

# How to Design a Qualitative Health Research Study. Part 2: Data Generation and Analysis Considerations

Come disegnare uno studio di ricerca sanitaria qualitativa. Parte 2: Considerazioni su generazione e analisi dei dati

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## ABSTRACT

In the first part of this article, we introduced methodological issues associated with study design, research questions, contexts, sampling, and recruiting for qualitative health research studies. Here, in this second part of the article, we continue providing health researchers with information on how to design a qualitative health research study and we aim to prepare novice researchers for entering the field. Specifically, by providing considerations for selecting data gathering strategies, differentiation of types of qualitative data and practical tips on how to go into the field. Then, we will briefly discuss data management, analysis and dissemination.

**KEYWORDS:** Research Methodology, Qualitative Research, Qualitative Health Research, Research Design, Data gathering, Data analysis.

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## RIASSUNTO

Nella prima parte di questo articolo, abbiamo introdotto questioni metodologiche associate alla progettazione dello studio, domande di ricerca, contesto, campionamento e reclutamento per studi di ricerca qualitativa sanitaria. In questa seconda parte dell'articolo, continuiamo a fornire ai ricercatori della salute informazioni su come progettare uno studio di ricerca qualitativa sanitaria e ci proponiamo di preparare i ricercatori alle prime armi per andare sul campo. In particolare, fornendo considerazioni per la selezione della strategia di raccolta dati, differenziazione dei tipi di dati qualitativi e consigli pratici su come andare sul campo. Dopodiché, discuteremo brevemente la gestione, l'analisi e la diffusione dei dati.

**PAROLE CHIAVE:** Metodologia della ricerca, Ricerca Qualitativa, Ricerca Sanitaria Qualitativa, Disegni di Ricerca, Raccolta Dati, Analisi dei dati

## INTRODUCTION

In part one of this article (Luciani, Campbell, Tschirhart, Ausili, & Jack, 2019), we provided health researchers with a blueprint to designing a qualitative health research study. By sharing practical advice for choosing a topic, selecting a design, writing a research question, and engaging in reflexivity, we introduced the initial elements associated with developing a qualitative research protocol. The purpose of this article is to describe common types of data in qualitative studies, including interviews, observations, and documents. Then we offer some suggestions to help facilitate a smooth data collection experience for health researchers. Given that qualitative research data generation and analysis occur concurrently (Creswell & Poth, 2018), we provide a rudimentary guide to developing codes, categories, and themes. However, qualitative data analysis is a complex skill that develops over time and preferably with good mentorship (Richards, 2015).

## DATA GENERATION

In qualitative research, researchers who hold a constructivist assumptions refer to the process of engaging with data as data generation rather than data collection or gathering (Thorne, 2016). This is because the researcher – often referred to as the “research instrument” in qualitative studies – along with the participant, co-create data and use insight and reflection to decide and understand ‘what is data’ and ‘what is important within data’ (Thorne, 2016).

### Considerations for Selecting Data Generation Strategies

In qualitative health research, we predominantly seek to describe, explain, and deepen our understanding of individuals’ perceptions, beliefs, and experiences about health or illness related phenomena, and document varied patterns in behaviours and relationships. In order to understand how another person or group perceives or experiences a phenomenon – we require mechanisms that allow for the expression of their thoughts, values, and beliefs. In qualitative health research, it is therefore common to generate data through interviews with study participants, retrieving and reviewing documents, accessing content on social media, observing individuals or groups within a specific setting, as well as collecting audiovisual or digital materials.

There are multiple considerations that will influence the type of data that a research team determines is most appropriate to generate or collect (with respect to documents) in the study to answer the overarching research question. In Table 1, we identify seven questions, along with key considerations, to guide researchers’ decision-making around the selection of qualitative data generation strategies. In qualitative health research, particular attention is paid to the “characteristics” of participants as well as the “setting” in which the data will be generated. As these types of studies may involve individuals experiencing an acute or chronic illness, researchers will want to take into

consideration how disease symptoms, physical and mental health status, or personal and social circumstances influence the participant’s ability or energy to share their experiences. For example, in a case study to examine the complex web of factors that influence how young adults with paediatric life limiting conditions transition to adult health care services, study participants within this medically fragile population were unable to commit to a specific interview date and time due to often complex and unstable health care needs. Furthermore, many had limitations to their verbal communication and relied on the use of computer mediated voice recognition programs (Cook, Jack, Siden, Thabane, & Browne, 2014). Due to these conditions, a data generation strategy that allowed for expression of ideas but did not rely on verbal communication or a lengthy interview session was required. The solution selected was to generate data through the conduct of online bulletin board focus groups (Cook et al., 2014).

