HOW DO PROFESSIONALS COLLABORATE IN THE FACE OF UNCERTAINTY? AN INVESTIGATION INTO THE COMPLEXITIES OF MENTAL HEALTH CARE

Ms Chiara Pomare, BPsych (Hons)

A thesis submitted as partial fulfilment of the requirements of the degree of
Master of Research in Health Innovation

Australian Institute of Health Innovation
Faculty of Medicine and Health Sciences
Macquarie University

MACQUARIE
University
SYDNEY·AUSTRALIA

Submitted: 9th October 2017

Abstract: 251 words
Main Text: 21,789 words

DECLARATION

I hereby declare that this submission is my own work and to the best of my knowledge it contains no materials previously published or written by another person, or substantial proportions of material which have been accepted for the award of any other degree or diploma at Macquarie University or any other educational institution, except where due acknowledgement is made in this thesis. Any contribution made to the research by others, with whom I have worked with at Macquarie University or elsewhere, is explicitly acknowledged in the thesis.

I also declare that the intellectual content of this thesis is the product of my own work, except to the extent that the assistance from others in the project's design and conception or in style, presentation and linguistic expression is acknowledged.

Chiara Pomare

Date: 01/10/17

ABSTRACT

Professional uncertainty is ubiquitous across health care settings, yet it may be managed by the sharing of information through effective interprofessional collaboration. Professional uncertainty is particularly prominent in mental health care; however, the literature lacks a consistent categorisation of the types of uncertainty in this context. The aim of this thesis was to identify the types of uncertainty experienced by professionals working in mental health, and evaluate how professionals collaborate in these situations. The research was conducted in two youth mental health 'headspace' centres in Australia. Two literature reviews and an exploratory two-stage mixed-methods design were employed. Study 1 used semi-structured interviews and Study 2, a social network survey. Statistical, thematic and social network analyses were employed to analyse the data. Findings revealed distinct types of professional uncertainty in mental health care related to: decisions, professional role, and external factors. In the face of these uncertainties, health care professionals collaborated across professional bounds, however, the degree of connectedness and who colleagues sought for support varied depending on the type of uncertainty. Specifically, collaboration during professional role uncertainty was sparse, indicating that the mere co-location of professionals may not always lead to cohesive interprofessional working. This suggests the need to do more to engender professional collaboration (rather than just co-location). Research must continue to identify situations of sparse collaborative patterns, such as role uncertainty, in order to develop interventions to improve interprofessional teams in navigating these complex situations. The findings of this research are directly applicable to headspace centres, and can be extrapolated to other services that aim for integrated, collaborative care.

PUBLICATIONS AND PRESENTATIONS ARISING FROM OR ACHIEVED DURING THE COURSE OF THIS CANDIDACY[a]

White paper

- Braithwaite, J., Churruca, K., Ellis, L. A., Long, J., Clay-Williams, R., Damen, N., Herkes, J., **Pomare, C**., and Ludlow, K. (2017) Complexity Science in Healthcare – Aspirations, Approaches, Applications and Accomplishments: A White Paper. Australian Institute of Health Innovation, Macquarie University: Sydney, Australia. ISBN: 978-1-74138-456-7

Conference presentations

- **Pomare, C.**, Long, J., Churruca, K., Ellis, L.A. and Braithwaite, J. (2017) How do mental health care professionals collaborate during times of uncertainty: A social network analysis. *Australian Social Network Analysis Conference,* University of Sydney, Sydney, Australia, 28 November.
- Braithwaite, J., Churruca, K., Ellis, L., Ludlow, K., Herkes, J., **Pomare, C**. and Long, J. (2017) Complexity science meets implementation science. "We need to talk about complexity Conference", University of Oxford, June 13, 2017; United Kingdom,
- **Pomare, C**. (2017) Professional Uncertainty in Mental Health Care: A social network approach. *AIHI CHRIS Conversations*; 9 May, 2017; Sydney, Australia.

Refereed of published abstracts and posters

- **Pomare, C.**, Long, J., Churruca, K., Ellis, L.A. and Braithwaite, J. (2017) How do mental health care professionals collaborate during times of uncertainty: A social network analysis. Abstract in the *Australian Social Network Analysis Conference,* University of Sydney, Sydney, Australia, 28 November.
- **Pomare, C.**, Churruca, K., Ellis, L.A., Long, J. and Braithwaite, J. (2017) Mental health care professionals: Collaborating in the face of uncertainty. Poster presented at the *EnCourAge Symposium,* Macquarie University, Sydney, Australia, 27 October.
- **Pomare, C.**, Churruca, K., Ellis, L.A., Long, J. and Braithwaite, J. (2017) Mental health care professionals: Collaborating in the face of uncertainty. Abstract in the *EnCourAge Symposium,* Macquarie University, Sydney, Australia, 27 October.

[a] Not all publications and presentations are direct outputs of the research in this thesis, but are relevant to the theoretical underpinnings of this thesis: complexity science.

ACKNOWLEDGMENTS

I would like to acknowledge and thank the headspace staff who participated in this research project. All the participants gave their time freely and generously, despite their busy working schedules. This study would not have been possible without the support of the headspace centres involved.

Thank you to all who contributed to the completion of this thesis, including the staff and students in the Australian Institute of Health Innovation. To my supervisor, Professor Jeffrey Braithwaite, for encouraging me to undertake my Master of Research, and for providing me with the opportunity to do so. Jeffrey assisted in the development of the research project, provided invaluable advice throughout the year, and conducted the final review of the thesis. I am also extremely grateful to my additional supervisors; Dr Kate Churruca, Dr Louise Ellis, and Dr Janet Long; for all their support, patience, motivation and immense knowledge. Supervisors assisted in the development of all chapters, particularly, Kate contributed to the coding process and qualitative analysis in Chapter 4. Louise and Janet, assisted in the statistical and social network analysis in Chapter 7. Thank you for making this an enjoyable experience.

A special thank you to my fellow students and colleagues, Ms Jessica Herkes and Ms Kristiana Ludlow, for their support, advice and encouragement throughout the year. Jessica conducted a proofing of the final thesis. I would also like to thank my family and friends for their support and encouragement in my endeavour to pursue higher degree research. A special thank you to my parents, for always encouraging me to be the best version of myself.

Doing a Master of Research, Year 2, research project in nine months is an extremely challenging endeavour. I chose an ambitious study, and benefitted from those listed above who helped me throughout my candidacy: I designed the research, gained ethics approval, conducted the work, analysed the data, and wrote up the thesis.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

CAS	Complex Adaptive System
CLP	Consultation-liaison Psychiatric Services
CMHT	Community Mental Health Team
HCP	Health Care Professional
MHC	Mental Health Care
RQ1	Research Question 1
RQ2	Research Question 2
SNA	Social Network Analysis

CHAPTER 1. INTRODUCTION

1.1. Background and rationale to the research project

1.1.1. The ubiquity of uncertainty

Since the 1950s, uncertainty in many guises has been recognised as a central and problematic issue in health care.[1] In this context, professional uncertainty refers to any situation of uncertainty experienced by a health care professional (HCP). There are different types of professional uncertainty manifesting across a range of situations,[2] including, but not limited to; deciding on unclear diagnoses,[2] drawing inferences from ambiguous criteria,[3] clarifying blurred professional boundaries,[4] and being unsure about the prognostic outcome of a patient.[5] These persistent uncertainties can have serious negative ramifications for both a client or patient and the HCP. Researchers have shown that uncertainty is associated with poor patient outcomes[6] and the emotional labour and stress of HCPs.[7] The literature is consistent in acknowledging the ubiquity of professional uncertainty in health care,[8] and mental health care (MHC).[9] However, there is no consensus on how to conceptualise this body of work.[2] Thus, consolidation of the literature and a deepened understanding of the conceptualisations of uncertainty are required to accommodate for the range of situations, and determine the best way forward in terms of studying and dealing with uncertainty.

1.1.2. Collaboration and confronting uncertainties

According to the World Health Organisation, interprofessional team work is integral to the delivery of effective health care,[10] including mental health care.[11,12] Interdisciplinary working has been significantly associated with improved care processes,[13] patient satisfaction[14] and patient outcomes.[15] Further, patterns of professional collaboration may be particularly important in times of high uncertainty.[16] Collaboration is a multidimensional term that can be conceptualised in terms of the formality of interaction, with whom collaboration occurs, and the degree of interactivity. Interactions can be dichotomised into formal contexts (structured meetings, case-conferences, care or discharge planning) or informal contexts (e.g., impromptu discussions).[17] Collaboration may be within a group of the same professionals (intra-professional), or between groups of different professionals (interprofessional). Interprofessional collaboration in health care may be indicative of idealised collaborative care models whereby the coordinated work consists of three or more distinct professionals working towards a multifaceted intervention.[18] Collaborative care models have been praised for their novelty, in that members are interdependent and rely on a mutual commitment to effect changes in the system as a whole and on the patient level, in contrast to benefitting the individual staff member.[19] While the literature is consistent in suggesting that there are benefits of collaboration

across professional groups,[12,15] how professionals collaborate in the context of MHC, and particularly in the face of the uncertainties they experience in the course of their work, has not yet been examined in depth.

1.1.3. Mental health care

Mental health disorders are the leading international cause of disease burden for people aged 10-24 years.[20] Despite this evident burden of mental health conditions, it remains an under-researched domain of health care.[21] Complicating things, unlike other domains, psychiatric diagnoses lack clear cut criteria,[22] rendering downstream treatment options unclear. For example, presentations of disorder are often highly variable, such that two cases of major depressive disorder may manifest in different ways but be unified by the same diagnostic label. Thus, HCPs must offer highly individualise delivery of care as each client has his or her own unique set of symptoms and needs.[23] In addition to the uncertainty inherent in diagnostic tests, treatments and delivery of care, the behavioural outcomes of people with MHC conditions can be unpredictable,[24] exacerbating the uncertainties faced by professionals working in MHC. In order to face the uncertainty and uniqueness of each case, different professionals are required to come together in order to provide efficient, collaborative care.[12,25] Some past research has shown that collaborative care, rather than individualised care (i.e., care provided by one professional), is more effective in short and long term outcomes of improving mental health conditions such as depression.[26]

Collaborative care in mental health is advocated by the literature,[26] and federal government mental health care schemes, such as headspace, Australia's National Youth Mental Health Foundation.[18] headspace is a collaborative model aimed towards early intervention of youth mental health; this is particularly important given that over three quarters of mental disorders commence before 25 years of age,[21] though they are often the least likely to be recognised or treated.[27] Despite the idealisation of collaborative care models in MHC, such as headspace,[28] we do not know whether the aspirations for interprofessional collaboration are being realised. Independent evaluations of headspace have argued that despite the co-location of different services, communication still appears to be operating in silos[29] and improvement in mental health patient outcomes as a results of headspace have been minimal.[30,31] Further research is needed in order to understand present collaborative practices when the professionals are faced with uncertainty in MHC facilities, such as headspace.

