a specific local setting. The assessment is especially suited for research sites where an evidence base around the social and cultural factors of type 2 diabetes is yet to be established.

The Diabetes Vulnerability Assessment is guided by three overall research questions:

- What are the **social risk factors** in urban diabetes?
- What are the **cultural determinants** of urban diabetes?
- Who is **most vulnerable** to suffer because of these risk factors and cultural determinants of diabetes? How can they become less vulnerable?

At the core of the Diabetes Vulnerability Assessment is a semi-structured interview protocol designed to elicit detailed information about the various influences on a person's health, wellbeing, and experiences of living with diabetes. The interview protocol is intended for field-based data collection and addresses a range of topics relevant to health and wellbeing through a series of open-ended questions. The interview prompts cover three main domains of inquiry: a Formal Domain (assessing public assistance and programmes, and use thereof); a Local Community Domain (assessing local situations, responses and forms of adaption and resilience); and a Vulnerability Domain (assessing barriers to individual capability and opportunity) (Figure 1: Overview of the Diabetes Vulnerability Assessment). The Diabetes Vulnerability Assessment also includes a pre-questionnaire for capturing demographic data and integrates ethnographic observations and executive summaries into the analysis and interpretation of results.

Collected data are analysed following a qualitative data reduction approach based on the principles of Thematic Analysis.

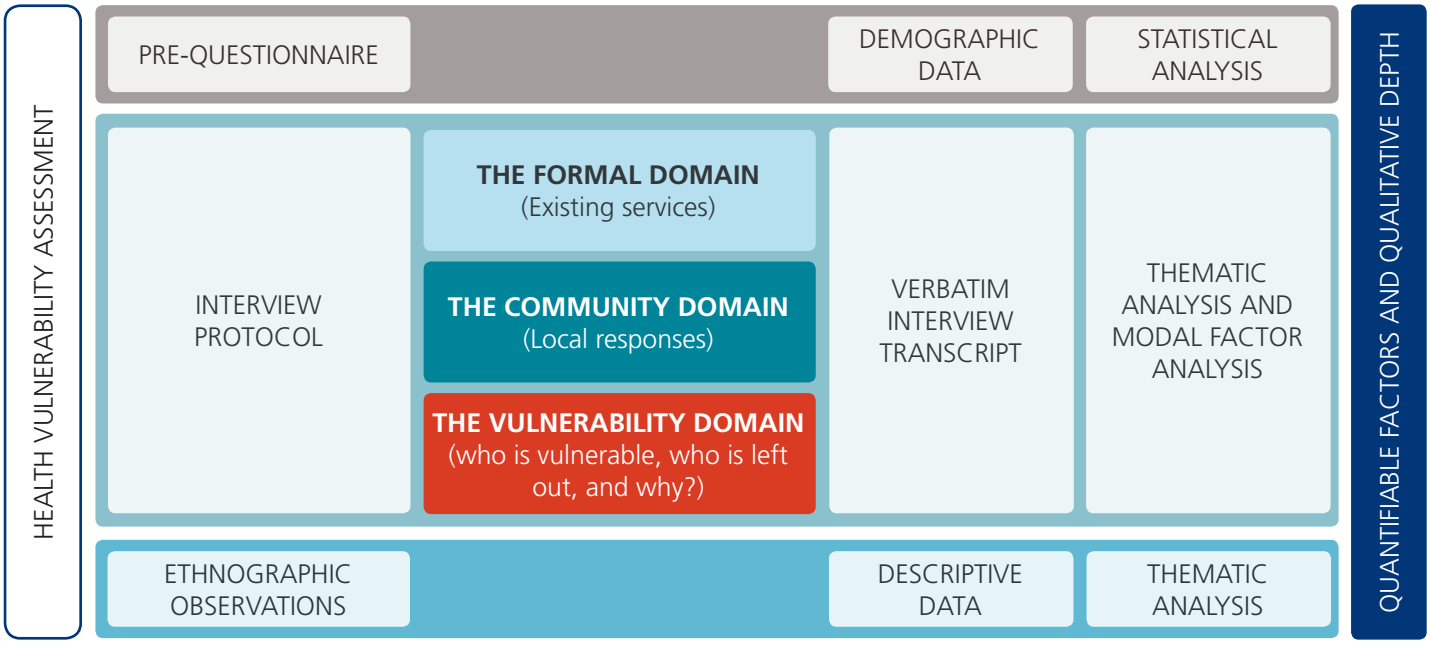
Intended outcomes of the Diabetes Vulnerability Assessment assessment are:

- Identification of key factors that impact diabetes vulnerability locally ('vulnerability indicators')
- Creation of a new qualitative evidence base around the local social factors and cultural determinants of diabetes
- Synthesised findings to inform local intervention design and policy

Why conduct a Diabetes Vulnerability Assessment?
The application of the Diabetes Vulnerability Assessment will:

- Generate insights that effectively inform local intervention design and that are well-suited for local stakeholder engagement and policy shaping
- Allow researchers to establish a new local evidence base around the sociocultural drivers of diabetes
- Contribute to the Cities Changing Diabetes global research platform and the largest qualitative database on type 2 diabetes globally

FIGURE 1 OVERVIEW OF THE DIABETES VULNERABILITY ASSESSMENT



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STEP-BY-STEP GUIDE TO CONDUCTING A DIABETES VULNERABILITY ASSESSMENT

The following section provides an overview of how to conduct a Diabetes Vulnerability Assessment. The process is divided across four phases.

INFOBOX 2 DIABETES VULNERABILITY ASSESSMENT FINDINGS FROM FIVE PARTNER CITIES

The Diabetes Vulnerability Assessment has been conducted as part of the Cities Changing Diabetes programme in five cities around the globe: Mexico City, Copenhagen, Houston, Tianjin and Shanghai. The research unveils common factors across the five cities that manifest themselves locally in unique ways.

SOCIAL FACTORS

The most prevalent social factors contributing to an increase in the vulnerability to type 2 diabetes across the five cities:

Financial constraints
Limited financial resources may become a barrier to accessing health-promoting resources such as paying for healthy food, healthcare, health insurance, and exercise as well as feeling stressed and hopeless.

Time constraints
Time consuming family and work obligations and long commutes may be barriers to a health-promoting lifestyle such as seeking healthcare, exercising, sourcing of healthy food and feeling stress and social isolation.

Resource constraints
Low education level, lacking knowledge of existing health resources, and scarcity of healthcare provision, medicine, healthy foods, and possibility to exercise may be barriers to health-enhancing decision-making and what an individual can do to improve personal health.

Geographic constraints
Unfavourable climate, pollution, high crime levels and/or lack of infrastructure (eg, basic roads, access to water) may become barriers to health-promoting activities such as walking or other outdoor exercise as well as isolation and loneliness.

CULTURAL DETERMINANTS

The most prevalent cultural determinants contributing to an increase in the vulnerability to type 2 diabetes across the five cities:

Traditions and conventions
Traditions and conventions have direct consequences on health and wellbeing. Traditional gender roles, unhealthy food traditions, and use of healthcare only in emergency situations may become barriers to effective self-care, healthy eating, and optimal healthcare.

Health and illness
The way health and illness are understood shape the perception of health and wellbeing. The perception of diabetes as less severe than other social and health issues, misconception of own health and disease, mistrust in healthcare providers, and feeling of stigma may be barriers to optimal care seeking behaviour and lifestyle modification.

Self and others
A person's understanding of self in relation to others contributes to health and well-being. Environments where large body size is accepted as normal may create a scenario where slimming is perceived as unnecessary. In contrast, when normal body size is favourable, obesity may become a barrier to, for example, going to the gym.

Change and transition
Experiencing change and transition may have physical and psychological consequences. Living in rapid growing cities or neighbourhoods that undergo constant changes, and migrating from rural to urban settings are often worrying and stressful and may become barriers to optimal health outcomes. Especially memory of hunger and resource shortage can create an environment that is obesogenic.