One must also consider the setting or where the research will be conducted in terms of data generation. For case studies or focused ethnographic projects, researchers may need to ensure that a detailed description of the context is captured, thus researchers might need to arrange to observe the phenomena within a natural setting and collect data about the context. More commonly, health researchers prioritize the importance of meeting with study participants in settings that offer privacy, are safe, and place minimal burden on the participant to access. When collecting data from health care providers, researchers should also give consideration, and explore with setting gatekeepers or participants themselves, if they would be allowed to participate in the study during paid work hours. Researchers must also reflect on the benefits or disadvantages to conducting interviews with individuals within their place of work (Morse, 2012). Meeting at the workplace, may offer convenience for the participant but may limit the ability to maintain confidentiality about the participant’s involvement in the study if they are observed with a known researcher. Therefore, the researcher might want to assess with participants whether they prefer to be interviewed at or away from their place of work.

Finally, it is common in many qualitative studies to collect more than one type of data. Thus, a research team must determine not only what type of data to collect, but how many types. Data type triangulation, namely generating or collecting more than one type of data, contributes to the overall quality and rigor of a study by enhancing the credibility or truth value of the findings (Krefting, 1991). For example, if the goal is to describe how shared decision-making around treatment decisions occurs between gynaecologic oncologists and women diagnosed with ovarian cancer, the inclination might be to interview both oncologists and women separately and ask them to describe the shared decision-making process. However, to gain a more comprehensive and accurate understanding of how both of these individuals behave and act towards each other within the clinical setting, it may be prudent to augment the interviews with observation of the clinical encounters.

Table 1. Questions and key considerations to help determine type(s) of data to collect in a qualitative health research study.

Questions to help determine type(s) of data to collect in a qualitative health research study.	Key considerations or examples
1. What is the study purpose?	<p>If the study purpose is to describe an individual's perceptions, experiences or beliefs – then the data collection strategy must allow for them to communicate their thoughts and descriptions, including: interviews (any form) or expression of thought through writing (submit a journal, diary, blog entry) or digital recording (personal video).</p> <p>To deepen our understanding, explain, or describe how individuals act or behave within a specific context or towards one another, one might select observation.</p>
2. What is the qualitative health research study design?	<p>Observation is commonly used ethnographic studies; given the smaller scope of focused ethnographies, observation may or may not be included.</p> <p>Interviews are common across all qualitative health research designs</p>
3. How might the personal attributes of the participant or a group's cultural norms influence how data are generated?	<p>Are there any physical, cognitive or social limitations, often associated with disease or disability, that will influence ability or capacity to participate in a specific form of data generation? For example, individuals with dementia may not remember to document experiences in a research journal, or a person with aphasia may find it difficult and burdensome to participate in a verbal 1:1 interview.</p> <p>Consider if data generation strategies are culturally appropriate for a specific group or population. For example, photovoice, symbol-based reflection, circles and story-telling are appropriate methods for oral data collection among Indigenous people in Canada (Wright, Wahoush, Ballantyne, Gabel, &amp; Jack, 2016).</p> <p>It can be difficult to coordinate the schedules of "busy" individuals with competing demands (E.g. nurses on shift-work, physicians, new mothers) which makes the planning and coordination of focus groups often difficult; arranging for a 1:1 interview may be more convenient.</p>
4. What characteristics of the research setting will influence use of a specific form of data generation?	<p>There may be institutional restrictions or rules that limit access to personally interview or observe a participant. For example, there may be limits in accessing prison, educational, or some health care environments – which then does not allow for observation or certain types of interviewing.</p> <p>In studies of health care providers or health educators, where there are naturally occurring "groups" or teams of individuals working together in a work setting, accessibility and the ability to conduct a work-based focus group may be enhanced.</p>
5. How will study resources (human, financial) influence accessibility and feasibility of using one data generation approach over another?	<p>Available human and financial resources, as well as study timeline will influence how data are generated and the number of data types used within a study.</p> <p>When study participants are not located close to a researcher (with limited funding), a decision to conduct telephone or web-based interviews instead of in-person interviews may be made.</p>
6. What ethical issues must be considered to ensure that the safety, privacy and confidentiality of study participants is maintained?	<p>Often topics of a sensitive nature or stigmatised are explored and described in qualitative studies, therefore individuals may feel safer sharing their personal experiences in writing or 1:1 interview rather than focus groups.</p>
7. How does the knowledge, characteristics, and skill level of the researcher influence how data are generated?	<p>The generation of qualitative data through interviews (1:1, focus groups) requires a high degree of knowledge, skills, confidence in communication including developing rapport, validation and clarification.</p> <p>Focus groups require a skilled facilitator who can manage group processes.</p>

### Types of Qualitative Data

The characteristics of different types of data and strategies for generating qualitative data have been extensively documented in a wide range of methodological articles describing qualitative interviewing, including focus groups, observation, documents, artefacts and a range of elicitation techniques. In this section, we briefly introduce the common types of data generated in qualitative health research studies and provide some practical guidance to their use.