1.2. Theoretical framework: Complexity science

Complexity science involves the study of complex adaptive systems (CAS), systems that are characterised by emergent properties and nonlinear dynamics.[32,33] Health care,[34] and specifically MHC,[23] has been conceptualised as a CAS. This conceptualisation is appropriate given the composition of large numbers of agents (including HCPs, nonclinical staff, patients and various other stakeholders such as government, insurance agencies), interacting in informal and formal ways to deliver care at multiple scales. This interactivity gives rise to nonlinearity, where causes and effects are difficult to distinguish and not necessarily proportional to one another; this makes outcomes potentially unpredictable.[35] The characteristics of a CAS (e.g., unpredictability),[35] guarantee that uncertainties will manifest and persist over time.[16] The ability to deal with unanticipated events is essential to, and rooted in, the effective functioning of health care systems,[34] particularly for professionals working on the frontlines of care. In this vein, complexity theory maintains that it is not sufficient to look at the characteristics of individual agents (e.g., doctors, nurses, allied health professionals); rather, patterns of relationships among agents must be considered in order to understand the system.[34] The agents (the mental health staff) self-organise and collaborate in various ways to deal with complex situations,[25] such as uncertainties. Creative minds working together allows for the development of solutions, or contribute innovative ideas.[36] These may be useful in managing uncertainty. Therefore, understanding uncertainty and collaboration through the lens of complexity science, rather than conventional science, allows for the acknowledgement of the dynamism of health care settings and work and avoids attempts to *see* linearity in a system of inherent complexity.[32] Furthermore, the diversity of agents and their interactions is perceived as a source of novelty and potential adaptability in the face of uncertainty. To give effect to these ideas, and acknowledge their importance, a complexity science lens is utilised in this thesis.

1.3. Aims, research questions, and hypotheses

This thesis aims to assess the types and situations of uncertainty experienced by professionals working in MHC, and subsequently evaluate how professionals collaborate in the face of these different uncertain situations. To achieve the aims of this project, two research questions were formulated:

- Research Question 1 (RQ1): What are the types and situations of professional uncertainty experienced in MHC?
- Research Question 2 (RQ2): How do professionals working in MHC collaborate in the face of different uncertainties?

These research questions are answered using systematic reviews of empirical and non-empirical research literature in conjunction with a mixed-method, sequential research study.[37] The research project was conducted in two headspace centres located in metropolitan Australia. In Study 1 of the research project, semi-structured interviews are used to identify the types and situations of uncertainty (RQ1). In Study 2, a social network survey and analysis is used to assess collaborative patterns in the face of uncertain situations (RQ2). While formal hypotheses are not appropriate for the exploratory approach taken in Study 1, for Study 2 of the research, the following general hypotheses were made:

Table 1.1: Hypotheses

H1.1	Collaborations are interprofessional; that is, they are occurring across professional boundaries.
H1.2	Collaboration between staff varies between headspace centres.
H2.1	Networks of routine collaboration utilise different collaborative patterns, compared to collaborations during types of uncertainty.
H2.2	Collaboration between individuals working in MHC vary across types of uncertainty.

1.4. Organisation of thesis

The structure of the thesis is illustrated in Figure 1.1. The present chapter, Chapter 1, provides the introduction. Chapter 2 comprises a scoping literature review. The purpose of this chapter was to review and synthesise the literature in order to identify a consolidated definition of uncertainty, and categorise types and situations of uncertainty experienced by HCPs. Chapter 3 then provides the design of the research project, and a detailed synopsis of the method for Study 1. The results and a brief discussion of Study 1, which were analysed through a thematic analysis, are presented in Chapter 4. The thesis then moves to answer RQ2, first through a systematic review of the literature (Chapter 5). The purpose of this review was to identify patterns of collaboration among professionals working in MHC in the literature, particularly during times of uncertainty. Chapter 6 then provides a detailed overview of the method used for Study 2, incorporating a social network survey. The results from the survey are reported using t-tests and social network analysis (Chapter 7). The Discussion and Conclusion chapter (Chapter 8) presents a summary of the findings, and discusses the unique contribution of the research, it strengths and limitations, and provides direction for future research.

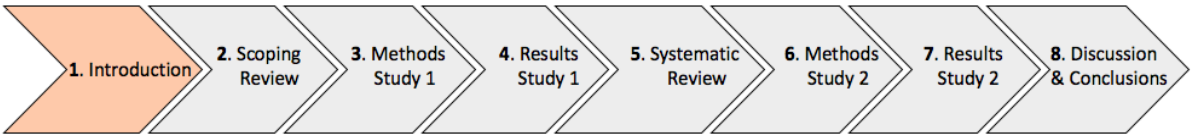
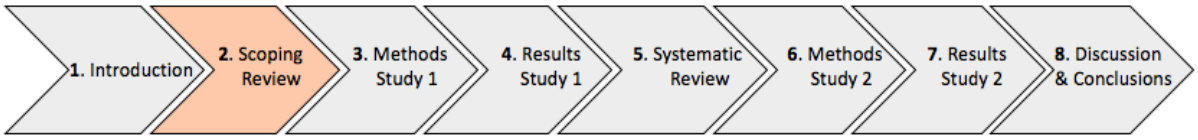


Figure 1.1: Thesis map diagram

1.5. Ethics

Prior to the commencement of the study, ethical approval was granted from the Macquarie University Human Research Ethics Committee [HREC ref 5201700297] (See Appendix A). Local sites also granted research governance approval, allowing access to the settings in order to conduct the research.

CHAPTER 2. UNCERTAIN ABOUT UNCERTAINTY: A SCOPING REVIEW



2.1. Overview of Chapter 2

Chapter 2 presents a scoping review of the literature on uncertainty in health care. The aim of this chapter was to review and synthesise the literature in order to develop a consolidated definition of uncertainty, and categorise types and situations of uncertainty experienced by HCPs.

2.2. Background

Uncertainty is often described as a ubiquitous and dynamic manifestation in the health care system,[8] due to both the complexity of the conditions and of the system itself.[38] Despite the growing popularity in describing health care as uncertain, this phenomenon remains an under researched topic that has yielded an apparent gap in the literature surrounding its conceptualisation.[2] It is important that we understand present conceptualisations of uncertainty, in order to accommodate for the diverse situations of unpredictability in health care, particularly from the perspective of the HCP. Therefore, the present review aimed to: (1) explore how uncertainty has been defined across health care contexts, and (2) identify the types and situations of uncertainty documented in the health care literature.

2.3. Method

2.3.1. Search strategy and criteria

A scoping review of the literature on professional uncertainty in health care was conducted between March to May 2017. The focus of this review was to examine definitions and conceptualisations of uncertainty used in the literature, as well as identify key situations of uncertainty experienced by HCPs. The review was conducted across two bibliographic databases (Scopus and PubMed). The following Boolean search terms were used in each database: [“uncertain” OR “unsure” OR “unpredict*” OR “ambig*” OR “doubt” OR “confus*” OR “equivocal”] AND [“health care” OR “healthcare”]. The search was limited to English language and no date limits were specified. The terms “professional uncertainty” or “staff” were not included in the strategy as the search became too restricted, negating the purpose of a scoping review, which is to achieve so far as possible both broad and in-depth coverage of available literature.[39]

Reference details for all returned searches were downloaded into the reference manager software, EndNote X8.[40] Duplicates were removed, then title and abstracts for each publication were assessed against the inclusion criteria. Inclusion criteria were set to include papers attempting to define uncertainty or provide insight into situations of uncertainty from the perspective of HCPs. Exclusion criteria included sources that only commented on uncertainty tolerance (methods to cope with or manage uncertainty). In line with scoping review guidelines, sources were included that used a range of different methods and studies,[39] including empirical and non-empirical papers. The choice to include theoretical papers was made so as to acknowledge the diverse conceptualisations and definitions of uncertainty used in the health care literature, much of which has not been empirically-based.[2,8,41] Studies outside of the health care setting were excluded. Publications meeting the inclusion criteria had their full text reviewed; any publications that could not be excluded or included based on review of their title and abstract were retained for full text review. During the full text review, information about the studies (e.g., study aims, study setting, situations of uncertainty, definition of uncertainty, types of data collected, analysis methods) were extracted from each paper. Any papers for which inclusion or exclusion was unclear were discussed among the extended research team to reach a consensus.

2.3.2. Analysis

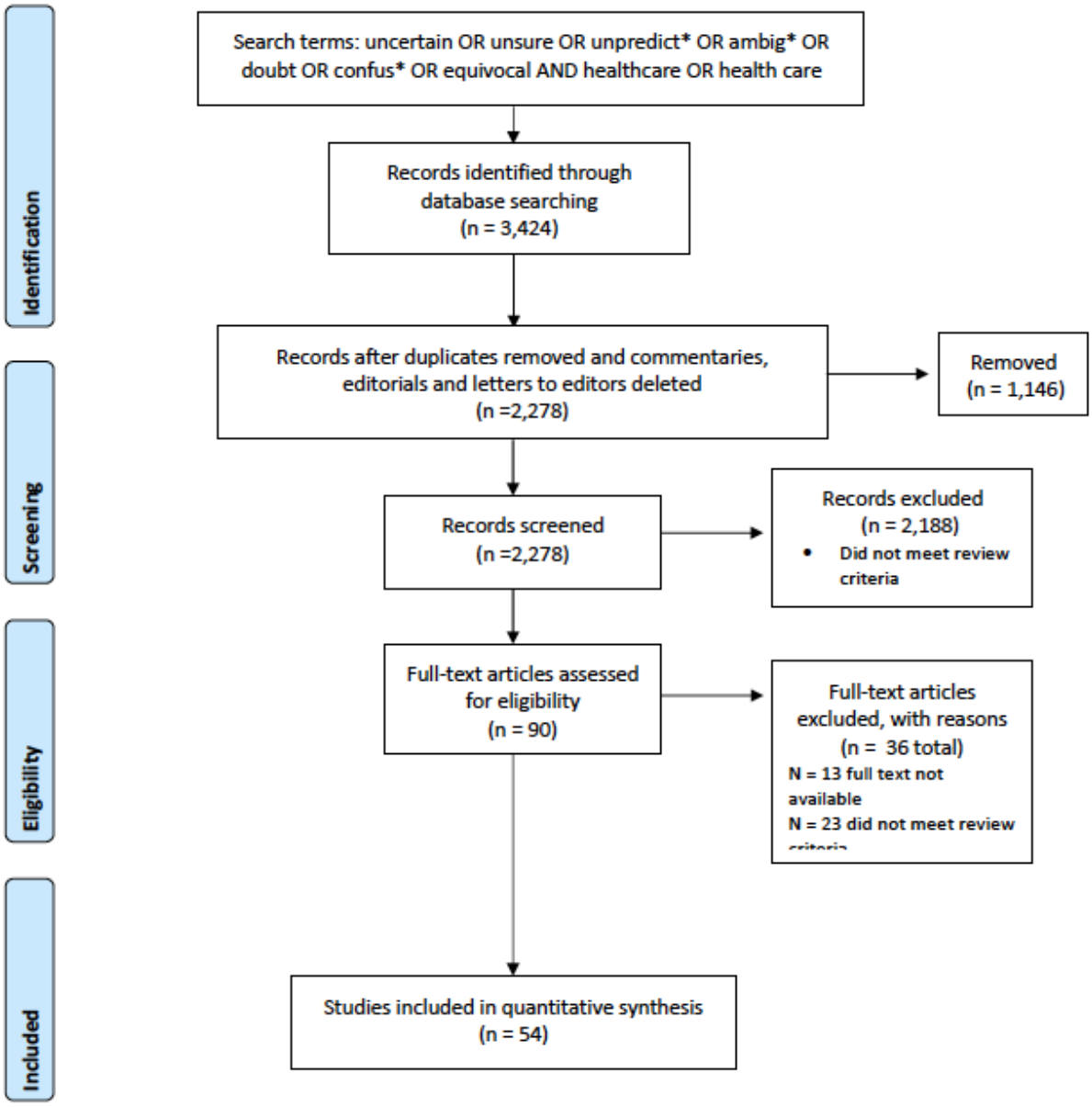
A statistical analysis was not appropriate for this review due to the scoping approach and heterogeneity of included publications. A scoping review framework instead allows for detailed and descriptive presentations of data.[42] An open coding process[43] was used to apply descriptive labels to the text in order to extrapolate meanings related to definition, types and situations of uncertainty across the papers reviewed. Labels deemed to be similar were grouped together to represent recurring concepts or themes related to uncertainty. This approximated a thematic analysis because it involved the identification, analysis and reporting on patterns within qualitative data.[44] The current review did not include a quality assessment because this is not typically expected of a scoping review, which focuses on illustrative characteristics of the field of research.[42]