ROADMAP TO PERFORMING A DIABETES VULNERABILITY ASSESSMENT

1 PHASE ONE
Plan the study

PREPARE FOR THE STUDY

DEFINE THE FOCUS OF THE LOCAL STUDY
Update the global research questions and fine-tune the overall focus

DOWNLOAD AND TEST THE SOFTWARE
Computer-assisted qualitative research software (*CAQDAS*) is used to facilitate data analysis

DATA MANAGEMENT
Address data management considerations

RECRUIT THE FIELDWORKERS AND STUDY PARTICIPANTS

RECRUIT AND TRAIN THE FIELDWORKERS
Fieldworkers need to be recruited and trained to conduct participant interviews

RECRUIT THE STUDY PARTICIPANTS
Study participants need to be recruited using *local case filters*

PHASE TWO 2
Data collection

DIABETES VULNERABILITY ASSESSMENT DATA COLLECTION TOOLS

THE DIABETES VULNERABILITY ASSESSMENT PRE-QUESTIONNAIRE
Captures basic demographic information

THE DIABETES VULNERABILITY ASSESSMENT INTERVIEW PROTOCOL
Provides an overall structure to a succession of 75 questions and prompts

INTERVIEW SUMMARY TEMPLATE
Provides a framework for summarising the interviews and ethnographic observations

3 PHASE THREE
Data analysis

Through coding, data relevant to the research questions are extracted in an efficient, transparent, and systematic fashion

THEMATIC CONTENT ANALYSIS

Thematic Content Analysis to draw conclusions from the coded data

SYNTHESIS INTO SOCIAL AND CULTURAL FACTORS

Data is further synthesised to obtain specific social and cultural factors that, based on the collected data, are plausibly linked to diabetes vulnerability

PHASE FOUR 4
Reporting

PUBLISH

Consider publishing the results in a scientific peer-reviewed journal

PRODUCE A REPORT

On completion of the analysis produce an internal research report, which can be used to record and share the findings

Developing a set of key findings and insights is an essential part of the study, and synthesising the results from the thematic and factor analyses with available demographic participant data is a minimum requirement. This means that a narrative description of results (themes, factors, or both) should be presented together with relevant primary data as evidence.

1 PHASE ONE
PLAN THE STUDY

PREPARE FOR THE STUDY

During the planning phase of the Diabetes Vulnerability Assessment, it is important to establish a detailed timeline for the study (Appendix 1) and to take into consideration local requirements for ethics approval. Ethics approval varies by location, but generally, requires an extensive study protocol and copies of questionnaires or interview guides to be used in the study.

DEFINE THE FOCUS OF THE LOCAL STUDY

Depending on local priorities, it may be relevant to update the global research questions and fine-tune the overall focus of the Diabetes Vulnerability Assessment. A protocol has been designed for participants living with type 2 diabetes (Appendix 3).

Importantly, the protocol has been designed in such a way that data collection can proceed in a systematic fashion across multiple sites involving groups of fieldworkers with diverse skills. The global assessment protocol is in English, and locally adapted versions have been produced in Spanish (Mexico City), and Chinese (Shanghai and Tianjin). Naturally, vulnerability assessments should be carried out in the appropriate local language, and further adaptation into local dialects may be warranted.

DOWNLOAD AND TEST THE SOFTWARE

To facilitate qualitative data analysis, the use of Computer-assisted qualitative data analysis software (*CAQDAS*), which helps to archive, organise and code data, and to facilitate analysis, is recommended across Cities Changing Diabetes partner cities. The use of specific *CAQDAS* software enables researchers to code salient data (see section 'Coding' below) in interview transcripts and interview summaries and greatly aids analysis and interpretation.

NVivo (QSR International) is one among several widely used qualitative data analysis computer software packages. It has been designed for qualitative researchers working with very rich text-based and multimedia information, where deep levels of analysis on small or large volumes of data are required. The software is available for purchase for Windows and OS X. Given that the software has been used for all Cities Changing Diabetes research sites for the analysis of Diabetes Vulnerability Assessment (and parts of the Urban Diabetes Risk Assessment), data collected in the future can easily be integrated with existing data sets and thus added to the global research platform.

Coding and textual analysis with *NVivo* requires training as well as an understanding of the principles of qualitative data analysis and data reduction; this should be considered when planning a study involving the Diabetes Vulnerability Assessment.

DATA MANAGEMENT

The Diabetes Vulnerability Assessment produces a significant amount of qualitative and quantitative data, which should be managed strategically throughout the data collection process. Some aspects of data management, such as anonymisation of participant data, will be dictated by local ethics regulations and guidelines.

To de-identify or anonymise data, a unique participant identification (ID) number should be created for each study participant. Data collected for each participant should only contain the ID number, which will be used in the analysis phase to link data to a participant. It is recommended that the research team identify one team member to develop unique identifiers for each participant.

A strategy also needs to be in place regarding both short-term and long-term data storage. This should be addressed in the research protocol submitted for ethics approval before the data collection phase, note that some countries restrict the transfer of data between locations and/or across borders, making analysis by multiple researchers located in different locations or countries potentially difficult.

Everyone involved in data collection and analysis must be trained in data confidentiality and storage. A strategy should be in place that dictates when and where data will be archived, and what happens with data held by fieldworkers and non-permanent members of the research team, as well as the lead team.

RECRUIT THE FIELDWORKERS AND PARTICIPANTS

RECRUIT THE FIELDWORKERS

At the core of the Diabetes Vulnerability Assessment are the participant interviews conducted in the field; therefore, fieldworker recruitment and training requires careful consideration. Ideally, fieldworkers carrying out the assessment should be familiar with the local community involved in the study, perhaps through their work locally, and have experience with qualitative data collection. It is recommended that fieldworkers have an interest in the topic at hand and therefore can become dedicated to the cause of the project. This could involve an interest in further engaging with stakeholders and increasing awareness of the challenges faced by the community studied.

CONDUCT A FIELDWORKER TRAINING WORKSHOP

A two-day training workshop should be held to train fieldworkers and pilot the interview protocol. Refer to Appendix 4: Fieldworker Training Workshop – Sample Schedule for an example workshop schedule.

The training workshop should fulfil the following objectives:

1. Introduce and familiarise fieldworkers with the principles of the Diabetes Vulnerability Assessment and rationale of the study.

2. Train fieldworkers in relevant data collection techniques (including interview, and ethnographic observations as part of the interview summary).

3. Provide an opportunity for fieldworkers to practice interview techniques.

4. Provide an opportunity to adapt the interview protocol to the local language or dialect, if appropriate.

5. Pilot test the interview protocol with four to five volunteer participants.

It is good practice in qualitative research settings to pilot the interview protocol before starting data collection. Peer-reviewed journals increasingly demand piloting, especially of qualitative studies, to ensure rigour and transparency. If translation from English to the local language is involved, then piloting is first and foremost needed to test whether there are any undiscovered flaws or limitations in either form or content of the Diabetes Vulnerability Assessment.

The pilot should establish whether the flow of questions in the interview protocol is intuitive and whether the assessment sits comfortably with both the interviewer and interviewee. Furthermore, the pilot serves to ensure that the interview questions answer the Cities Changing Diabetes research question and that there are no omissions or flaws in the interview protocol.

The pilot session also provides an opportunity for fieldworkers to familiarise themselves with the structure of the assessment and to gain confidence in asking questions in the field.

Ideally, pilot interviews are conducted by one or two fieldworkers in separate rooms or suitably private spaces in the training venue. Research leads may choose to circulate and observe the interviews or allow fieldworkers to go through the whole assessment process uninterrupted. Either way, it is advisable to audio-record, or if possible video-record, the pilot interviews for later discussion with the group of fieldworkers.

Such discussion should focus on two main objectives: 1) to reflect on fieldworker-participant interaction, interviewing techniques, and observation skills; and 2) to explore the way participants responded to the locally adapted interview protocol. Specifically, the aim should be to ensure clarity of language and disambiguation of questions and prompts, as well as to examine the 'flow' of questions throughout the protocol.