**Interviews.** Interviewing in qualitative research creates an opportunity for the researcher and the participant(s) to

engage in a discussion so that the participant's experiences and perceptions can be shared, as well as the meaning of the phenomenon under study can be explored. In designing a study protocol, a researcher will have to make methodological decisions related to: 1) number of participants; 2) structure; 3) mode; and 4) number of interviews.

Once the decision is made to interview participants, the first critical decision is: how many participants should participate in the interview with the researcher? Options include conducting a one-to-one interview, where the researcher and a single study participant engage together in a discussion to co-create new knowledge about the study topic. Alternatively, a researcher may consider conducting

a dyadic interview with two participants (Morgan, Ataie, Carder, & Hoffman, 2013). It is common to use dyadic interviewing with “naturally occurring” dyads such as parents or two individuals engaged in an intimate relationship. This method of interviewing allows for multiple perspectives to be shared in addition to providing time and space for the exploration and explanation of similarities and differences of the perspectives shared. Or else, the researcher may determine that exploration of the study topic will best be achieved through a focus group, or a group interview with ideally 6-8 individuals (often a homogeneous sample) who come together to describe, discuss, and compare and contrast their shared experiences.

A researcher also has a responsibility to determine the structure of the interview, considering if the data generation process will be unstructured, semi-structured, or structured (DiCicco-Bloom & Crabtree, 2006). In the development of a study protocol, the research team is responsible for drafting the relevant interview guide, which is a list of guiding questions to help the interviewer direct the conversation and provide guidance on how to ask questions. Questions for an interview guide may be generated from multiple sources including: theoretical frameworks, literature review, previous studies, or recommendations from knowledgeable experts in the field. Generally, the interview guide is indeed a guide and it is not intended to be followed blindly. To ensure that the study topic is explored holistically from the participants’ perspectives, typically open-ended questions are posed. However, the number and nature of the questions, as well as the degree of flexibility to introduce probing questions will be determined by the inherent structure of the interview.

In an unstructured interview, there is typically no (or few) questions that are pre-determined by the researcher. Instead the questions may be developed on the spot – as the researcher seeks information or clarification from a key informant or participant (DiCicco-Bloom & Crabtree, 2006). For example, unstructured interviews may be employed in focused ethnographic studies where researchers chose to spend a limited amount of time observing behaviours and actors in the field. Following an observation, the researcher may turn to any actor in the field and ask: “What is happening here?” or “Can you explain to me what I am observing?” These interviews will flow naturally, with the interviewer allowing the participant to control the speed and content of the discussion.

Typically, most qualitative health research studies employ semi-structured interviews (Morse, 2012). In this type of interview, the researcher will have developed a list of open-ended questions that allow for exploration of key concepts and experiences, and an opportunity to describe individual, group, organizational or contextual influences. In a semi-structured interview, there is flexibility to ask additional probing questions and if the participant introduces a new concept (that has not been identified a priori on the interview guide), then the researcher may choose to follow this line of inquiry. In semi-structured interviewing, while similar concepts may be explored across all interviews, the order of the questions and the topics of conver-

sation may differ somewhat. In contrast, a structured interview consists of a list of open-ended questions that are asked in a fairly consistent manner from interview to interview. These types of interviews are commonly used in program evaluations, questionnaires evaluations or fundamental descriptive qualitative studies.

There are many options to consider with respect to the “mode” or how the interview is to be conducted. When resources are available, many researchers prefer to conduct in-person interviews. Being in the same space with a participant may facilitate the development of rapport and engagement, and result in high quality, in-depth data. When it is not feasible to conduct an interview in-person, other options available may include interviews conducted by telephone or online, through web-technologies or apps such as Skype, WhatsApp, Webex or Zoom.