2.4. Results

After the duplicates were removed, 2,278 articles were identified for title and abstract review. Of these, 90 met criteria for a full text review of content, and finally 54 met the full-text

inclusion criteria. A flow diagram of study selection based on the Preferred Reporting Items for Systematic Meta-Analyses (PRISMA)[b] is shown in Figure 2.1.[45]

Figure 2.1: Search strategy and review process based on PRISMA flow diagram



2.4.1. Characteristics of studies included

A summary of study characteristics can be seen in Appendix B. Of the 54 studies that met full-text inclusion criteria, 34 were empirical and 20 non-empirical (six of these were reviews). Of the empirical papers, 23 employed a qualitative study design, six used a quantitative design, and another five studies involved mixed methodology. Together, these papers sought the perspectives of numerous different HCPs, including: physicians, nurses, social workers,

[b] PRISMA guidelines were not followed given this was a scoping review.

specialists, surgeons, psychiatrists, optometrists, counsellors, dieticians, mental health carers, and allied health professionals. Only six studies considered the mental health setting. For a conceptual summary of the 54 studies included in this scoping review, Figure 2.2 displays the 50 most frequently occurring terms from the included abstracts.

Figure 2.2: Word cloud of frequently-occurring words in the abstracts of included articles.

Source: Generated using http://www.wordle.net/.

2.5. Data synthesis: Defining uncertainty

Thematic analysis[44] was used to address two major queries across the literature: (a) attempting to define uncertainty, and (b) identifying different situations or types of uncertainty. There was no consistent definition of uncertainty across papers included in this review. This is consistent with past literature, which acknowledges that there is extensive variability in the few conceptual definitions of uncertainty developed.[2,41] Penrod[8] attempted to develop an expanded theoretical definition of uncertainty using a concept analysis of the literature. The derived definition was independent of context and not specific to the professional experience, thus broad enough to apply to HCPs in a variety of contexts. In this work, uncertainty was: "A dynamic state in which there is a perception of being unable to assign probabilities for outcomes that prompts a

discomforting, uneasy sensation that might be affected (reduced or escalated) through cognitive, emotive, or behavioural reactions, or by the passage of time and changes in the perception of circumstances" (p. 241). While this conceptualisation appears broadly applicable across health care contexts, it was only used in two out of the 54 papers that met inclusion criteria.[46,47] Interestingly, a subsequent conceptual framework of uncertainty in health care[2] made no mention of Penrod's earlier work.[8] Instead, Han et al. (2011) defined uncertainty in a much more succinct form, focusing on fundamentality: "the subjective perception of ignorance" (p. 3).[2]

The lack of a consistent conceptual definition of uncertainty is further reflected in the present review, whereby 59% of papers did not provide a definition for the concept of uncertainty. Of the 41% (22/54) that did provide a definition, 15 papers were categorised as broad definitions, while the other seven papers were more definitionally specific. Specific definitions referred to pertinent and relevant situations of uncertainty (e.g., "task uncertainty is defined by the variety and difficulty of the tasks; difficult or variable task assignments increase information requirements").[48] Specific definitions were not transferable into more general conceptualisations and so have not been considered further here. On the other hand, broad uncertainty reflected a generic definitional approach that could be applied across a number of contexts and types of uncertainty. However, within the 15 papers that included a broad-based definition of uncertainty, there was considerable variability. These definitions were coded and analysed to identify recurring themes. Themes included: *predictability & probability*, *decision-making*, *evidence*, *subjectivity*, and *descriptors* (See Table 1). Each of these themes is discussed briefly below.

Table 2.1: Themes identified in *broad* definitions of uncertainty after full text review

Papers including a broad definition of uncertainty	**Predictability & probability**	**Decision -making**	**Evidence**	**Subjectivity**	**Descriptors** (e.g., dynamism, ubiquitous)
Han et al. (2011)[2]				✓	
Lu (2014)[49]		✓	✓		
Lloyd et al. (2009)[50]			✓		
Leykum et al. (2014)[16]	✓				
Ledford et al. (2015)[51]			✓		
Cranley et al. (2009)[46]*	✓			✓	✓
Vaismoradi et al. (2011)[47]*	✓	✓		✓	✓
Tyreman (2015)[52]		✓			✓
Begun & Kaissi (2004)[38]				✓	✓
Buetow (2011)[53]					✓
Thomas et al. (2010)[54]			✓		
Tai-Seale et al. (2012)[55]*	✓	✓			
Seely (2013)[56]	✓				✓
Penrod (2001)[8]	✓			✓	✓
Schoonhoven et al. (1980)[57]	✓				
Total:	7	4	4	5	7

* Definition not original, sourced from previous work

2.5.1. Predictability & probability

Seven of the 15 papers with broad definitions of uncertainty contained an aspect of limited predictability or unknown probability. Of the seven papers, four included definitions that commented on the value of probability (e.g., "unable to assign probability"),[8,46,47,55] two commented more broadly on unpredictable outcomes (e.g., "cannot predict the future"),[16,56] while one framed unpredictability as a contingency.[57]

2.5.2. Decision-making

Another common theme identified was *decision-making*. *Decision-making* was included in definitions of uncertainty from the perspective of the decision maker (e.g., "occurs when the decision maker is unable…")[55] or highlighted the process of decision-making as a situation of uncertainty (e.g., "at the time that decisions must be made").[47,49,52]

2.5.3. Evidence

The next theme identified related to *evidence*. Three papers used definitions markedly different from the majority (N = 15) as they framed uncertainty in light of unavailable scientific literature.[50,51,54] For example, past research defined uncertainty as any question that a systematic literature review cannot answer,[50,54] and uncertainty as the gaps in medical knowledge.[51] The remaining definition included the theme of *evidence* from a broader perspective, conceptualising uncertainty as "incomplete information".[49]

2.5.4. Subjectivity

The fourth theme identified regarded the *subjectivity* of uncertainty, in which definitions of uncertainty reflected upon the individualised experience (e.g., "uncertainty is an individual response",[47] that is subject to your own perspective: "subjective perception of ignorance").[2] In this theme, uncertainty was indicated as an experience that may change across context, with such an experience suggested to be unique to the person involved.

2.5.5. Descriptors

Descriptors of uncertainty was another common theme identified in definitions of uncertainty. *Descriptors* pointed to the "dynamic",[8] "complex",[38] "unpredictable",[16] "inescapable",[47] and "ubiquitous"[52] nature of uncertainty. Such descriptors suggest the pervasiveness and broad applicability of professional uncertainty across the diverse field of health care. By way of contrast, one particular article provided a positive definition, reflecting upon the virtue of

uncertainty: "uncertainty is natural, promotes creativity and a critical attitude, can signify wisdom, nurtures safety, sustains hope and protects against excess" (p. 873).[53]

2.6. Data synthesis: Types of uncertainty

Thematic analysis was then used to classify the types of professional uncertainty reported in the literature into five themes: *decisional, role, informational, personal,* and *prognostic*. The number of papers categorised into each theme can be seen in Table 2.2, with the most prevalent type of professional uncertainty identified in the literature being *decisional uncertainty*.

Table 2.2: Types of professional uncertainty after full text review

	Decisional	Role	Informational	Personal	Prognostic
Quantity:[c]	21	12	12	9	5
Situation explored in an empirical study:	18	9	9	7	0
Mental Health setting:	4	1	1	0	1
Example situation:	Deciding on intervention, diagnosis, treatment, explanations etc.	To be unsure of the requirements and responsibilities of a particular role	Ambivalence toward the accuracy, strength, or validity of evidence.	Doubt in communicating uncertainty to patients	Unpredictability of details of a patient's end of life journey in palliative care.

2.6.1. Decisional

Decisional uncertainty, as a type of uncertainty from the perspective of the HCP, was the most prevalent type of uncertainty identified in the present review. *Decisional uncertainty* includes uncertainty surrounding any kind of decision, including: diagnosis,[58-60] treatment recommendations, choosing a procedure,[57,61,62] a causal explanation,[54] and making medical decisions in the face of uncertain quality of life.[63] *Decisional uncertainty* was discussed across a number of health care settings, including: primary care,[58] neurology,[59] neonatology,[63] mental health,[50] physiotherapy,[60] and nursing.[48] This shows the wide applicability of this theme.

As an example of the broad applicability of this type of uncertainty, a qualitative study interviewing mental health workers examined the dilemma of differentiating normal from

[c] Papers may appear in more than one category

pathological behaviour.[64] Results revealed expressions of uncertainty when differentiating between delusions and religious belief. The uncertainty in this case was about deciding if the patient met criteria for intervention. This broad situation of *decisional uncertainty* could also be applied to acute care nurses' experiences of deciding if patients met criteria to call the medical emergency team,[46] along with many other situations of uncertainty experienced across health care settings. While previous theorists have differentiated between diagnosis, treatment, and causal explanations as different types of uncertainty,[2] these aspects can also be subsumed under the common theme of *decision uncertainty*. Consolidating these specific situations of uncertainty creates a more inclusive term of *decisional uncertainty* that is applicable to a broader range of HCPs, such as when HCPs are not specifically responsible for diagnosis or treatment recommendations, but their decisions still affect patient care.

2.6.2. Role

Role ambiguity is the absence of clarity regarding the expectations and responsibilities of a particular health care position.[65] Examples of uncertainty regarding role include ambivalence towards the responsibilities and expectations of how to respond to patients[66] and what should be accomplished in what role.[67] When there is absence of clarity between the roles, for example between doctors and nurses, issues of accountability may surface.[68] In this literature review, the broad applicability of *role ambiguity* as a type of uncertainty was discussed as an issue in the areas of: case management,[69] primary care,[4] nursing,[47,65] and palliative care.[5] Furthermore, *role ambiguity* has also been referred to as uncertainty of identity[51] or the breakdown of professional identity.[4] This is of particular importance for medical residents who experience uncertainty in understanding their different identification in roles as doctor and learner.[51] Clarity of identity is associated with understanding of role, thus is included in the theme of *role ambiguity*.