Any necessary revisions to the Diabetes Vulnerability Assessment Interview Protocol can be made before the implementation of the assessment based on researcher consensus.

RECRUIT THE STUDY PARTICIPANTS

The primary aim of the Diabetes Vulnerability Assessment is to identify and explore the characteristics of vulnerable groups in a chosen location; therefore, participant recruitment is a critical aspect of conducting the study. A purposive sampling technique is used to select participants for the Diabetes Vulnerability Assessment, which follows a specific selection protocol. In an ideal situation, a proportion of participants is recruited in a snowball-fashion through other participants as the Diabetes Vulnerability Assessment interview protocol prompts interviewees to identify other potential participants.

Participant inclusion criteria

For the Diabetes Vulnerability Assessment, interview participants are selected based on their ability to discuss the most salient issues in the experience of urban diabetes. The overall sampling frame is people living with type 2 diabetes in a given city who are age 18 or older. The selection process is governed by the application of local case filters to an existing data set. Existing population-level data sets could include publicly available demographic data or hospital-level data.

These case filters represent selected characteristics (eg, living in a community without access to health insurance), and 'flag' individuals that may be suitable for participation. Such 'flagging' can take place within a specific sample population (for example, within specific geographical areas of a city) or within the general population of the city.

Case filters for a vulnerability assessment can be generated using statistical means, based on existing data (ie, via a frequency analysis), and should accommodate any factors known to impact vulnerability locally. If the required statistical data is not available, then research teams may agree upon relevant case filters based on preliminary research and experience through a consensus procedure.

It is recommended to apply between 15 to 20 case filters for recruitment, and recruit at least 10 participants per case filter. Participants must fulfil a minimum requirement of one case filter. The total number of participants is therefore 150 and 200.

Recruitment of participants

Researchers have the option to recruit in a field-based 'door-to-door' fashion or administer a pre-screening procedure remotely (for example by a brief telephone or web-based survey). There are advantages and drawbacks to either approach, and a mixture of both may be necessary to recruit the required number of participants. Screening of suitable individuals for participation should follow standard recruitment procedures for qualitative research,[4,5] bearing in mind that individual screening through emails, phone calls, or face-to-face meetings will most likely to be necessary.

TABLE 1 CITIES CHANGING DIABETES VULNERABILITY ASSESSMENT – CASE FILTERS (BASED ON CONSENSUS MEETINGS FROM COPENHAGEN, MEXICO CITY AND HOUSTON)

BIOLOGICAL	SOCIAL	GEOGRAPHICAL	CULTURAL
High BMI	Health insurance	Migration background (ie, rural to urban/urban communities/ cultural groups, etc)	Physical activity level
Blood glucose levels	Access to public programmes (ie, food stamps etc)	Safe neighbourhood	Trust (in healthcare system/ government)
Age	Employment status	Access to local resources (green and recreational spaces, food and water, etc)	Living in a place that is in a state of transition
Race/ethnicity	Socioeconomic status (above or bellow the poverty level)	Distance between home and work	Living in a community that values large body size
Days in poor health	Education	Environmental givens (outside temperature/humidity/pollution levels)	Body image and stigma (exercise/ weight)
General health (co-morbidities/ duration of illness etc)	Living situation (alone/with dependants/ being sole carer)	Potable water	Access to food as an indicator of health
Smoking	Level of social support		

NOTES:

2 PHASE TWO DATA COLLECTION

DIABETES VULNERABILITY ASSESSMENT DATA COLLECTION

There are three tools used to collect data for the Diabetes Vulnerability Assessment:

- **Diabetes Vulnerability Assessment Pre-Questionnaire** captures basic demographic information about the participants and consists of closed-ended yes/no questions (see Appendix 3: Global Diabetes Vulnerability Assessment pre-questionnaire).
- **Diabetes Vulnerability Assessment Interview Protocol** consists of approximately 75 closed and open-ended questions and guides the in-depth semi-structured individual interviews.
- **Interview Summary Template** provides a framework for summarising the interview and recording ethnographic observations.

Fieldworkers must remember to bring a field package of all relevant interview materials and be aware of the assessment procedures before initiating the interviews (Appendix 2). Interviews should be terminated immediately if participant consent is not obtained, the participant refuses to be audio-recorded, or the participant wishes to end the interview.

DIABETES VULNERABILITY ASSESSMENT PRE-QUESTIONNAIRE

The Diabetes Vulnerability Assessment pre-questionnaire captures basic demographic information about the participants and consists of closed yes/no questions (Appendix 5). The questionnaire should be brief so that it does not distract from the qualitative interview or tire participants prematurely. However, it is important to note that the questionnaire provides data that is vital to the interpretation of the interview findings; therefore it must be administered thoroughly.

Normally, extensive note-taking during the interview is strongly discouraged. However, for the Pre-Questionnaire, fieldworkers can fill in a hard copy of the questionnaire during the interview as this can help to create an initial rapport and put both the participant and fieldworker at ease. Once the questionnaire has been completed, the fieldworker should move on to the Diabetes Vulnerability Assessment Interview Protocol.

DIABETES VULNERABILITY ASSESSMENT INTERVIEW PROTOCOL

The Diabetes Vulnerability Assessment Interview Protocol is an interview guide consisting of approximately 75 closed and open-ended questions. The in-depth semi-structured individual interviews should be conducted by local experienced fieldworkers and last on average 1.5 hours.

The Diabetes Vulnerability Assessment Interview Protocol is designed to provide an overall structure to a succession of specific questions and prompts. The questions are arranged so that content is discussed in a logical order and allows for a dialogue to emerge between the fieldworker and participant.

Fieldworkers are encouraged to use the interview protocol as a guide, rather than as a rigid template, to ensure that all relevant questions and content are covered. It is, therefore, essential that fieldworkers are familiar with the succession of questions and prompts. Fieldworkers are welcome to re-phrase a question or prompt during the fieldworker workshop and in the post-pilot discussion if the questions do not deviate from the intended purpose of the interview. Fieldworkers may also ask questions not covered in the guide, as this creates a more natural flow in the interview. For the analysis phase, researchers will have a full interview transcript at their disposal. This means that participant responses can be explored against fieldworker questions, providing useful clues about context and setting of a response.

For a vulnerability assessment, fieldworkers are discouraged from taking extensive notes during the interview, and they are especially discouraged from reading out the questions one by one and writing down the participant's response; this is unnecessary as the interview is audio-recorded. Furthermore, extensive note-taking distracts both the interviewer and interviewee from the conversation and can create a barrier if the interviewer is perceived to 'hide' behind his or her interview protocol. It is good practice, however, to note down key words or prompts for follow-up questions where appropriate. It takes about two to three interviews before fieldworkers are comfortable with the interview guide.

INTERVIEW SUMMARY TEMPLATE

To add further richness to the data set and to support analysis, an Interview Summary Template should be completed by the fieldworker immediately following the interview (Appendix 6). The template requires that fieldworkers summarise key aspects of the interview and flag anything of immediate importance, such as an interesting case, to the research team for quick follow-up.

The template also contains sections for the fieldworkers' ethnographic observations, which should focus on descriptions of the participant's living environment, the participant's appearance, mannerisms, and engagement with their environment and the interviewer.

These observations provide valuable context to the interview data and allow for more detailed communication of findings.

Not all fieldworkers will be equally skilled in producing ethnographic observations, which is why the template provides clear guidance on what to report.

INFOBOX 3 CONSIDERATIONS BEFORE CONDUCTING INTERVIEWS

Selecting an appropriate location for the interview

The interview should ideally take place in a participant's home or suitable environment familiar to the participant, for the following reasons:

1. One of the underlying principles of a vulnerability assessment is the notion of establishing a rapport between interviewer and interviewee. Carrying out a long interview that may touch on personal topics can be more successful and is often easier for the participant if it takes place in an environment where they feel safe and comfortable.
2. Though principally based on the interview protocol, ethnographic observations, where feasible, are also an essential component of the assessment, as fieldworkers' descriptions can add depth and richness to the interview data and the observations help contextualise participant narratives.