Finally, a decision will be required about the number of interviews to be completed with each individual. In designing the study, we recommend building flexibility into the study protocol that will allow for a range of interviews to be conducted with a single participant, dyad or group. As data generation and analysis are conducted concurrently, undoubtedly there will be situations where the team is engaged in analysis and identify a need for more information or further clarification about a specific concept from a participant. If flexibility has been built into the study design (e.g. protocol indicates that each participant will be invited to participate in 2-4 interviews), then researchers can reach back out to participants without the need to seek an amendment to the study protocol. We must also consider that the topics being discussed in a qualitative interview are often of a deeply personal nature – and that this might be one of the first times that a person has had the opportunity to share their experience without interruption to an individual who is actively listening and engaged in their narrative. For this reason, the first interview may just consist of the individual sharing rich detail about their experience – leaving little time for the researcher to explore specific facets of the phenomenon. With a planned second interview, the discussion can continue, and the researcher can then prioritize asking about the central study questions. Some advise multiple interviews for the purposes of member checking (Krefting, 1991) – a common strategy used to enhance the credibility of the findings by sharing the interviewer’s interpretation of the data with the study participant and seeking confirmation of results and interpretation. Conventional member checking can be of relative utility because one might believe to have done the right thing only if the participant agrees with presented findings (Thorne, 2016). Alternatively, a research team may decide to develop and share a synthesis of the findings from across all study participants, and ask participants to reflect on the credibility of the broader interpretation.

**Observation.** Observation is a powerful data generation strategy where first-hand information about people, events, and processes can be observed and documented. Observational data adds richness and may generate

insights unlikely to emerge from other strategies. It allows the researcher to understand and describe the context and observe actions that participants may be unaware of or unwilling to reveal in an interview. Observation provides an opportunity to triangulate findings from other forms of data generation and disclose potential differences between revealed and observed behaviour, for example as a result of social desirability bias (Harvey, 2018).

As participant observation research can be quite time-consuming, it is important that researchers consider multiple logistical issues prior to entering the field. Decisions related to “who” and “what” will be observed, as well as for “how long” must be determined. The responses to these questions will depend on the study purpose and available resources, as well as access to the area where observations will occur. A novice researcher might find it valuable to develop an observation guide with prompts on the types of things they might wish to attend to during their periods of observation. Guest, Namey & Mitchell (2013) suggest that some common categories to include in an observation guide might include: individuals’ appearances, verbal and physical behaviours, how individuals manage personal space, the patterns of how people move through the space, and unique individuals within the setting. In selecting a specific context to observe, Guest, Namey & Mitchell (2013) recommend that researchers must consider where the phenomenon or behaviours occur, e.g. in one consistent place (observing surgeries in an operating room) or in multiple places (drug use by individuals who are homeless), and how many locations one must go to observe a range of behaviours. Entering the field requires careful consideration of many safety, access and ethical issues (Guest et al., 2013).

Most importantly, a researcher needs to be very clear on how they will introduce themselves, if they need a “gatekeeper” to facilitate entry into a setting, and how engaged they will be in either “participation” or “observation” and how visible their role as a researcher will be (Guest et al., 2013). In an ethnographic study conducted in Italy to understand the relationship between badanti (migrant female caregivers for the elderly) and the individuals they provide care for (Nicolescu, 2019), the researcher observed 10 badanti providing personal care (e.g. feeding, dressing, conversing, gardening with their clients, etc.), with each observation session ranging anywhere from 30 minutes to three hours (for a total of 400 hours). In this study, as periods of observation were followed by in-depth, semi-structured interviews with the care workers as well as family members, we can conclude that the researcher role was highly visible and that the actions of the researcher would have included both participation in some activities (gardening alongside) as well as observation (observing administration of medications) (Nicolescu, 2019). In comparison, in other studies, a researcher might assume the role of being strictly just an observer, for example attending and observing from the side a meeting at a Ministry of Health where health policy responses to the opioid crisis are being developed and discussed. In other situations, the researcher role will be less visible to actors in the

field, for example if a researcher is interested in understanding the play dynamics between children in a park – they may choose to attend a local park, not disclose their identity as a researcher, and just observe families present.

**Documents.** Documents can serve a variety of purposes in qualitative health research. While typically used to supplement interviews and observations (Creswell & Poth, 2018), documents can be a rich source of qualitative data. In fact, documents can generate research questions, provide background and context, track change and development, verify findings from other sources, and offer a rich portrayal of the values and beliefs of the participants or experience of interest (Bowen, 2009; Marshall & Rossman, 2016). Documents can be created in the course of everyday events and therefore be void of researcher influence on the data generated, or else documents may be constructed purposely for the research at hand (Marshall & Rossman, 2016). Types of documents include, personal documents, official documents and popular culture documents (Creswell & Poth, 2018).

Diaries, personal letters or online correspondence, personal web pages, and blogs are examples of personal documents that comprise rich sources of qualitative data. For the qualitative health researcher, this form of data can provide insight into individuals’ health experiences and interactions with the health system (Jacelon & Imperio, 2005). For example, researchers interested in understanding how young people learn to live with inflammatory bowel disease asked participants to record a digital diary every six weeks over the course of one year (Sargeant & Gross, 2011). These diaries allowed the researchers a “view of how the disease fitted into individual lives” and revealed “a level of ‘ordinariness’ that can be otherwise difficult to ascertain in the context of chronic illness research” (Sargeant & Gross, 2011, p. 1368).