Ambivalence about professional role was also associated with issues of ethical and moral uncertainty.[70] That is, when a HCP is unsure about the responsibilities and obligations of their role, he or she may encounter uncertainties about what is the ethically appropriate action to take.[71] However, ethical uncertainty is not separated into its own category here, because the manifestations of ethical uncertainty are the result of being subject to confusion of role.[70] This is consistent with Beresford's[72] framework that suggests that the ethical dimension is situated within the person (i.e., their role), rather than inherent to the situation.

2.6.3. Informational

Informational uncertainty has been classified as imprecise knowledge of the past or present.[56] While *informational uncertainty* can be reduced and quantified, there will always be an aspect

of this uncertainty that is intrinsic in health care.[56] The present review found examples of *informational uncertainty* across varying health care settings, including: optometry,[73] psychology,[3] primary care,[51,74] oncology,[75] and nursing.[76] Review of the literature leads to the delineation of two sub-categories of informational uncertainty; (a) *epistemological uncertainty* (n = 10) and (b) *self-doubt in knowledge* (n = 4).

Epistemological uncertainty concerns the validity and presence of evidence. In health care, this type of uncertainty refers specifically to the gaps in medical knowledge[72] and quality of evidence-based research.[74] In Beresford's (1991) conceptualisation of uncertainty, *epistemological uncertainty* was also referred to as "technical uncertainty", which signified a paucity of scientific data.[72] This categorisation of technical uncertainty was measured in a recent mixed-methods study, confirming the presence of this type of uncertainty among physicians.[77] Unlike the term "technical uncertainty", *epistemological uncertainty* also includes ambivalence towards the quality of evidence. For example, a qualitative study exploring clinician uncertainty in the diagnosis and treatment of attentional deficit hyperactivity disorder revealed that clinicians experienced ambivalence regarding the accuracy of the diagnostic tool the DSM-IV[d].[3] Similarly, in an examination of uncertainty and information need in nurses, observational methods highlighted the presence of professional uncertainty in weak scientific evidence.[76]

The second sub-category of *informational uncertainty* identified was *self-doubt in knowledge*; this can stem from deficits in knowledge[73] or inexperience.[51] Ledford and colleagues[51] conducted a mixed-methods study into physicians' perspectives on uncertainty. Semi-structured interviews and longitudinal self-report surveys helped identify four levels of uncertainty, one of which included knowledge gaps and inexperience. Other researchers have referred to this uncertainty as "not knowing how to act" as a result of personal deficits in knowledge.[75] The differentiation between *epistemological* and *doubt in own knowledge* as situations of uncertainty is supported by other research.[41,51] As an example, Politi and colleagues[41] differentiated between uncertainty about the strength of evidence and uncertainty resulting from ignorance or an absence of knowledge maintained by the self.

2.6.4. Personal

The theme of *personal uncertainty* was identified in Beresford's early three tier conceptualisation of clinical uncertainty.[72] In his model, *personal uncertainty* subsumed uncertainties of communication in the patient-physician relationship and understanding patient

[d] Diagnostic and Statistical Manual of Mental Disorders

wishes. Issues of professional uncertainty of patient's wishes[78] can often stem from unfamiliarity with a particular patient.[46] A more recent paper supported Beresford's model, evaluating critical incidents of uncertainty described by medical residents, with the qualitative findings illustrating that residents experienced uncertainty related to patient wishes and goals of care.[78] *Personal uncertainty* is also inclusive of issues of communication.[72] Communication of uncertainty to patients is a necessary step in the process of shared decision-making,[41] however, many clinicians are unsure about what content and when to communicate uncertainty to their patients.[79,80] For example, focus group and survey methods revealed four major themes of uncertainty in HCPs' experiences, with one being communicating uncertainty to patients.[79] Thus, knowing what information needs to be shared with patients, and when, is an area of uncertainty for HCPs.

2.6.5. Prognostic

Uncertainty of future outcomes is consistent with previous conceptualisations of uncertainty in health care.[41] Uncertainty about prognosis signifies the unpredictability of a future event[5] such as patient behaviour.[24] This refers to the vagueness and doubt of future outcomes in health care, essentially, not knowing what will happen. In the present review, examples of *prognostic uncertainty* were particularly relatable to psychiatry[24] and palliative care.[5] In a conceptual (non-empirical) article, Swanson [24] highlights the struggle psychiatrists face in dealing with uncertainty of patient violent behaviour. He argues that while there are epidemiological factors that help predict the occurrence of violent behaviour in psychiatric patients, the point in time when that patient will act on such violent tendencies is unpredictable, creating an enduring presence of *prognostic uncertainty*.

In a field of palliative medicine, one study explored the uncertainty of the illness trajectory that acts as a barrier of good palliative care.[5] In their systematic review of 30 studies, capturing the views of 400 professionals, the presence of *prognostic uncertainty* as a common challenge for HCPs was revealed (along with other types of uncertainty). Further, another review inclusive of broader health care studies commented on the pace of evolution of disease as a factor contributing to uncertainty in health care.[16] Their review of four clinical scenarios, identified variability in pace of evolution, deterioration and occasional exacerbations of patient disease that can lead to manifestations of uncertainty. While in previous research, *prognostic uncertainty* was categorised as disease-related,[16] given that the pace of evolution is an event related to the unpredictability of what will happen, here it is categorised more broadly, as an example of *prognostic uncertainty*.

2.7. Discussion

This chapter aimed to: (1) explore how uncertainty has been defined across health care contexts, and (2) identify the types and situations of uncertainty present in the health care literature. Fifty-four papers met inclusion criteria and were subjected to a thematic analysis, which identified five themes present in broad conceptual definitions of uncertainty, and five categories for types of professional uncertainty.

The review of definitions of uncertainty confirmed claims in the literature that there is a paucity of work conceptualising uncertainty,[2] and when it is defined there is considerable variability.[41] A minority (n = 15) of papers included a broad conceptual definition of uncertainty. Of these, common themes were: *predictability & probability, decision-making, evidence, subjectivity,* and *descriptors*. In reviewing *decision-making* and *evidence* as recurring themes, it became clear that they lacked the same level of broad applicability across health care contexts as the other three themes. Although it is common in the literature to conceptualise uncertainty in medical decision-making,[41,81] including it in the broad conceptualisation of uncertainty may restrict the generalisability of this definition because *decision-making* is only one situation of uncertainty, as evident here and in other taxonomies.[2] Further, references to *evidence* in a broad definition not only lacks applicability to HCPs who may not deal regularly with evidence-based literature, but also to much of how clinical work is done (i.e., clinical judgement and experience often overshadows empirical evidence). Therefore, definitions that focus exclusively on these two themes are not as generalisable or reconcilable as those that include themes of (a) unpredictable future outcome probability, (b) individualised perception, and (c) descriptions of the ubiquity and dynamic nature of uncertainty. Thus, from this review a new definition was proposed to encompass professional uncertainties in health care: *A subjective, yet ubiquitous experience in health care, related to the unpredictability of a future outcome.*

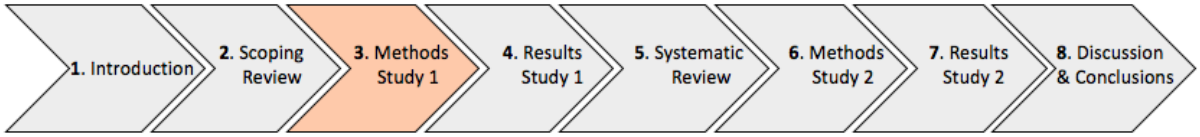
Thematic analysis of the types and situations of uncertainty experienced by HCPs highlighted the ubiquity and variability of uncertainty in health care. *Decisional uncertainty* was the most prevalent theme, discussed in 21 papers, suggesting it is a common, even universal, situation of uncertainty experienced across health care contexts. *Decisional uncertainty* is inclusive of any decision-making process, including diagnosis, treatment, procedure and casual explanation. *Role ambiguity* was also a reoccurring theme, largely centred around unclear boundaries and responsibilities. The theme of *informational uncertainty* was further classified into two sub-categories; (a) *epistemological uncertainty* and (b) *self-doubt in knowledge*. These refer to uncertainty in evidence and inexperience or knowledge gaps, respectively. Further, *personal uncertainty* was a common manifestation, classified by the literature. *Personal uncertainty* refers to uncertainty about what and/or when to communicate

to patients. The final theme identified as a situation of uncertainty was *prognostic uncertainty*. This had broad applicability, referring to unpredictability of future patient behaviour or disease in health care. Although this review provides an overview of the paucity of definitions and some new insights into the dominant themes of uncertainty, further analyses are required to confirm the prevalence of these different types of uncertainty across different health care settings.

2.8. Summary

In conclusion, uncertainty appears to be a ubiquitous issue, affecting diverse fields of health care.[52] This review has identified some of the most generalisable themes that define uncertainty, and categorise situations or types of uncertainty in health care. This thesis used these themes to structure Study 1 to further explore the suggested situations of uncertainty in specific contexts. It in turn informed Study 2, that sought to understand the manifestations, effects and coping mechanisms to help professionals working in MHC deal with varieties of uncertainty.

CHAPTER 3. METHODS: STUDY ONE



3.1. Overview of Chapter 3

Chapter 3 provides a detailed description of the methods used in Study 1; the first of the two sequential studies. There are eight sections that follow: research project design, study setting and participants, recruitment, procedure, data gathering instruments, data analysis; limitations, and summary.

3.2. Research project design

The overall research project employed an exploratory mixed-methods sequential design; that is, the use of both qualitative and quantitative methods in distinct phases of the research project.[37] Study 1 sought to identify some of the key professional uncertainties in the delivery of holistic MHC. Study 2 evaluated collaborative patterns among professionals working in MHC in the face of these different uncertainties. The present chapter will focus on Study 1. Semi-structured interviews were employed to address RQ1; *what are the types and situations of uncertainty experienced in mental health care?* (See Figure 3.1 for the overall study design and Figure 3.2 for the project timeline).