Conducting interviews with a one or two-person team?
Research teams should decide whether they would like fieldworkers to conduct the assessments on their own or in teams of two. There are pros and cons to both approaches described below:

- ONE PERSON TEAM: Having fieldworkers carry out the interviews on their own has the advantage that participants are likely to feel less intimidated and there is greater potential for a 'conversation' to develop between interviewer and interviewee. Furthermore, fieldworkers carrying out interviews on their own can be more flexible and can focus more on the participant. Data collection can progress more rapidly and require fewer resources with a one-person team rather than a two-person team.
- TWO PERSON TEAM: First, it may be safer for a two person team, especially when going into participants' homes or to less safe neighbourhoods. Second, if the team is set up with one interviewer and one assistant, then the assistant can follow up on questions or prompts that the interviewer omitted. The assistant can also ensure that all field materials are in place and that documents are provided, and consent forms are signed.

NOTES:

3 PHASE THREE DATA ANALYSIS

Upon completion of the data collection phase, the following three types of data will require analysis:

- **Demographic background information** collected in the pre-questionnaire (primary data) can be used to create a vulnerability matrix, which is essentially an overview of the demographic and biomedical data for each participant set against certain outcomes of the qualitative analysis.

- **Verbatim transcripts** of the field-based interviews (primary data). The audio recording of each complete interview is transcribed word-by-word, including fieldworker questions and any third parties that may have interrupted or taken part in the interview somehow. Ideally, transcripts should be produced by skilled transcribers.

- **Interview summaries** of the field-based interviews written by the fieldworkers who conducted the respective interviews (secondary data).

Analysis for the Diabetes Vulnerability Assessment involves three major steps including:

1. Data reduction and coding
2. Thematic content analysis
3. Synthesis into social and cultural factors

DATA REDUCTION AND CODING

At the core of any qualitative analysis, strategy is the principle of data reduction. This refers to the process whereby the mass of qualitative data that has been obtained – interview transcripts, interview summaries, observations, etc – is reduced and organised through a coding procedure. Through coding, data relevant to the research questions is extracted in an efficient, transparent, and systematic fashion. For the Diabetes Vulnerability Assessment, any data that contributes to answering the local and global research questions are of interest, and should be coded.

The following steps are involved in the coding process:

1. **Initial familiarisation with the collected data**. Before coding and analyses can begin, the research team must familiarise itself first with the data that has been obtained – reading sample transcripts, for example, or the interview summaries is a good first step. At this point, it is also useful to revisit the research questions and integrate any new insights that have already emerged or interests that have developed as part of the data collection phase.

2. **Develop the coding manual**. During a research group meeting, a code manual, a conceptual tool with which to classify, understand and examine the data, is drafted. The manual serves as a guide for analysts to categorise and extract salient data in a coherent, transparent, and uniform manner. To this end, a code label is created for each draft code in the first column of a table; a precise definition of what should be classified with this code appears in the second, and an example of the material that should be coded with this code appears in the third column. Thus, relevant information can be extracted from the interview transcripts, and a mass of data is effectively reduced to pertinent data.

3. **All available qualitative data (transcripts and, where applicable, interview summaries) is uploaded into *NVivo*.** *NVivo* allows for easy import of interview transcripts as well as tabularised demographic data. There are excellent training programmes available through QSR International on how to use *NVivo* in qualitative research.

4. **The first set of transcripts are coded, and the code manual is reviewed.** Each researcher initially codes one or two interviews based on the draft code manual. At this point, there will be a need to amend and refine the code manual based on experiences with the first interviews. This is best done through a research group consensus meeting. Already coded interviews may need to be re-coded following this to capture all relevant data.

5. **Coding of all the remaining transcripts.** Importantly, the coding process is highly iterative and may necessitate reflecting on and changing aspects of the code manual throughout. Regular consensus meetings that provide records of coding strategy; any changes in the manual and analysis development are, therefore, essential. Once all transcripts have been coded, thematic content analysis commences.

THEMATIC CONTENT ANALYSIS

The meaning of the coded data are analysed using Thematic Content Analysis (TCA)[6] to draw conclusions from the coded data. TCA has at its core the systematic investigation of themes, or patterns of meaning, created around a specific subject matter.

With an overview of the coded data, it is possible to examine the various experiences of participants around specific issues relating to health, wellbeing and diabetes and explore their differences and commonalities. Through identified commonalities, a theme may emerge which can be supported with original data, such as verbatim participant comments, demographic and ethnographic observation data.

For the Diabetes Vulnerability Assessment a theme is a label assigned to an observable pattern within the interview transcripts, such as financial constraints impact diabetes care, or gender differences in attitudes to diabetes, and so forth (these are just examples!). The coded interview data is used as a starting point to identify locally relevant themes or patterns of meaning. Preliminary themes are noted throughout by each member of the analysis team and discussed at regular intervals.

SYNTHESIS INTO SOCIAL AND CULTURAL FACTORS

Starting from an established set of themes that have emerged through coding and TCA, data is further synthesised to obtain specific social and cultural factors that, based on the collected data, are plausibly linked to diabetes vulnerability. Social and cultural factors are defined as concretely observable influence in a person's life, based on his or her life course, economic circumstance, environment, health, geographical location, as well as culture, customs and traditions.

It is important to identify and then explore in depth such factors because it is well known that social and cultural factors impact an individual's ability and opportunity to make choices and to affect his or her life. Understanding what basic factors limit or enhance a person's wellbeing and health-related decision-making, therefore, is essential in understanding the broader foundations of vulnerability to diabetes.

To extract and explore the relevant factors, all codes relating to the established themes should be examined for relevance (ie, based on a discernible impact on participants' lives, health, wellbeing). Any codes that relate to or reflect potential factors are listed, summarised, and grouped according to themes. Very similar draft factors are merged, and any superfluous ones discarded based on the research team's consensus, which is essential in this procedure. Likewise, transparency should be ensured by documenting decision-making procedures as researcher judgement is involved to some extent in asserting the relevance of factors.

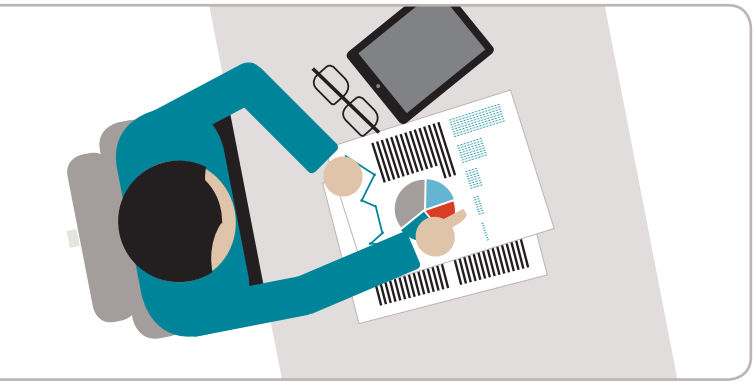
Once consensus is reached that factors are meaningful, they are cross-checked carefully against coded interview data (ie, raw interview content), and a final set can be established.

The established local social and cultural factors can then be identified across the participant population, and interpretation of findings can commence. It is helpful at this point to generate a 'vulnerability matrix': a tabularised overview that lists all participants; each of the social and cultural factors that apply to them, and all obtained demographic data collected as part of the pre-questionnaire in one overview (Appendix 7) With the aid of the vulnerability matrix, further quantitative analyses are also possible; for example, frequency and distribution of the social and cultural factors across the overall participant as well as across specific sub-groups can be examined.

Since the final list of social and cultural factors emerges entirely from within the initial qualitative data set (rather than, for example, through testing priori assumptions in a narrower population survey questionnaire), following the suggested procedure to generate social and cultural factors is advantageous when trying to explore diabetes vulnerabilities through qualitative methods.

NOTES:

4 PHASE FOUR REPORTING



PRODUCE A REPORT

Following the completion of the Diabetes Vulnerability Assessment data collection and analysis, it is recommended that an internal research report is produced. This can serve as a basis for further communication of findings to local stakeholders; scientific dissemination and publication planning, and follow-up research and intervention design.