An unsolicited health/illness narrative or diary can be rare, however, the Internet and self-publishing applications such as blogs have allowed for universally available publications of personal health and illness experiences that are attracting the attention of health researchers (Heilferty, 2011). For example, to better understand women’s experiences of in vitro fertilization (IVF), researchers examined over 1400 blog posts authored by 7 women bloggers about their infertility and IVF treatment experiences (Orr, Jack, Sword, Ireland, & Ostolosky, 2017). Findings contributed to an in-depth understanding of the IVF experience as well as to highlight the potential value of blogging as a form of therapy or emotional support for women during the IVF process.

Policies, reports, meeting minutes, organizational websites and medical records are a few examples of official documents that can be used as data in qualitative health research. Official documents published by agents of a formal community or organization can be useful in developing an understanding of an institution, setting, group or topic of interest (Marshall & Rossman, 2016). For example, in a recent study of international osteoporosis guidelines, researchers examined how patient beliefs,

values, and preferences were included and conceptualized in these official documents – leading to a recommendation that qualitative data be included as evidence of patient beliefs, values, and preferences in such guidelines (Sale, Marwah, Naeem, Yu, & Meadows, 2019).

Publicly accessible documents such as magazine or newspaper articles are not simply mechanisms of information transmission reflecting on events that have happened, but are the principal means of access to, and participation in, a wider debate about an event or social phenomenon (Giarelli & Tulman, 2003). The representation of broad social issues found within popular culture documents make these viable sources of qualitative data of interest to health researchers. For example, to explore the issue of vaccination resistance, researchers analysed 57 years of newspaper articles on childhood vaccination and were able to track the evolution of public perception from the earlier discourses of cure to the more recent discourse of vaccine risk (Berezin & Eads, 2016).

### Other data sources/data generation methods

In recent years, qualitative health researchers have begun to push the boundaries beyond traditional forms of data generation and while the potential for data sources and methods seem limitless the importance of selecting an approach in alignment with the purpose of the study remains (Thorne, 2016). Other forms of data and/or data generation strategies include audio-visual or arts-based methods, social-media-based methods, physical artefacts and data from researcher field notes.

**Audio-visual & arts-based data generation.** Audio-visual materials, like documents, often supplement the data collected from interviews or observations (Creswell & Poth, 2018). However, advances in technology and the relative accessibility of audio-visual equipment (i.e., handheld devices with photo/video capabilities) have led to the expansion of this form of qualitative data generation and audio-visual data can constitute the primary data source for many inquiries. Photovoice and digital storytelling are two exemplars of audio-visual/arts-based methods of qualitative research that afford participants, often from a place of disadvantage or marginalization, a powerful medium for communicating their needs and concerns (Baker & Wang, 2006; De Vecchi, Kenny, Dickson-Swift, & Kidd, 2017). For example, health researchers utilized digital storytelling to describe the experiences of addiction in pregnancy, recovery, and peer-mentorship among a group of women in recovery from substance use disorder. Findings highlighted the need for a sensitive and tailored support system for pregnant and parenting women experiencing substance use disorder, particularly from someone who has been through the same experience (Paterno, Low, Gubrium, & Sanger, 2018).

**Social media.** Social media platforms such as Facebook, Instagram and YouTube have facilitated unprecedented human interaction in the form of interactive text, voice, image, and video (Gregory, 2018). Widespread diffusion of these social media applications has resulted in their integration into the everyday practices of many indi-

viduals, including researchers interested in the everyday life and experiences of individuals and groups (Caliandro, 2018). Applications of social media for qualitative health research include, participant recruitment, data gathering, and data verification or triangulation (Zhang, Albrecht, & Scott, 2018). For example, researchers engaged a group of adolescents with Type1 Diabetes in the Instagram social media platform collected and analyzed participants' shared photos as well as comments and hashtags to inform a future intervention study (Yi-Frazier et al., 2015).

**Physical artefacts.** Physical or cultural artefacts, such as works of art, tools or instruments, technological devices and other physical items, are additional sources of qualitative data that are often complementary to the other types of data generation described in this article (Yin, 2018). Physical artefacts are often used as elicitation devices within qualitative interviews (see above) and can assist the participant in detailed recollection of events (Abildgaard, 2018) or can facilitate engagement among topics or groups perceived as sensitive or challenging (Cox & Guillemin, 2018).