Figure 3.1: Study design

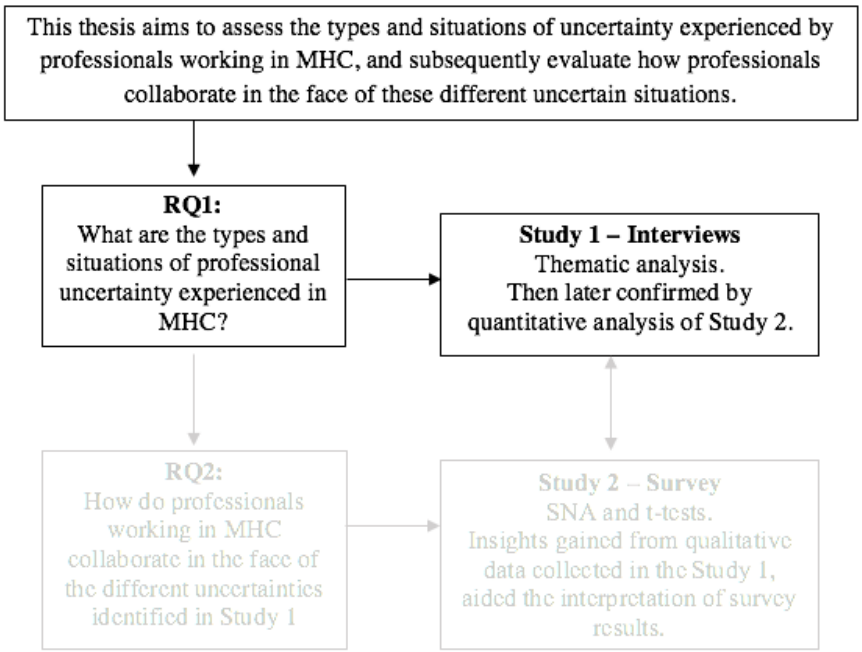
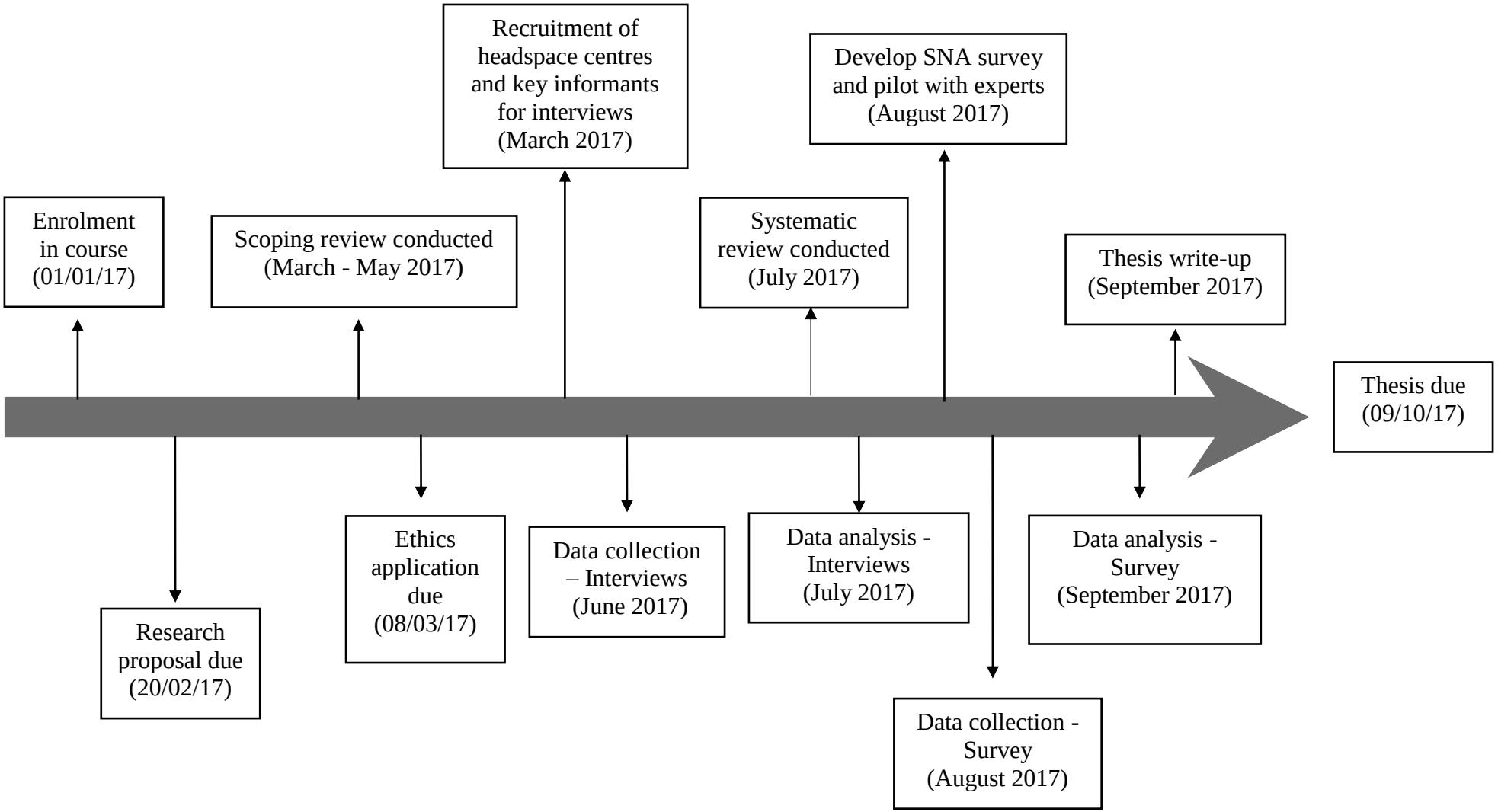


Figure 3.2: Project timeline



3.3. Study setting and participants

The study was conducted at two headspace centres in metropolitan Australia (Centre A and Centre B)[e]. Headspace is Australia's National Youth Mental Health Foundation that aims to facilitate and promote improvement in youth mental health, social wellbeing and economic participation of young Australians between 12-25 years of age.[82] Headspace delivers coordinated care through a range of HCPs (e.g., general practitioners, counsellors, psychiatrists, psychologists, nurses). It also employs a range of additional managerial and administrative staff, such as practice managers. There are approximately 100 headspace centres situated in metropolitan and regional centres across Australia. Headspace centres are regarded as "collaborative networks", a specific term used to characterise interdependent staff who rely on a mutual commitment to effect changes in the system as a whole, as opposed to benefit the individual member.[19]

The two centres enrolled in this research project were similar in number of staff, mix of professions, and the resource and time limited nature of their services. Two notable differences pertaining to the centres were in regards to their duration of operation and client population. Centre A was a relatively new centre compared to Centre B. Centre A was established in 2015, whereas Centre B opened its doors in 2006. The population of clients differed between the two centres in regards to cultural and linguistic diversity and socio-economic status. Centre A is situated in an area of higher cultural diversity (i.e., high percentage of residents born overseas) compared to Centre B, which services a predominately white Anglo-Saxon heritage area.[83] Participants in this research project were staff members employed at either facility at the time of the research project.

3.4. Recruitment

The researcher met with the managers of each headspace centre to provide information about the requirements of involvement in the study. Once ethical approval was attained and management staff approved the involvement of their centre in the research project, recruitment began. Participants for the semi-structured interviews were enrolled via purposive sampling based on suggestions made by managerial staff. The key staff desired were a mix of clinical and managerial employees who could provide a breadth of insight into situations of uncertainty encountered by professionals working in MHC. Following discussions with management at each centre regarding the number and mix of staff employed, a minimum of three interviewees

[e] Name of centres withheld to preserve the anonymity of the participants and the facilities where research was conducted.

per centre was deemed an appropriate number of participants in semi-structured interviews to allow both breadth and depth in the experiences of professional uncertainty, within each headspace centre, as well as across them. A total of seven participants (four from centre A and three from centre B) were identified, approached, and were provided initial information about the study. All staff contacted by the researcher agreed to participate in interviews. These staff members were then sent an introductory email detailing the nature of the study and requesting the scheduling of a face-to-face interview. Participant information and consent forms were provided initially over email for information disclosure (See Appendix D); consent was initially inferred by willingness to schedule interviews, and written consent from participants was not requested till the scheduled interview time.

3.5. Procedure

Informed consent was obtained from each participant prior to commencement of the interview. An exploratory qualitative approach was employed, consisting of semi-structured interviews to enable exploration and deepen understanding of uncertainties that have particular relevance in the context of MHC. Interviews are a common method used in health care research to collect pertinent, personal of data surrounding complex issues in order to provide specificities of multifaceted phenomena.[84] The researcher met with each participant face-to-face at his or her workplace. Participants were asked open-ended questions regarding situations of professional uncertainty in MHC and were informed that the interview would take 30-45 minutes. Answers were audio recorded and transcribed.

3.6. Data gathering instruments

3.6.1. Semi-structured interviews

The pre-developed interview guide included questions concerning each participant's experiences with, and of, professional uncertainty in MHC. Questions were crafted in consultation with experts in the field of mental health to ensure applicability to the various roles of professionals working in MHC. Semi-structured interview questions were all open-ended with the ordering able to vary depending on the flow of discussion during interviews.[84] Opening questions were used to ascertain context, asking participants about their role at headspace (See Appendix E for semi-structured interview guide). Subsequent questions focussed on gaining insight into the meaning of professional uncertainty for professionals working in MHC: "What does professional uncertainty mean specifically for professionals working in MHC?" Further discussion explored specific situations of professional uncertainty; e.g. "Is there a particular scenario that comes to mind?" At the close of the interview, participants were asked to provide

their opinion of the most prominent situation of uncertainty: "Out of all these uncertainties we have discussed today, in your opinion, what is the most prominent?" Where participants might struggle to comment on specific uncertainties in their workplace, prompts were used to instigate discussions of types of uncertainty; e.g., "Do you think making treatment decisions is an area of professional uncertainty in MHC?". At the close of the interview, participants were given opportunity to clarify or add any other information, then thanked for their time.

3.7. Data analysis

The first research question (RQ1), identifying the types and situations of uncertainty experienced in MHC, was addressed using a thematic analysis of the interview data. Interview responses were first recorded and professionally transcribed. The researcher then checked the transcripts' integrity against recordings to ensure consistency and quality. This involved simultaneously listening to and reading transcripts to correct errors, check transcription conventions and change any potentially identifying terms. For example, to maintain meaning and assist readability, where identifying information was disclosed, inserted words were denoted by brackets "[ ]". While performing integrity checks, the researcher also took notes of patterns of meaning and interesting issues in the data for the purposes of developing a coding frame.

Transcripts were then imported into NVivo software, Version 11.4,[85] for coding and qualitative data analysis. Qualitative analysis involved thematic analysis[44] using an open coding process.[43] Open coding applies descriptive labels to the text in order to extrapolate meaning related to recounts of events and disclosures of situations of uncertainty from the interviews.[43] This preliminary coding frame was based on inductive and deductive work and was reviewed by two coders. This involved the development of codes based on the content of the interview discussion itself (inductive), while also considering theoretical concepts identified from the literature (deductive).[44] The deductive work in this coding process reflected the findings of the scoping review of the health care literature on uncertainty, reported in Chapter 2. By implementing both inductive and deductive processes, the coding framework was able to apply a pre-existing framework of uncertainty in health care flexibly, while exploring the specificities and nuances of uncertainties in MHC and in these two headspace centres in particular, ensuring that previous theoretical work did not limit the interpretation of the interview content.

The coding frame was developed iteratively, through the trial and refinement of themes and codes, and discussed by two coders. Coders discussed and refined themes and codes, eventuating in a coding frame that more specifically reflected the MHC context, and the particular configuration and nuances of headspace centres. The final coding frame was applied

consistently by multiple coders and resulted in the identification of seven situations of uncertainty. Aiding interpretation, the coding frame, the themes and concepts within it and their relationship to one another, was visually represented as a concept map.[86] Concept maps are typically used in qualitative research to visually identify themes and patterns in order to facilitate the process of understanding interconnections and meaning in the data.[86] For the purpose of this study, themes are conceptualised as "types" of professional uncertainty and codes are representative of "specific situations".