Developing a set of key findings and insights is an essential part of the study, and synthesising the results from the thematic and factor analyses with available demographic participant data is a minimum requirement. This means that a narrative description of results (themes, factors, or both) should be presented together with relevant primary data as evidence.

Where possible, it is ideal also to strive towards establishing a set of *case definitions;* ie, a set of specific, non-random combinations of social and cultural factors present in a significant number of participants in the sample that are plausibly linked to diabetes and health vulnerabilities.

The report should follow the standard publication outline:

1. Introduction
   - Including background to topic
   - Existing data on the city of interest (eg, summary of a Rule of Halves analysis)
   - Background on the Cities Changing Diabetes collaboration

2. Methods
   - Rationale for study
   - Objectives
   - Outline of methodological principles
   - Overview study protocol and methodology

3. Results
   - Description of the participants
   - Description of major themes and factors that have emerged from the research
   - Impact of local factors on diabetes and health vulnerabilities
   - New insights

4. Discussion
   - Synthesis of results
   - Limitations
   - Next steps

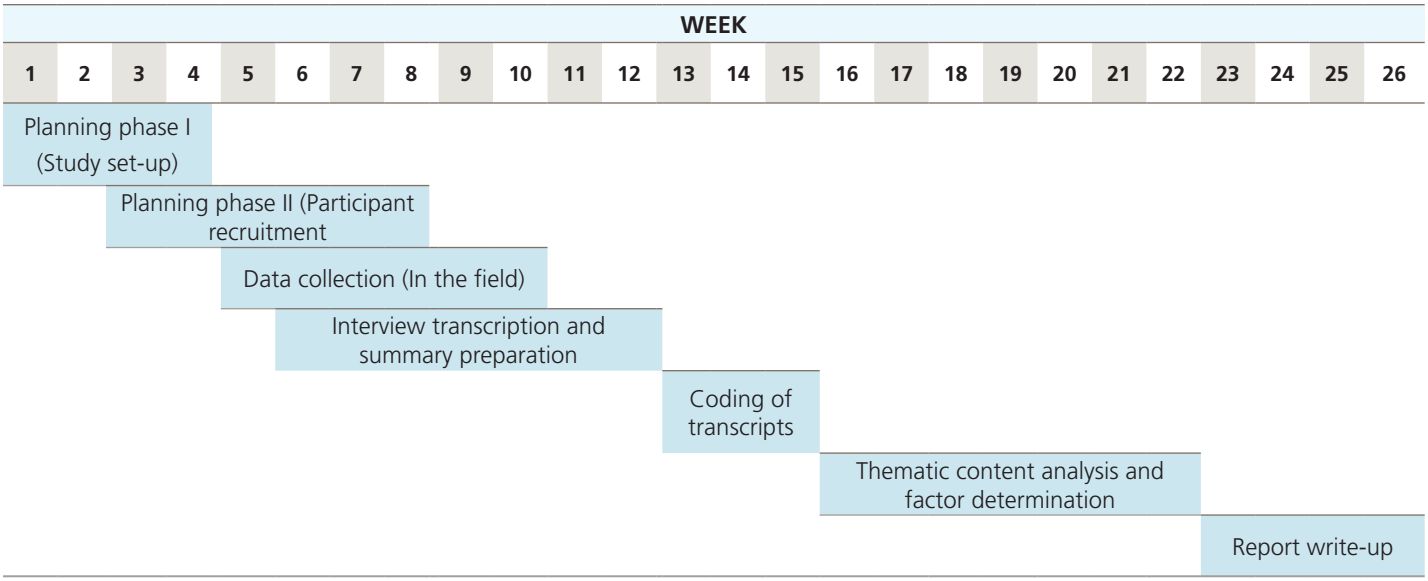
PUBLISH

Consider how the findings can be made accessible and shared broadly with stakeholders. Writing an article for a scientific peer-reviewed journal and presenting an abstract and poster at a relevant scientific conference are good ways of sharing the Diabetes Vulnerability Assessment results and making them accessible to other stakeholders.

NOTES:

APPENDIX 1

DIABETES VULNERABILITY ASSESSMENT SAMPLE STUDY TIMELINE



APPENDIX 2
DIABETES VULNERABILITY ASSESSMENT – FIELDWORK CHECKLIST

FIELD PACKAGE

- Audio recording equipment (checked) and spare batteries; a backup is ideal.
- Field address, map, instructions to fieldworkers, relevant contacts during field visit, etc (site-specific).
- At least three copies of participant information document and consent forms per interview (one spare, one for the participant, one for the fieldworker to return to base).
- We recommend an extensive list of local support groups and other relevant resources that can be given to a participant if questions arise or the participant needs support.
- Diabetes Vulnerability Assessment cover sheet (pre-questionnaire).
- Diabetes Vulnerability Assessment interview protocol
- Diabetes Vulnerability Assessment field summary template, to be filled out within 24 hours of conducting an interview and submitted online. Fieldworkers must submit the cover sheet and summary together to the agreed online filing system. The consent form should be filed separately according to local data protection.

ASSESSMENT PROCEDURE

- Personal introductions, general conversation. Ensure participant is comfortable and unlikely to be interrupted. Offer water if needed.
- Ask for permission to record the interview, turn on the recorder (it is best to have study explanation and verbal consent from the participant on record).
- Explain the study, read out information document, and obtain written consent (2 copies). File consent form in a separate folder and put aside; leave signed copy with the participant. Assure participant that it is perfectly acceptable to stop the interview at any point, no explanation needed.
- Begin the assessment with a cover sheet: assign participant ID and fill out the pre-questionnaire.
- Carry out the assessment using the interview protocol. Note down keywords and follow-up questions as needed, but restrict note taking to a minimum. Remember that establishing rapport is key.
- Finish the interview, thank the participant. Switch off the recording equipment, ideally only when leaving the venue.
- Fill out the summary template and submit alongside the pre-questionnaire and audio recording.

APPENDIX 3
GLOBAL DIABETES VULNERABILITY ASSESSMENT FOR THOSE LIVING WITH DIABETES

1. FORMAL DOMAIN

BLOCK	QUESTION/PROMPT	FOLLOW-UP 1	FOLLOW-UP 2
(F1) NATURE OF ASSISTANCE	(F1) Do you have any health insurance?	[if no] Why do you not have health insurance?	
		[if no] Do you know if health insurance is available where you live?	
		[if no] How did you/do you pay for expenses relating to your diabetes?	How do you pay for any other health-related expenses?
		[if yes] What kind of health insurance is it?	
		[if yes] Does your health insurance cover your diabetes-related expenses completely?	[if no] how do you pay for remaining expenses?
	(F1) Since having been diagnosed with diabetes, have you received any help or assistance for your diabetes?	[If no] Why would you say have you not received any help or assistance?	
		[If yes] What kind(s) of help or assistance have you received?	Please explain in what way that help or assistance was, or was not, useful to you.
		[if yes] For how long did you receive the help or assistance you just described?	
		[if yes] Who provided that assistance?	
	(F1) Do you know of any other kinds of help or assistance you could get for your diabetes that you are not currently getting?	[if no] What kinds of help or assistance would you like for your diabetes?	
		[if yes] What prevents you from accessing that help or assistance?	
	(F1) [if anyone else living in household] Has your household/family received any help or assistance because of **your** diabetes?	[if no] What, if any, kinds of help or assistance do you think your household/family might need regarding your diabetes?	
		[if yes] what kinds of help or assistance did they receive?	Was the help or assistance they received beneficial? In what way? What would you change?
	(F1) [if anyone else living in household] Has anybody in your household/family who is also diabetic received any help or assistance for **their** diabetes?	[if no] What, if any, kinds of help or assistance do you think your household/ family might need regarding their diabetes?	
		[if yes] what kinds of help or assistance did they receive?	Was the help or assistance they received beneficial? In what way? What do you think they might change? What would you change?
(F2) DURATION OF EFFECT/ IMPACT	(F2) [if received assistance] Did the help or assistance you received for your diabetes have a lasting effect on your diabetes symptoms?	Please explain in more detail. Can you give me an example of how the help or assistance had a lasting effect/did not have a lasting effect on your diabetes symptoms?	
	(F2) [if received assistance] Did the help or assistance you received for your diabetes have a lasting effect on your sense of wellbeing?	Please explain in more detail. Can you give me an example of how the help or assistance had a lasting effect/did not have a lasting effect on your sense of wellbeing?	