**Field notes.** Field notes have been a longstanding component of qualitative research methodology. These personal thoughts and queries regarding research observations and interviews serve the purpose of enhancing data generation efforts (e.g., providing non-textual or auditory information about interviews and focus groups, useful in understanding participant meaning) and providing rich context for analysis (e.g., situating qualitative studies within a larger societal and temporal perspective) (Mulhall, 2003; Phillippi & Lauderdale, 2018). Different formats can be used to create field notes, such as written, dictated, or visual sketches. A field note generally includes descriptions about the participants, location and setting of the interview, interview responses, and critical reflections about the interview (Phillippi & Lauderdale, 2018).

## HOW TO PREPARE FOR GOING INTO THE FIELD

When preparing to go into the field and begin gathering data, there are several recommended preliminary steps. Although all steps are not necessary in every study, researchers should determine which are applicable to their setting. Table 2 contains a checklist of items to prepare and bring when going into the field for data gathering and, while not being exhaustive, it might help novice researchers organize.

If one chooses to gather data with interviews, it is important to bring an interview guide to each meeting with participants. If one chooses to gather data with observation, the same principles roughly apply to the observational framework. It can be created and formatted to include a header that describes information about confidentiality and consent that needs to be communicated to participants, space between questions to jot down notes, and comments to close the interview and thanking the participant for the interview with a request for potential

follow-up information (Creswell & Poth, 2018). Before conducting the interview, the interview guide should be reviewed to ensure that there is familiarity with the questions without consistently referring back to the guide during the interview. Practical items need to be considered too. It is useful to record the interview with two recorders in case one of them fails, and to bring extra batteries. Pen and paper are useful when participants need to sign consent forms, which need to be brought, and to annotate field notes.

In qualitative health research, there are often topics that are sensitive and emotional for participants. Sometimes, these emotions may be unexpected and surface during an interview. The interviewer can take the time to pause the interview and provide time for participants to recollect their thoughts before proceeding with the interview, if appropriate (McGrath, Palmgren, & Liljedahl, 2018). The interviewer should also refer back to the consent form, emphasize that the participants can choose to stop the interviews, and normalize the situation. During the design of the study, the research team can discuss whether there should be debriefing protocols or assistance for participants, such as the possibility to refer the participant to counselling support (Varpio & McCarthy, 2018). We recommend that researchers limit the number of interviews in one day, particularly those of a sensitive nature, to protect the wellbeing of the interviewer and ensure time to rejuvenate before the next data gathering episode.

**Table 2. Checklist: Preparing for Data Gathering**

- Consent forms
- Recorder(s) and extra batteries
- Microphone, if needed
- Interview Guides/Observation framework
- Notebook
- Pens
- Participant honorariums, if available
- Debriefing protocols
- Appropriate resources/referrals

## HOW TO ANALYSE QUALITATIVE DATA

### Transcribing Interview Data

Transcription, the process of converting audio-recorded interviews into written documents, is often considered to be tedious and time consuming. We challenge the notion of transcription as a mundane task and encourage qualitative health researchers to recognize fundamental transcription issues. Decisions about what information to include, whether that be the language used or idiosyncrasies of the participants, reflect researchers' assumptions and can possibly constrain analysis (Hammersley, 2010; Lapadat, 2000). Researchers are encouraged to be clear about, and create a trail of, all transcription decisions from early in the study (Lapadat, 2000).

The degree of detail that is required may differ based on the purpose of the study. Interviews of a sensitive nature, common in health, may require information -

such as filler words (e.g., umm, uh), use of slang, or abrupt interruptions - more than other studies where detailed nuances are not needed. We believe that the unspoken is data (e.g. silence, pauses in speech, tears, volume, truncations etc.) and thus important information to include in transcripts. Prematurely choosing not to include linguistics or behavioural cues during transcription could inhibit and constrict analyses. It may be helpful to transcribe a few interviews, including the unspoken data, then review to determine their inclusion was necessary (Richards, 2015).

Transcription decisions should be purposeful, well-documented, and communicated to the whole research team, particularly if the primary researcher is not conducting the transcription. Determining who will transcribe the data is an important, yet often overlooked, decision. Interview transcription can be time-consuming but it also offers the researcher the opportunity to become entrenched in the data, possibly hearing things that were not obvious during the interview (Bailey, 2008; Bazeley, 2013; Hammersley, 2010; Lapadat, 2000; Markle, West, & Rich, 2011; Richards, 2015). Transcription is often delegated to assistants, which can be problematic because transcription facilitates the emergence of ideas and is a first step in data analysis (Bailey, 2008). The researcher investing in a transcriber will save time, but the conventions that will frame the transcription should be clearly determined and communicated.

### Storing Data

Storage of qualitative data an important issue because it contains peoples' stories and the data may be recognizable if recovered by unauthorized individuals. Therefore, to avoid privacy breeches and ethical problems, it is important to remove any identifying information as soon as possible (Richards, 2015). Data should be stored according to the guidelines set out by the research review board authorizing the study and local laws and regulations. At a minimum, we suggest encrypting electronic files, using strong passwords for protection, and locking any paper documents.