3.8. Limitations

Qualitative data analysis has been criticised for its creative process that is assumed to be largely dependent upon the perspective of the researcher.[87] Such reliance on researcher interpretation may be limited by subjectivity, leaving room for bias.[88] To compensate for this limitation, a second coder was involved in the data analysis.[87] This is an example of analyst triangulation processes used in the present research project to ensure the reliability and validity of qualitative data (See Table 3.1).[87] Further, while best efforts were taken to ensure that questions were open enough to ensure a broad scope of experiences of uncertainty by a range of professionals working in MHC, the scope of the interview data is limited to those professions included in the interview process. This was addressed in the subsequent survey of Study 2, that investigated reported uncertainties in a larger and broader sample (methods triangulation in Table 3.1). Another notable limitation of the present study was that interview data was limited by active recall of participants, which can lead to under-reporting and unintended bias.[84] Participant recall was compensated through the use of prompts to instigate discussion on types of uncertainty that may have been forgotten. The design, procedure and analysis of Study 1 used a consolidated check-list for qualitative research as a guide, to aid in the rigour and validity of the research.[89]

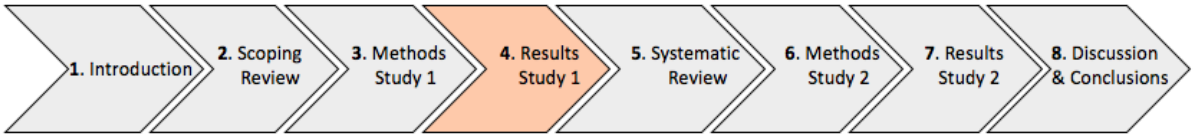
Table 3.1: Methods of triangulation used in Study 1

	Definition	Application in the present study
Methods triangulation	Assessing the consistency of findings across various methods of data collection.	Situations of uncertainty were assessed in a combination of methods; interviews and subsequent survey responses in Study 2.
Analyst triangulation	Using more than one analyst to review findings.	Multiple coders were used in the thematic analysis of interview content.

3.9. Summary

In summary, Study 1 consisted of individual, face-to-face, semi-structured interviews with professionals working in MHC, from two headspace centres in Australia. Each interview was audio recorded and transcribed to elucidate situations of professional uncertainty experienced in MHC. Through thematic analysis using an open coding procedure, RQ1 was addressed and the subsequent social network survey for Study 2 was created (see Chapter 6). The results of the thematic analysis are presented in Chapter 4.

CHAPTER 4. UNCERTAINTIES REPORTED AND EXPLORED



4.1. Overview of Chapter 4

Chapter 4 presents findings from semi-structured interviews to address RQ1; *what types and situations of professional uncertainty are experienced in MHC?* Interview data was analysed using thematic analysis comprised of inductive and deductive work reviewed by multiple coders. Not only will this analysis further develop our understanding uncertainty in MHC, it also provides the basis for the development of the social network survey used in Study 2.

4.2. Participants

All participants nominated by their managers, agreed to participate in the study (N = 7). Interview participants provided insights into situations of uncertainty experienced by professionals working in MHC, from a mix of clinical and management perspectives (See Table 4.1 for participant characteristics). Interview lengths ranged from 31 minutes to 45 minutes, with an average interview length of 39 minutes. Participants in Study 1 also completed the survey in Study 2.

Table 4.1: Summary of interview participant demographic characteristics (N = 7)

Characteristic	**Item**	**Frequency**
Sex	Female	5
	Male	2
Professional seniority	Senior	4
	Junior	3
Professional Group	Clinical	5
	Management	2

Figure 4.1: Concept map of types and situations of professional uncertainty in mental health care.

Source: Author's conceptualisation

4.3. A thematic analysis of uncertainty in mental health care

Thematic analysis led to the development of a framework to inform design and analysis of Study 2 (See Figure 4.1). The researcher sought to equally consider the relevant literature and disclosed interview content, through inductive and deductive thematic analyses. This framework is illustrated using a concept map, representing three types of uncertainty, as well as six more specific situations that relate to these types of uncertainty. The remaining situation, *incomplete information*, was considered both a situation of uncertainty and a driving factor of all other situations of uncertainty. For the purpose of this study, themes are conceptualised as "types" of professional uncertainty and codes are representative of "specific situations" in the context of these two centres. Before describing these uncertainties in detail below, there are number of issues related to this analysis that bear some consideration.

4.4. Issues raised regarding professional uncertainty in mental health care

4.4.1. Uncertain about uncertainty

During interviews, participants suggested they found difficulty in discussing and articulating professional uncertainty related to their work: "I don't know if this is uncertainty or just down to - well I suppose it is uncertainty…" (Management 1). Even though a definition was provided to all participants during the interview, participants asked for clarification: "But can I clarify, is that the sort of stuff that you're wanting to discuss when you talk about uncertainty? Or..." (Management 1). This confusion or lack of clarity about discussing uncertainty was also clear in the words participants interchanged with uncertainty, often likening it to a challenge or

frustrations, rather than a state of being unsure: "But I feel like that's probably one of the biggest challenges and uncertainties, making sure that a service is right for a particular client" (Clinician 1). Such difficulty in the discussion of uncertainty rendered the interviews and thematic analysis, of identifying which situations are indeed uncertainties, more complicated.

4.4.2. Interrelated uncertainties

In applying the coding framework to the transcripts, it became apparent that the uncertainties experienced by professionals working in MHC were often interrelated. For example, one participant discussed the uncertainty she experienced regarding the outcome of a client; this ambiguity about the future created uncertainties in deciding the next steps and also led to her questioning her role: "if there's suicidal intent, and plans, I guess there can be some uncertainty in there in - yeah, do I - is this person safe to go home? Is this person safe to leave here with someone else? Do they need to go to hospital?" (Clinician 4). These issues suggest it is rare to experience only one situation of professional uncertainty due to the implicit connections and contingencies of unknown issues and events. This was evident too in the way uncertainty about the completeness of information might operate as a type of uncertainty and drive other types of uncertainty too.

4.4.3. The role of experience

Professional experience was another factor related to participants' discussion of uncertainty. Overall, participants referred to experience as a mitigating factor for situations of professional uncertainty in MHC. There appeared to be a taken-for-granted assumption among professionals in MHC, that uncertainty will always be present, it will only be with experience and the acquirement of knowledge that its enduring presence will feel like less of a burden. One participant in a junior role discussed the uncertainty she encountered when she first entered her role with limited experience compared to the present; with experience, she felt more comfortable in dealing with the inevitable uncertainty associated with MHC: "probably the biggest issue in terms of uncertainty, at the start it was obviously around risk, and just wanting to make sure that someone left safe. I think that would be the biggest thing I struggled with at the beginning, whereas now I feel comfortable" (Clinician 5).

4.5. The types and situations of uncertainty

4.5.1. Type 1: External factors

This theme concerns a type of uncertainty that related to the unpredictability and lack of controllability of issues external to the self. Situations of uncertainty classified under this type,

included: *system services & processes* and *unpredictable client outcome*. With regards to *unpredictable client outcome*, participants disclosed common experiences of uncertainty pertaining to unforecastable and uncontrollable client outcomes and behaviours: "because you can't tell, with certain clients it might end up being nothing an hour later and it's fine and we'll go about our whole day whereas it could end up being a potentially fatal situation" (Clinician 2). The unforeseeable outcome of the client's behaviours was outside the control of the participant, because once a client leaves the facility, there is very little influence the clinician has on the outcome. For this theme uncertainty pertains to the client's response being unknown to the professional, even if the professional is certain in his or her decision to conduct a certain treatment, there is a degree of unpredictability regarding the response of that client; thus, the uncertainties are *external*.

Other situations of uncertainty grounded in externalities was uncertainty regarding *system services & processes*. This included the sustainability of the service itself, something participants also suggested they had limited control over: "Well at this stage we're funded till [date removed]. But we don't know what it's going to look like past that date" (Management 1). Thematic analysis demonstrated that staff members are fundamentally affected by these issues, but have limited ability to change them. As headspace is a national initiative, service configurations are set by the overarching body (head office). Thus, unlike public hospitals that are, for the most part, confident in the longevity of their organisation, uncertainty of the sustainability of the service may be ubiquitous amongst community-based health care organisations that rely on funding, such as headspace. Uncertainty of the system also included uncertainty about the best way forward regarding policy and procedure: "referral processes… that's a bit of a gap, and there's uncertainty around I suppose best practice with that*"* (Management 1). Uncertainty about the future of the centre relating to policy, included issues of best referral policy, best policy for communication between full time and contracted clinicians, standardisation across centres and best policy for outcome measurement. These situations of uncertainty were external to, and larger than, the self, as professionals had limited control over these system-level outcomes.

4.5.2. Type 2: Deciding next steps

Participants reported uncertainties specifically related to *deciding next steps* for a client, which involved sequential situations of decision-making. That is, when *deciding next steps* it was common for participants to first express uncertainty in deciding if headspace was the right service for the client, then, staff encountered the uncertainty of selecting the correct client trajectory, in terms of the appropriate treatments and care approach to use. This is characteristic

of the complexity of MHC services, that requires staff to individualise treatment and delivery of care for patients.[23] Firstly, in regards to deciding if headspace was the right service for a client, staff expressed uncertainty in deciding if a client met the inclusion criteria of headspace, which is specifically focused on early intervention of mental health for young people between 12-25 years.[90] Thus, participant expressed uncertainty in making the initial decision in regards to admission: "are we the best service to assist this young person?" (Management 1). When making this decision, it was important to consider the client needs: "I feel like aligning with client needs probably is one of the biggest uncertainties" (Clinician 1) as well as what the service is equipped to offer: "they're probably beyond the point of early intervention, and I guess quite complex…probably beyond a point of [headspace]… I find that quite challenging" (Clinician 5).

Once the initial decision was made, headspace staff were then faced with a second situation of uncertainty: what to do with the client once they are in the centre. Participants discussed that once a client was admitted to a headspace centre, there are many possible trajectories to take in terms of treatment options and follow-up, thus creating more uncertainty in deciding on the best suited path for the client. This situation of uncertainty was common for both intake clinicians and the administrative team: "they do what's called screening…The uncertainty arises when you have, I guess, a diagnosis or some prevailing symptoms coming through for clients, and then whether to ascertain whether they need to be sent straight to the… clinician for review, or whether they can just be offered an appointment" (Management 2). Here, the uncertainty does not lie in the client's response, rather, the professional is uncertain about his or her decision in the client's trajectory of care. Many other participants espoused similar opinions: that while criteria are put in place to facilitate decision-making in these situations, it can sometimes be counterproductive, generating rather than alleviating uncertainty: "there is that uncertainty about referrals and criteria that, apparently, is out there, which we never received any sort of documentation about" (Clinician 4). One participant used a metaphor to highlight the uncertainty generated by restrictive criteria, likening care pathway options to boxes that would make it clearer. However, when a client doesn't fit into that box, there is limited clarity when deciding what the other options are: "it's quite tricky. Unless you fit into some certain boxes it's quite challenging" (Management 1).