BLOCK	QUESTION/PROMPT	FOLLOW-UP 1	FOLLOW-UP 2
(F3) NEEDS MET	(F3) Did the assistance you received for your diabetes meet your needs?	Please explain in more detail. Can you give me an example of how the help or assistance met or did not meet your needs?	
	(F3) Do you think that your diabetes needs will be met in the future?	Please explain in more detail. How do you feel about this?	What do you think could be done to ensure that your needs are met in the future?
(F4) EQUALITY OF ACCESS	(F4) In general, do you think that there is enough help or assistance for people with diabetes available where you live?	Please explain in more detail. Can you give me an example?	What do you think could be done to improve the availability of help or assistance for people with diabetes where you live?
(F5) HEALTH COMMUNICATION	(F5) When you were diagnosed with diabetes, did someone explain diabetes to you?	[if no] How, if at all, did you then learn about diabetes?	Have you tried to find information about diabetes on your own? Were you able to find satisfactory information? Can you give me an example of how you tried to find information? What did you find out?
		[if yes] Who explained diabetes to you?	Was the explanation of diabetes that you received useful? In what way? Can you give me an example?
	(F5) What would you say is the most useful information that you have received about your diabetes?	Who gave you that information? Why was it useful?	
(F6) PROVIDERS OF ASSISTANCE	(F6) Do you know of any organisations that help people with diabetes where you live?	[if no] Why do you think there are no such organisations?	
		[if yes] Can you give me some examples?	Do you use their services? Why?
			Do you know anyone (else) who does? Can you think of anyone else who might benefit from using those services?
	(F6) Do you have a designated healthcare provider?	[if no] Why not?	Who do you then see for your health-related needs? What are your experiences with them?
		[if yes] What are your experiences with that health care provider?	
(F7) GENERAL	(F7) What kind of assistance would you like to have for your diabetes?	Is there anything regarding services, or other kinds of help or assistance that we have not yet discussed, which would be beneficial regarding your diabetes?	

2. COMMUNITY DOMAIN

BLOCK	QUESTION/PROMPT	FOLLOW-UP 1	FOLLOW-UP 2
(C1) COMMUNITY	(C1) Were you born in the neighbourhood you live in now?	[if no] Where were you born?	Can you tell me a bit more about how you came to live where you are now? Do you like living here? Why, why not?
		[if yes] Do you like living here?	Why, why not?
	(C1) Would you say that you are part of a community?	[if no] Why do you think that is?	Can you describe to me how you feel about not feeling like part of a community?
		[if yes] Can you please describe your community to me?	
	(C1) Where you live, do people get together to help one another live well with diabetes?	[if no] Why do you think this is?	What do you think could be done to encourage people to get together to help one another?
		[if yes] Do you participate?	[if no] Why do you not participate? Is there something that could be done to make it easier for you to participate?
			[if yes] Can you give me some examples? Why do you participate?
	(C1) Where you live, do people get together to exercise (e.g. local sports teams)?	[if no] Why do you think this is?	What do you think could be done to encourage people to get together to exercise?
		[if yes] Do you participate?	[if no] Why do you not participate? Is there something that could be done to make it easier for you to participate?
			[if yes] Can you give me some examples? Why do you participate?
	(C1) Where you live, do people get together to help one another to grow food (eg, through community gardening)?	[if no] Why do you think this is?	
		[if yes] Can you give me some examples?	Do you participate in any of such activities? Why/why not?
	(C1) Are there any other ways in which people help each another where you live?	[if no] Why do you think this is?	What do you think could be done to encourage people to get together to help one another?
		[if yes] Do you participate?	[if no] Why do you not participate? Is there something that could be done to make it easier for you to participate?
			[if yes] Can you give me some examples? Why do you participate?
	(C1) Do you think more could be done to improve community organisation for people with diabetes?	[if no] Why not?	
		[if yes] Can you give me some examples?	

BLOCK	QUESTION/PROMPT	FOLLOW-UP 1	FOLLOW-UP 2
(C2) CUSTOMS AND TRADITIONS	(C2) Would you say that there are traditions in your community that promote social connections?	[if no] Why not?	
		[if yes] Can you give me some examples?	How important are social connections in the community to you personally? Why?
	(C2) In your community, would you say that people follow a traditional lifestyle?	[if no] why do you think that is?	How do you feel about this?
		[if yes] Can you describe what a traditional lifestyle looks like to you?	Can you give me some examples?
		Is following a traditional lifestyle important to you?	
	(C2) Do you think that your community's customs and traditions are changing?	[if no] Why do you think that is?	How do you feel about this?
		[if yes] In what way are your community's customs and traditions changing?	In what way does that impact you, and/or your household?
	(C2) In your community, are there any customs or traditions that have an impact on how people eat?	[if yes] Can you give me some examples?	In what way do such customs or traditions impact the way you and/ or your household eat?
	(C2) In your community, who would you say do people customarily go to for advice with their health?	Has this changed in the recent past? Why?	Where do you go to for advice with your health? Why?
(C3) NUTRITION	(C3) In your community, what would you say is the main food that people eat on a normal work day?	Can you describe to me a typical main meal or what you think most people in your community may typically eat in the morning, mid-day, and evening?	What would you say is the main food that you and household eat on a work day? What would be a typical main meal for a day, or a typical meal in the morning, midday, and evening?
	(C3) In your community, what would you say is the main food that people eat for a celebration or special occasion?	Can you describe to me a typical meal eaten for celebrations or special occasions by most people in your community?	What would you say is a typical meal you and your household eat for a celebration or special occasion? How often would you say do you eat such a meal? What does eating this meal mean to you?
	(C3) Do people in your community grow their own food, ie, vegetables or fruit, or do they make their own food staples, such as bread, pasta, yoghurt?	[if no] Why do you think people in your community do not grow their own food or make their own food staples?	Do you think something could be done to encourage people to grow their own food? In what way might that be a good idea?
		[if yes] What do people in your community typically grow or make?	
	(C3) Do you or someone in your household grow your own food or make your own food staples, such as bread, pasta, yoghurt?	[if no] Why not?	Do you think something could be done to encourage you or people in your household to grow or make some of your own food? In what way might that be a good idea?
		[if yes] Why?	How much of your own food do you typically eat? What would you say are the benefits of growing or making your own food?
	(C3) Where in your neighbourhood do people most often buy groceries?	Where in your neighbourhood do people in your household most often buy groceries?	Why do you go there? What are your main considerations when buying groceries on an everyday basis? Does this change when you buy groceries for a special occasion? Why?
	(C3) Where in your neighbourhood do people most often go to eat?	Where in your neighbourhood do you go most often to eat?	Why do you go there? What are your main reasons for eating out? How do you choose where to eat?
	(C3) In your neighbourhood, how often do you think people eat outside of their homes in a week?	How often do you eat outside of your home in a week?	
	(C3) In your household, who typically prepares the food?	Why is that?	