Computers are not always necessary, and for a long time, analyses have been completed using pen and paper alone. However, we recognize the value and convenience that electronic systems have added and that it can sometimes save time, besides being very useful when managing large amounts of data. There are also many computer software systems available to aid in the organization of data and support analytic activities (e.g. coding). In Table 3 we share some common qualitative research software programs we have experience using and the benefits and challenges we observed. It is important to mention that themes do not just emerge, computer software programmes do not do the analysis, and that the researcher is the instrument in the analysis. Qualitative health researchers are encouraged to claim their agency in creating findings and should know that analysis is not conducted by computer software (Richards, 2015).

Table 3. Qualitative Research Computer Software

Examples of Qualitative Software: NVivo, MAXQDA, Dedoose, ATLAS.ti
<p><b>Benefits:</b> Easy to organize and manipulate large amount of data; can support transcription and can be used to import data from multiple sources; may save time and increase efficiency once user is familiar with software; many offer applications (e.g. matrices, word clouds) to help with analysis; data is stored in one place; can facilitate sharing among team members. The most significant factor in choosing a software is personal preference and economical resources available, some universities and institution offer access to licensed software for students,</p>
<p><b>Limitations:</b> May take time to learn software; vary in cost (some have student or time-limited licenses); many of the functions can be done in existing word processing programs; may stifle analysis if researcher becomes attached to codes; can be difficult to share if all team members are not using the same software; different countries have unique privacy and security considerations, which may be incompatible with some cloud-based software; user may unwittingly rely on software.</p>
<p>Nvivo <a href="https://www.qsrinternational.com/">https://www.qsrinternational.com/</a>  MAXQDA: <a href="https://www.maxqda.com/">https://www.maxqda.com/</a>  Dedoose: <a href="https://www.dedoose.com/">https://www.dedoose.com/</a>  ATLAS.ti: <a href="https://atlasti.com">https://atlasti.com</a></p>

### Developing Coding, Categories, and Themes

Coding is a common qualitative data analysis technique that supports the generation of new ideas and organizes data into topics (Richards, 2015). Coding happens across almost all qualitative methodologies and often has specific techniques that are associated (Caliandro, 2018; Charmaz, 2014; Corbin & Strauss, 2015; Heinonen, 2015). However, qualitative health researchers conducting applied research may find descriptive, topic, and analytical coding useful as initial analytic strategies. Table 4 contains an example of a coded transcript.

Descriptive coding in qualitative data analysis is a method used to sort and organize similar data together (Richards, 2015; Richards & Morse, 2013). Variables, such as age, gender, job title, etc., are often used to help organize the data (Richards, 2015). This level of coding involves little interpretation (Miles et al., 2014), but can be very helpful for asking questions of the data (Richards & Morse, 2013). As an initial step, researchers must consider what information is necessary and refer to the overarching research question to determine what variables are important. We stress the importance of not constructing unnecessary codes. Richards and Morse (2013) also warn about the dangers of over coding and recommend only including enough variables to help answer your question.

Topic coding is more common but also more analytical, rendering it more challenging (Richards & Morse, 2013). The purpose is to label all data, which allows for description, reflection, or categorization of the material (Richards & Morse, 2013). This can occur manually by colour-coding or indexing labels, but computers can speed up this process significantly. However, there is a risk of a superfluous use of codes, and researchers should ensure that all codes are meaningful (Richards, 2015). Through review and thoughtful attention, similar codes can be joined to form categories. Categories are created when meaningful patterns of codes come together to form a common idea (Creswell & Poth, 2018; Elliott, 2018; Miles et al., 2014; Richards & Morse, 2013).

Themes, the thread that runs through the whole data set, are an additional level of abstraction that can occur through analytic coding or by stepping back from the data and questioning what is happening (Richards, 2015; Richards & Morse, 2013). There is no one way to do analytic coding (Miles et al., 2014; Richards & Morse, 2013). Miles and colleagues. (2014) identify many diffe-

rent methods that can be used to support analytical coding. We encourage researchers to use strategies that align with their methodological design and are intuitive to their own intellectual style. Theme development may occur through review and condensation of codes and categories; however, it is more likely that researchers engaging in deep reflection of copious, detailed memos, audit trails, and field notes then comparing those against what they are seeing in the data, are led to higher conceptions (Richards & Morse, 2013).