4.5.3. Type 3: Professional role

Uncertainty pertaining to *professional role* involved any situation of uncertainty related to one's job, tasks or work, or the job, tasks or work of someone else. Participants typically discussed this type of uncertainty in regards to the *demarcation of roles* within the centre. The major issue here is the lack of clarity between or within roles. Headspace staff were unsure of their own responsibility and expectations and those of others; this interaction of roles has led to confusion

and crossover on a management level: “from a management point of view things do get blurred, where a lot of the time I do find myself doing things that I'm like well this is really not my job” (Clinician 2), at an administrative level: “I think uncertainty that shouldn't really be uncertain is the uncertainty of clinicians seeking advice or assistance from administrative staff around clinical issues” (Clinician 4), and clinician level: “as a [clinician] we offer care coordination. Sometimes for me there was a little bit of uncertainty about the differences between that and case management” (Clinician 3). This issue of staff taking on, and being confused about, others’ roles highlights the uncertainty in regards to the boundaries between professional roles.

Uncertainty regarding the *demarcation of role*, also occurred in relation to colleagues outside the headspace service. That is, ambiguity about the role of a different service, beyond headspace, may hinder collaborative efforts between services to provide optimal care: “So I think there's uncertainty in that, in not knowing what that service is doing because a lot of the time clients will say yeah, I'm seeing this person and yeah, I'm engaged with them but we don’t actually know what they're getting and we don’t want to duplicate” (Clinician 1). This situation not only encapsulates uncertainty about what the external party is doing, but also, the professional uncertainty external parties maintain about the roles of headspace staff: “that’s definitely something that other services are unclear on as far as the youth access clinician’s role not being as a case manager” (Clinician 3). Thus, this is another example of uncertainties surrounding *demarcation of role*. This is particularly complex for headspace centres given their collaborative care model, where all staff (clinical, administrative and management staff included) are co-located and interrelated, rendering uncertainties in the distinction of roles within headspace centres, and across other services.

Am I doing this right was another situation of uncertainty experienced by professionals working in headspace centres. Participants suggested they were uncertain about themselves in their respective roles, indicating a self-doubt in professional competency. Unlike other situations of uncertainty, participants prioritised this situation as the most important. In particular, participants working as clinicians reported being unsure about their abilities for client management and if they were fulfilling their role to help the client: “So uncertainty in the sense of addressing the young person's presenting issue while also making sure that you don’t leave all the other stuff that they've got going on go by the wayside so that you're still being client centred” (Clinician 3). In addition to self-doubt in professional competency this theme also encapsulated situations of uncertainty related to dealing with people from a different culture:

> *you could have someone from a particular cultural background where it's very normal to have 20 family members sharing the one bedroom. You could have children, you*

could have males and females and for that cultural group that's very appropriate and there's nothing wrong with that and there are no boundary issues there. For us as clinicians we have concerns around something like that (Clinician 1).

There was also self-doubt in relation to professional ability related to what, when, and how to communicate to a client: "Client's under 18. Do you disclose? Do you say something? So sometimes there's uncertainty there" (Clinician 5).

4.5.4. Incomplete information

A lack of information contributed to a range of situations of uncertainty. Hence, rather than classifying *incomplete information* only as a separate type of uncertainty; its interrelatedness and tendency to compound other themes discussed above, suggested it was not only a situation of uncertainty, but a driver of others (See Figure 4.1). Absence of information, or doubt in the completeness or reliability of information provided a basis to other situations of uncertainty across the three main themes in this thematic analysis. Lack of complete information impinged on clarity in deciding next steps: "what do we do with this person when we don't know this information which we need to do the next step" (Clinician 1). Further, lack of awareness of how complete information is, led to professional uncertainty in regards to the self and knowing *am I doing this right*: "another challenge is around the information that they do disclose, young people can under report, they can maximise issues and it's very difficult to form a clinical picture" (Clinician 1). Lastly, *incomplete information* was also related to the theme of *external factors* because the lack of knowledge and predictability about the *system services & processes*, as well as the *unpredictability of client outcomes*, are the root of the subsequent uncertainties experienced by professionals working in MHC.

4.6. Discussion

The first research question (RQ1); *what are the types and situations of professional uncertainty experienced in MHC,* was addressed through interviews with professionals working in MHC. Interviews were thematically analysed, revealing three types of professional uncertainty experienced in MHC: *external factors, deciding next steps,* and *professional role*. Across these types, lay six specific situations, and one driving factor (See Figure 4.1). This conceptualisation was both informed by past taxonomies present in the health care literature,[2,72] and developed to reflect the particular, unique and context-specific MHC issues relevant to headspace staff, thereby reflecting a mix of inductive and deductive analysis. Across the health care literature there have been several taxonomic structures of uncertainty, however, none specific to MHC. Given the complexity of MHC, rendering it fundamentally different to practices in broader

health care,[23] as well as the unique service arrangement of headspace, it was expected that the types and situations of uncertainty revealed in this study, would show variation from previous taxonomies that had focused on health care more broadly. This was supported in the present findings.

External factors, was extrapolated as a type of uncertainty experienced by professionals working in MHC. A major issue of this theme is the limited controllability professionals possess to influence arrangement of (a) *system services & process*, and (b) *unpredictability of client outcomes*. Feeling uncertain about client outcome is a common situation of professional uncertainty conceptualised in the broad health care literaure,[41] and has been discussed as relevant specifically to professionals working in MHC.[24] However, the second situation of uncertainty identified in this theme; *system services & processes*, has not, to our knowledge, been previously identified as a situation of uncertainty. It can be inferred that this may be a situation specific to headspace, as an integrated MHC service of co-located specialists. Perhaps given the novelty of integrated and community-based mental health services in comparison to long standing establishments of broad health care (such as hospitals), headspace staff are unique in feeling uncertain about the processes and longevity of services. In this case, it is plausible that this study did not reveal a novel situation of professional uncertainty, but that the situation is specific to the setting, and service arrangements within which the research was conducted.

In contrast to the previous type of uncertainty, the subsequent two types; *deciding next steps* and *professional role*, are more interactional types of uncertainty, whereby professionals possess some control of the circumstances. *Deciding next steps*, for example, involved uncertainty explicitly related to one's control over a situation, in the pressure to make the right decisions for a client, and was largely supported by the health care and MHC literature (See Chapter 2). In a recent study on narrating uncertainties in MHC, researchers found that professionals working in MHC experienced uncertainty surrounding medication and treatment options.[62] This is consistent with the findings of the present study, reporting uncertainty in deciding on what process to take; *are we the best service* and *what option should I chose*. It is particularly common in the MHC literature for professional uncertainties to focus on deciding on a trajectory of care.[50,61,62]

While HCPs often encounter elements of uncertainty in making admission decisions, for example in emergency departments,[46] *decision uncertainty* regarding admission in this study, was exclusive to headspace centres. Headspace is a unique service that only admits clients who require early interventional psychological support between the ages of 12-25 years of age. Unlike an emergency department that has very few barriers to providing care, headspace staff are limited by guidelines even when they may still be able to help the client. This implies

that although criteria are put in place to increase clarity in complex integrated mental health facilities, this does not guarantee an absence of uncertainty. Given the complexity of mental health issues, professionals must self-organise around client needs and provide personalised care,[23] that often exceed the limitations of protocol.

The third and final type of professional uncertainty discussed in interviews; *professional role*, was also supported in the literature. Specific situations of uncertainty pertaining to *demarcation of role* were supported in research from health care[68] and MHC.[91] For example, interviews with managerial and clinical staff from primary care and specialist mental health services revealed that there were differences in understanding the barriers between roles.[91] However, while the situation of professional uncertainty, *am I doing this right*, was supported in the health care literature,[71] no research was found that has identified this issue specifically in MHC. According to Beresford's early taxonomic structure of uncertainty in health care,[72] this is considered personal uncertainty, that is, when the HCP is uncertain in dealing with patient wishes or aspects of communication. It is plausible that, given the paucity of research on professional uncertainty in MHC, this study is the first to identify this novel situation of uncertainty regarding professional competency. This situation of uncertainty may be particularly germane to headspace given the relative newness of the model and that the *demarcation of roles* may not yet be established among headspace staff. Thus, uncertainties of *professional role* may be specific to headspace, or other MHC services of integrated and co-located professionals. Future research is warranted to confirm the broader applicability of these findings among a range of MHC settings.

4.7. Strengths and limitations

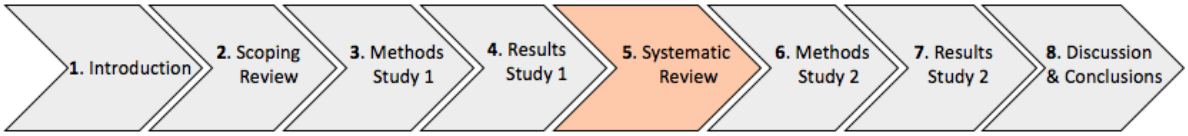
The strengths of this study lie in its exploratory and in-depth analysis of professional uncertainties relevant to MHC, an understudied area of health care in the uncertainty literature. The qualitative method allowed for the deeper understanding of a relatively under-researched area,[84] and provided work to develop a survey for the purposes of Study 2. The survey must be suited to the specific situations of uncertainty encountered by staff working not only in MHC, but in headspace centres in particular. This approach is consistent with past research that has highlighted the importance of exploring uncertainties in light of contextual factors.[16] The veracity of the findings of this study are improved by the implementation of triangulation processes to ensure reliability and validity.[87] The use of multiple coders (analyst triangulation), and the deepened understanding of this data in the subsequent chapters utilising quantitative analysis (methods triangulation) add rigour to the findings and negate common criticisms of subjectivity and bias of qualitative research.[87] While qualitative analysis is advantageous in

capturing an in-depth and personal understanding of phenomena,[84] general methodological limitations must be considered. The present interview process is limited to the perspectives of the seven headspace staff, thus data is context specific. While the generalisability of such findings may be limited, the findings are efficient in fulfilling their aim: to inform the direction and development of Study 2.

4.8. Summary: The next steps in the project

In summary, semi-structured, face-to-face interviews revealed a variety of types and situations of professional uncertainty in MHC. Two types of uncertainty were interpreted as interactive and to some extent, in the control of the professionals: *deciding next steps* and *professional role,* whereas the third type: *external factors,* denotes a lack of controllability. Given this, the two interactive types of uncertainty will be explored and compared for collaborative patterns in Study 2. These findings were used in the design of a context-relevant SNA survey[92-94] for Study 2 (See Chapter 6). The survey provided supportive quantitative analysis of these situations, among a larger and more generalisable sample and assessed patterns of collaboration dependent upon the specific types of uncertainty. First, a systematic review of the literature was conducted, which is subsequently presented in Chapter 5.

CHAPTER 5. HOW DO MENTAL HEALTH CARE PROFESSIONALS COLLABORATE WHEN THEY ARE UNCERTAIN? A SYSTEMATIC REVIEW



5.1. Overview of Chapter 5

Chapter 5 presents a systematic review of the literature, addressing the overall aim of this thesis: to explore how professionals working in MHC collaborate when faced with different types of uncertainty.