BLOCK	QUESTION/PROMPT	FOLLOW-UP 1	FOLLOW-UP 2
(C4) INFRASTRUCTURE	(C4) Where you live, do people have access to free drinking water?	[if no] why do you think that is?	What do people then commonly drink when they are thirsty?
		[if yes], do they have access to drinking water at home (from a tap?)	
	(C4) What do you and members of your household commonly drink when you're thirsty?	Why is that?	
	(C4) In your neighbourhood, do people commonly work closely to where they live?	Please give an example of how far people commonly travel to get to where they work	How do people commonly get to work – walk, cycle, public transport, car?
	(C4) [if working] Do you live close to your workplace?	How far do you have to go to get to work?	How do you then get to work? How would you like to get to work?
	(C4) Do you like where you live?	Can you provide me with some examples of why you do or do not like where you live?	
	(C4) Would you say that your neighbourhood is a safe place to live?	Why?	
	(C4) From a health point of view, what could be improved where you live?	Please provide some examples.	
(C5) EXERCISE	(C5) Are there any public areas in your neighbourhood where people can meet to go walking or running, or exercise in a green space like a park, for example?	Is it important to you to have access to such spaces?	Can you explain in a little more detail why? Do you like being outside? Why/ why not?
	(C5) What kinds of physical activities do people usually do in your neighbourhood?	Can you provide me with some examples?	Where you live, do people commonly exercise alone? Are people engaging mostly in indoor or outdoor exercises?
	(C5) What kinds of physical activities do you do?	Can you provide me with some examples?	Is there anything you can think of that would encourage you to become more physically active?
	(C5) Do you think of yourself as a physically active person?	Can you provide me with some examples?	Do you enjoy being physically active? Why/why not?

3. VULNERABILITY DOMAIN

BLOCK	QUESTION/ PROMPT	FOLLOW-UP 1	FOLLOW-UP 2
(V1) ILLNESS UNDERSTANDING/ INTERPRETATION	(V1) Please explain, if you can, what diabetes is.	[if can explain] Where have you learned about diabetes?	
	(V1) Can you name some diabetes symptoms?	[if can name] In your opinion, what do you think is the most problematic symptom of diabetes?	
	(V1) In your opinion, what makes people develop diabetes?		
	(V1) In your opinion, who would you say is most likely to develop diabetes?		
	(V1) In your opinion, who do you think suffers most from having diabetes?		
	(V1) In your opinion, how do you think diabetes could be prevented?	Can you give me some examples?	
(V2) STANDARD VULNERABILITY INDICATORS	(V2) Could you tell me if you live alone or with others?	Who do you live with?	
	(V2) Are you responsible for somebody else's care, [if applicable] other than your children?	[if yes] Could you explain to me whom you are responsible for and why?	Could you describe to me what it is that you do when you say that you are responsible for someone else's care?
		[if yes] Does that person have diabetes?	[if yes] are you responsible for their diabetes care?
	(V2) [if working] Can you explain to me what it is that you do for work?	Is your work long-term or temporary? Please describe.	Do you receive any kinds of workplace benefits? What kind?
	(V2) [if not working] Could you tell me why you are not working?	Is your not working temporary?	[if yes] What could be done, if anything, to change this?
	(V2) [if receiving benefits/ support] Could you tell me a bit about the kinds of benefits or support you are receiving?	Do these benefits/ support cover other members of your household?	Would you say that the benefits/ support meet your/ your household's needs?
	(V2) [if not receiving benefits/ support] Could you tell me why you are not receiving benefits/ support?	How do you pay for the things you need? How do you feel about this?	What could be done, if anything, to change this situation?
	(V2) In comparison to other people in your community, do you feel financially secure?	Why is that? Can you give me some examples?	What could be done, if anything, to change this situation?
	(V2) Do you feel that your basic needs in life taken care of?	Please explain what you would consider your basic needs to be and how they are met/ not met.	What could be done, if anything, to change this situation?
	(V2) Can you afford your diabetes care?	[if no] What are the main issues that you encounter about affording your diabetes care?	What could be done, if anything, to change this situation?
		[if yes] Can you give me some examples?	
	(V2) Do you feel you can manage your diabetes symptoms?	How do you manage your symptoms?	What could be done to improve how you manage your diabetes symptoms?
(V3) SAFETY	(V3) Is your neighbourhood a safe place?	Why is that? Can you give me some examples?	How does this impact your life? How does this impact your physical activities?

BLOCK	QUESTION/ PROMPT	FOLLOW-UP 1	FOLLOW-UP 2
(V4) TRUST AND AGENCY	(V4) Which people do you trust for general health advice?	Why is that? Can you give me some examples of whom you trust/do not trust, and why?	Can you tell me who you trust most/ least with your diabetes care, and why?
	(V4) Has having diabetes changed your outlook on life?	In what way has having diabetes changed your outlook on life? What are the positive/negative aspects of having diabetes?	
	(V4) Has having diabetes changed your enjoyment of life?	In what way has having diabetes changed your enjoyment of life?	What could be done, if anything, to change this situation?
	(V4) Do you feel confident about your future?	Please explain in more detail. Can you give me an example?	
(V5) OTHER CONCERNS	(V5) Are there other people you know who you think are suffering from diabetes and are living without care?	[if yes] Who are they? Do you think you could put us in touch with her/him so that we could interview her/him?	
	Is there anything else you would like to share with me at this point about your experience with diabetes?		

APPENDIX 4

FIELDWORKER TRAINING WORKSHOP – SAMPLE SCHEDULE

DAY 1	SESSION	PURPOSE/OUTCOME
09.00-10.00	**Introductory session** • Welcome and quick overview of the Cities Changing Diabetes global programme • Participants to introduce themselves (all)	Introduction, familiarise the group with the topic, contextualise research, 'warm-up'.
10.00-10.15	Break	
10.15-12.30	**Sociocultural factors, and how to assess them** • Diabetes in [city] • Discussion of qualitative research methodologies • End of session Q&A (all)	Introduction of technical aspects of Diabetes Vulnerability Assessment, understanding the background and methodology.
12.30-13.00	Lunch	
13.00-16.00	**The Diabetes Vulnerability Assessment** • Introduction • Group to work through the Diabetes Vulnerability Assessment in detail (all) - Part I: clarify language used in Diabetes Vulnerability Assessment (does question resonate, are there qualifiers needed, rationale behind wording) - Part II: approach to questions (how are questions to be asked in the field, leading questions versus offering guidance • End of session Q&A (all)	Understanding the rationale behind questions, clarifying content. Ensure fieldworkers are comfortable with prompts and understand their purpose. Ensure language is in the vernacular.
16.00-16.15	Break	
16.15-17.00	**Teaching session – Data preparation and analysis** • Purpose of executive summary • How to write an executive summary • Quick, practical example (all) • End of session Q&A (all)	Understanding the purpose of executive summary, how-to, and practice.

DAY 2	SESSION	PURPOSE/OUTCOME
09.00-10.00	**Planning session – Ethics, regulations, health and safety** • Recap • Informed consent and other ethics considerations	Ensure all procedures are followed, and fieldworkers understand fully local regulations.
10.00-10.15	Break	
10.15-12.00	**Exercise session I- Collecting data** • Diabetes Vulnerability Assessment interview techniques • Demo and VA examples • Fieldworkers to practice in random pairs **Exercise session II – Mock interviews with group** • Fieldwork pairs to practice administering Diabetes Vulnerability Assessment in teams	Interview techniques recap, practice under observation, group exercise. Ensure that all are on the same page.
12.00-12.30	Lunch	
12.30-17.00	**Pilot Session** • Preparation for the pilot session • Pilot Interviews (all fieldworkers and volunteers) • Wrap-up	Putting into practice what has been discussed throughout; test Diabetes Vulnerability Assessment locally.