It is important to note that coding is only one of many analytic strategies and should not be used in isolation. All coding should be purposeful, and we recommend that researchers avoid liberal use of codes. Although we do not want to place limitations on researchers, novice qualitative health researchers may find a range helpful. Creswell (2016) recommends beginning with no more than 50 codes, reducing those to 20, and developing 5 to 7 themes to guide writing a report. Miles et al. (2014) also support minimal use of codes, even suggesting developing sub-codes if required, and advise condensing findings into five themes to help clearly and succinctly express study conclusions.

Finally, the concept of data saturation may help provide some insight into when to end the data collection that occurs concurrently with data analysis. Though the definition is inconsistently used, generally it describes the stage of analysis where there is repetition in the data and no new data appears (O'Reilly & Parker, 2013; Richards, 2015). The notion of saturation comes from the tradition of grounded theory, which has a very specific application to determine theoretical saturation (O'Reilly & Parker, 2013), but that is rarely applicable to the qualitative health research designs that we have presented in this series of articles (i.e. Qualitative Description, Interpretive Description, Case Study, Focused Ethnography).

Recognizing the infinite possibilities of human experiences and expressions, we feel that the idea of "hearing it all" in health research is a myth. Instead, we refer to Morse (2015) who provides clearer understanding of data saturation for qualitative health research. Data saturation occurs not by saturating experiences but through the process of significantly describing the characteristics within categories (Morse, 2015). Without saturation, findings will lack comprehensiveness and richness and researchers will not be confident in their conclusions (Morse, 2015). "Without

**Table 4. Example of Codes, Categories, and Themes**

Demographic Information	Descriptive Codes	
Registered Nurse Female 23 years old Cardiac Care Unit	Role Gender Age Unit	
Section of a Transcript	Topic Codes	
Starting a new job as a nurse was not at all what I expected. I had no idea how tired I would be. Or that I would be expected to just jump right into being a nurse without any help. I thought that there would be more time to get oriented. I don't, I didn't even know where anything was. If someone needed tubing or if the right meds didn't get to the floor, I just didn't know where to go – what to do. I felt like I was always asking someone for help. It made me question if I was actually ready to do this and uh well uh I don't know. It's better now but it's just that it took me so long and I asked so many questions that I think some people still see me just as a new nurse. And like now I know what to do and where things are but it's still kinda hard. I just don't know if this is what I signed up for. It's exhausting. But I'm going to do it. I'm going to be the best nurse I can be so I can help my patients. That's why I started this in the first place.	Not meeting expectations Feeling tired Expecting orientation Finding supplies Finding help Questioning readiness Getting better Feeling tired Questioning choices Feeling exhausted Remembering motivation	
Codes	Categories	Themes
Feeling tired Feeling exhausted	Tiredness	Learning to be a Nurse
Finding supplies Finding help Expecting orientation	Supports	
Questioning readiness Questioning choices	Uncertainty	Becoming a Nurse is a Process
Not meeting expectations Getting better Remembering motivation	Building capacity	

saturation, findings will lack comprehensiveness and richness which can result in researchers not being confident in their conclusions (Morse, 2015). According to Morse, saturation in qualitative health research occurs when the researcher is able to write a competent, comprehensive, and complete account that is abstracted from the data and a strong contribution to the field.

## DISSEMINATING FINDINGS

The last phase of the research process comes with the dissemination of findings, which can happen in many ways (e.g., oral and poster presentations, articles, reports, etc.). Writing qualitative articles can be daunting, particularly for health researchers that are familiar with the traditional templates often used in quantitative studies (i.e. introduction, hypothesis, methods, results, conclusions) (Richards, 2015). Qualitative reporting, in writing or through presentations, can be approached in variety of creative and compelling ways. From our experiences, we have written traditional reports and articles (i.e. introduction, background, methods, findings, conclusions). However, rather than relying on statistical reports, we shared our data through persuasive quotes that appropriately reflect our findings. Quotes in qualitative health research reports

should be limited and purposeful (Richards, 2015; Thorne, 2016), in fact, a sequence of quotes found in a report often reflects a lack of confidence in the results (Morse, 2015; Richards, 2015). We have also reported our findings in other ways, such as the use of found poetry using participant quotes or through metaphors and diagrams that present complex findings in an approachable and understandable manner.

## CONCLUSION

Qualitative health research, as a sub-discipline of qualitative research, provides an opportunity for health researchers to examine, describe, and understand complex issues around health and health services (Morse, 2012). This type of knowledge can be helpful as interventions, programs, and policies are developed in health care. The aim of part one and two of this article was to equip health researchers with the fundamental information needed to design a qualitative health research study. As health researchers enter into the realm of designing qualitative studies, it is our hope that these articles have helped to increase their confidence and capacity in qualitative health research. In the next, and last, article of this series we will discuss how to critically appraise a qualitative health research study.

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