APPENDIX 5
GLOBAL DIABETES VULNERABILITY ASSESSMENT PRE-QUESTIONNAIRE

(CS.1.) INTRODUCTION	(CS.1.1.) [please note participant's gender]	[ ] Female [ ] Male [ ] Other
	(CS.1.2.) What is your age?	[ ] [ ] Would rather not say
	(CS.1.3.) What ethnic group do you identify with?	[ ] [ ] Would rather not say
(CS.2) HOUSEHOLD	(CS.2.1.) Are there other people living with you? -> Researcher: please state how many (where applicable).	[ ] Parents [ ] Children under 18 [ ] Friends [ ] Colleagues [ ] Extended family [ ] Others [ ] None [ ] Would rather not say
	(CS.2.2.) Do you live in a ...	[ ] House [ ] Apartment [ ] Mobile Home [ ] Other [ ] Would rather not say
	(CS.2.3.) Do you own the place you live in?	[ ] Yes [ ] No [ ] Would rather not say
(CS.3) EMPLOYMENT	(CS.3.1.) Do you usually work?	[ ] Yes [ ] No [ ] Would rather not say
	If yes: (CS.3.2.) How many hours did you work in total last week?	[ ] [ ] Would rather not say
(CS.4) TRANSPORT	(CS.4.1.) What kind of transportation do you rely on to get to the store or the doctor?	[ ] [ ] Would rather not say
(CS.5) HELP AND ASSISTANCE	(CS.5.1.) Are you currently receiving any assistance to meet your and your family's daily needs, such as TANF (Temporary Assistance for Needy Families)? -> Researcher: state which, *if mentioned,* in the second column.	[ ] Yes [ ] No [ ] Would rather not say
	(CS.5.2.) Are you receiving any kinds of benefits? -> Researcher: state which, *if mentioned,* in the second column.	[ ] Yes [ ] No [ ] Would rather not say

(CS.6) HEALTH	(CS.6.1.) May I ask what your height is?	[ ] Would rather not say
	(CS.6.2.) May I ask what your weight is?	[ ] [ ] Would rather not say
	(CS.6.3.a.) Do you currently smoke?	[ ] Yes [ ] No [ ] Would rather not say
	(CS.6.3.b.) Did you used to smoke?	[ ] Yes [ ] No [ ] Would rather not say
	(CS.6.4.a.) Do you suffer from high blood pressure?	[ ] Yes [ ] No [ ] Would rather not say
	If yes: (CS.4.b.) If yes, are you currently taking medication for it?	[ ] Yes [ ] No Would rather not say
	(CS.6.5.a.) Have you been taking any other kinds of medication regularly in the past six months?	[ ] Yes [ ] No [ ] Would rather not say
	If yes: (CS.6.5.b.) What condition(s) do you take this medication for?	[ ] [ ] Would rather not say
	(CS.6.6.) How many days in the last 12 months were you at home because you felt unwell? → Researcher: state reason, *if mentioned,* in second column.	[ ] [ ] Would rather not say

END OF PRE-QUESTIONNAIRE.
DO NOT FILL OUT QUESTIONS BELOW THIS LINE.

APPENDIX 6
INTERVIEW SUMMARY TEMPLATE

Date	
Interview ID	
Researcher ID and signature	

Please flag any important issues in red here:

Make sure to cover at least the following questions, and feel free to expand and be creative with your summary. Note that text boxes expand as you write; there are no restrictions on length.

1. In a few sentences, describe the setting in which the interview took place.

- Where did the interview take place?
- How did you get here?
- Did you notice anything unusual or special on the way to the interview location?
- If you went to somebody's house or flat, describe it in a few sentences.
- Overall impression of the neighbourhood:
  - Were there mostly houses/shops/restaurants etc?
  - Did it seem affluent/poor/mixed/'up-and-coming', etc?
  - Were any people outside, sitting and watching the street? Walking about? Jogging, cycling? Children playing outside? Anything else?

2. In a few sentences, describe your interview participant.

- What was her or his overall appearance:
  - How were they dressed?
  - Did you have the impression they made a special effort for the interview? Or the contrary?
- Did the person seem healthy?
- Did the person strike you generally as content/happy/unhappy/sad/anxious, etc?

3. Please describe the interview itself.

- Was there anything particularly noteworthy about the interview?
  - Either something the person said, or how they said it.
  - Something that you noticed that was not openly talked about.
- Did the person show you photos/medication/anything else? Please describe/provide an example.
- Based on your impression:
  - What would you say was the main problem the person was facing regarding their health/ wellbeing?
  - What was good in their life regarding their health/wellbeing?
  - What might make this person particularly vulnerable to suffering from the consequences of any chronic or acute conditions they may have?
  - Is there something that might help them right away?

4. Did the participant seem to be interested in the study and motivated to provide information?

- Provide an example (describe body language, or quote from interview).
- Did the participant ask any questions about the project?
- Provide an example, and the given response.

5. If the person said something that struck you as particularly interesting or important, please note it down here.

- You can refer to the time it occurs in the interview or quote.

6. Did the person suggest there were others more vulnerable?

- If yes, please provide details here.

7. Please add anything else that you think might be important.

APPENDIX 7
VULNERABILITY MATRIX

OVERVIEW SOCIAL, CULTURAL AND BIOLOGICAL FACTORS

Interview ID	Demographic Data										Biological Risk Factor Score (optional)				Social and Cultural Factors Identified											
	Gender Female	Gender male	Age	Educa-tion	Income	Weight	Height	BMI	High BP	Any other relevant data	Bio Risk Factors (0)	Bio Risk Factors (at least 1)	Bio Risk Factors (at least 2)	Bio Risk Factors (all)	Eg, Time Poor, etc.											
ID 123																										
ID 124																										
ID 125																										
etc.																										

APPENDIX 8
DATA ANALYSIS – STEP-BY-STEP OVERVIEW OF CODING

1. Development of coding manual: group consensus is obtained regarding validity and relevance of codes. Data is salient where it has the potential to inform the researcher towards answering the study/research question.

2. Demographic overview of participants should be developed alongside coding to generate 'vulnerability matrix' (template to be supplied upon request). Important features should include a list of all interview participants with corresponding age, gender, location, and, if available, any other information (such as weight, BMI, the presence of co-morbidities, etc) should be listed.

3. Initial coding of two transcripts each per coder, according to coding manual.

4. Group Checkpoint I:

    i. Before meeting, each coder codes one transcript from another member of the group to ensure manual is valid, and coding is done evenly across group (eg, Coder A takes interview 1 from Coder B, Coder B takes interview 1 from Coder C, Coder C takes interview 1 from Coder A and codes as if it was new). Any MAJOR differences should be recorded and brought to the meeting. A major difference would be where a whole passage is coded by one person but not the other. A minor difference would be where one person codes a whole passage including a sentence that is not.)

    ii. Group lead to import coded transcripts and to use *NVIVO* query to check for even coding; record results.

    iii. In the meeting: Coding manual is revised and updated if needed. This should happen in person. Ideally, all should bring any notes where they have found differences between coders, or where they have noted that the code manual might need to be amended.

    iv. Examples of each code are provided once the first stage of analysis has been conducted. (This should be done by a designated person in each group, ideally the lead.) All coders should then be supplied with a copy of the updated code manual (where changes are implemented if needed, and where examples are provided from the first transcripts that explain and illustrate a code well).

    v. If needed, initial interviews are re-coded depending on potential impact of changes in manual (decision-based on consensus)

5. Coding continues until midpoint is reached.

6. Preliminary themes are noted throughout by each member of the analysis team and discussed at regular intervals. Remember, a theme is a label we assign to an observable pattern within the interview transcripts, such as financial constraints impact diabetes care, or gender differences in attitudes to diabetes, and so forth (these are just examples!).

7. Group Checkpoint II (optional)

    i. Each coder codes one transcript from another member of the group to ensure manual is valid and coding is done evenly across the group. There should be no revision needed.

8. All interviews are coded.

9. Group Discussion: Results shared with group and sample transcripts (incl codes) are presented.

    i. Preliminary themes are described by the lead and discussed in the group.

    ii. Consensus is reached regarding the validity of codes and themes.

    iii. Specific preliminary social and cultural factors are drawn up based on themes. Factors relate to concrete characteristics or circumstances that can be objectively identified in an interview transcript.

10. Answers to research questions are drafted.

11. Preliminary factors are validated in interview transcripts and revised/adjusted if needed.

12. Factors are identified in each interview (respondent) and added to vulnerability matrix.

Statistical analysis can ensue, and write-up can be planned.

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This document was created for Cities Changing Diabetes and authored by David Napier (University College London) and Anna-Maria Volkmann (University College London) with contributions from Louise Hesseldal (Novo Nordisk) and Malene Bagger (Novo Nordisk).

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May 2017