5.2. Background

Efficient health care relies on the collaboration of HCPs from different groups working together towards a common goal.[15,95] This integration of different professional groups is essential in health care and has been associated with improved care processes,[13] patient satisfaction[14] and patient outcomes.[15,96] Collaboration between HCPs can occur in various ways; it may be within a group of the same professionals (intra-professional), or between groups of different professionals (interprofessional). Collaboration is particularly important during situations of uncertainty. For example, previous research has suggested that when HCPs are uncertain, they collaborate, exchange views, and seek advice from colleagues.[97] Uncertainty is an omnipresent factor in health care, rooted in the unpredictable actions of workers and the escalating complexity of understanding the human body.[34] There are different types of uncertainty present across a range of situations.[2] A previous literature review (See Chapter 2) synthesised definitions and categorised five types of uncertainty through thematic analysis: *decisional*, *role*, *information*, *personal*, and *prognostic*. Overlapping, though context-specific, themes of uncertainty related to *external factors, deciding next steps and professional roles*, were also identified in Study 1 (see Chapter 4 for full results); this provides empirical support to the presence and significance of these types of uncertainty in sites of integrated MHC delivery, such as headspace centres.

While the types of uncertainty have been illuminated in the synthesis of literature and research conducted in this project, there is an apparent paucity in examining *how* collaboration occurs across different situations of uncertainty, particularly, for professionals working in MHC. Consequently, the aim of this review was to use the results of the initial literature review, supported by empirical findings of Study 1, to identify *how* HCPs collaborate in the face of

specific uncertainties. The aim of this systematic review was: (1) to explore how HCPs collaborate when faced with uncertainty, and (2) to investigate differences in collaboration depending on the situations of uncertainty. A specific focus has been placed on MHC given that the broader research project was conducted at headspace facilities; an integrated MHC service.

5.3. Method

5.3.1. Search strategy and criteria

A systematic review of studies on collaboration between HCPs during times of uncertainty was conducted in July 2017. This systematic review followed the PRISMA[f] guidelines.[45] Two electronic databases were used: Scopus and PubMed. Search terms were chosen through consideration of MeSH terms and key words. Search terms included: [“uncertain*” OR “unpredict*” OR “ambig*” OR “decision*” OR “confus*”] AND ["between staff" OR “interprofession*” OR “interdisc*” OR “multidisc*” OR “transdisc*” OR “network of staff” OR “prof* network” OR “intersectoral collaborat*”] AND [“health care” OR “healthcare”]. The initial search strategy was created to include all health care research because the increasingly holistic understanding of “health” and the cross-disciplinary nature of delivering mental health care[23] suggested there may not be clear boundaries between mental and other types of health care. The search was, however, limited to the English language and no date limits were specified.

Articles were downloaded into the reference manager software, Endnote X8,[40] where duplicates were removed. Titles and abstracts were then reviewed against inclusion and exclusion criteria (See Table 5.1). The inclusion and exclusion criteria was developed in light of the scoping review and results of Study 1. Further, analysis of the literature during the full-text review included the classification of uncertainty situations in terms of with whom collaboration occurs. This categorisation of collaborative patterns between types of uncertainty approximated a framework synthesis. Framework synthesis involves the testing and development of previously conceived models, for a different population.[98]

[f] PRISMA calls for more than one researcher to review the full set of retrieved articles, however, to meet the requirements of the Master of Research, only one reviewer (the candidate) conducted the review.

Table 5.1: Inclusion and exclusion criteria for articles.

Inclusion criteria	Exclusion criteria
• Peer-reviewed empirical research	• Non-empirical articles: commentaries, editorials, opinion pieces, etc.
• Any health care setting	• Outside the health care setting
• Collaboration must be between HCPs (on the agent level)	• Staff to patient, staff to family, or any other collaborative patterns containing non-HCPs • Educational setting; collaboration within classes, between students and teachers, interventions to learn how to collaborate that do not reflect natural behaviours
• Focus on how the HCPs collaborate when uncertain	• No mention of uncertain situations encountered by HCPs

5.3.2. Quality appraisal

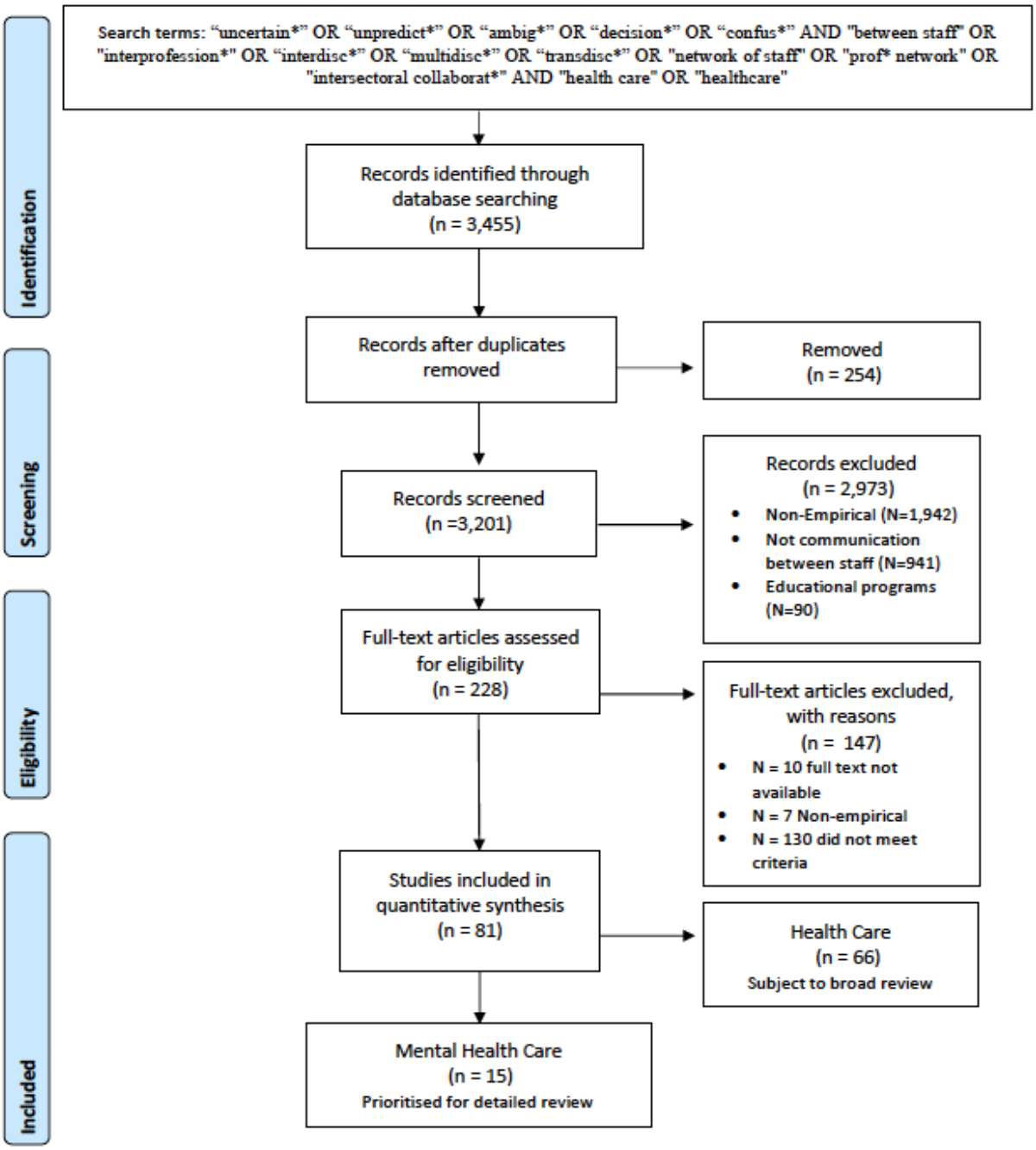
Articles that met full text criteria were gathered and categorised dependent upon health care setting (MHC or other). Articles relevant to MHC were evaluated for quality and risk of bias. Methods used to summarise and assess the quality of evidence followed Hawker's (2002) guidelines.[99] The evidence was assessed according to the following: whether the study abstract, title, aim and background were clear, appropriateness of method, rigour of data analysis, potential for bias, clarity of results, generalisability, and implications of the study (See Appendix I). Taking into consideration empirical assessment, findings were then collated into themes and discussed.

5.4. Results

The original search yielded 3,201 articles for title and abstract review (after duplicates were removed). Of these, 228 met criteria for full text review, and 81 subsequently met full inclusion criteria. Further specification led to the identification of 15 studies relevant to MHC. See Figure 5.1 for the PRISMA[45] flow diagram of study selection. Given the aims of this research project, papers reporting on collaboration in the context of MHC delivery are prioritised to a greater extent in the following discussions.

Figure 5.1: Search strategy and review process based on PRISMA flow diagram

PRISMA: Preferred Reporting Items for Systematic Reviews and Meta-Analyses



5.4.1. Broad review of all health care

The 81 studies that met full-text inclusion criteria encompassed a variety of health care settings, including: primary care,[100] cardiology,[101] oncology,[102] acute care,[103] neonatology,[104] perinatology,[105] palliative home care,[106] speech pathology,[107] neurology,[108] pediatrics,[109] geriatrics,[110] radiology,[111] dentistry,[112] and several more. This array of health specialties highlights the importance of understanding how professionals collaborate when they are uncertain. In regards to *with whom* they collaborated, the majority of studies (79.0%) discussed

interprofessional collaboration, whereas only 14 (17.3%) studies referred to intra-professional collaboration (with professionals in their own field), and the remaining three (3.7%) referred to both. In regards to the situations of uncertainty, the majority of studies made reference to uncertainty in making decisions, followed by issues of role ambiguity.

5.4.2. Detailed review of mental health care

Given that this review is part of a larger research project investigating collaboration during times of professional uncertainty in MHC, this systematic review focussed in greater detail on the studies conducted in MHC settings (See Appendix C). Of the 81 studies that met criteria for inclusion, only 15 (18.5%) were conducted within or in association with a MHC setting. These 15 studies were assessed for quality and deemed appropriate for inclusion (See Appendix I). However, in the quality assessment, the generalisability of the findings to a wider population[99] were scored lower than other categories, such as the rigour of data analysis. It is plausible that this is because of the contextual specificities of each study, limiting the implications to specific mental health settings. This did not impede the overall quality of the included studies. The studies occurred across a variety of mental health settings and countries, including: a general hospital in Iran,[113] community mental health in the United Kingdom,[114] and primary care in France.[115] For a conceptual summary of these studies, Figure 5.2 displays the 50 most frequently occurring terms from abstracts of the 15 included MHC papers. The words are scaled in terms of frequency, thus highlighting that working in teams is an important concept related to collaboration during uncertainty in MHC.

Figure 5.2: Word cloud of frequently-occurring words in the abstracts of included articles (*n* = 15).

Source: Generated using http://www.wordle.net/.

In all 15 studies, collaboration occurred interprofessionally, rather than solely intra-professionally. The majority (10/15) of studies referred to interdisciplinary collaboration in terms of case conferences[9] or formal team meetings.[114,116-123] In these teams, there was a myriad of professional groups collaborating, including: psychologists, social workers, psychiatrists,[117] general practitioners, nurses,[124] and occupational therapists.[119] A smaller portion of the studies specifically referred to community mental health teams (CMHT),[114,121,123] referrals,[115,125] consultation services[113,126] and in casual discussions to ask for advice,[116,119,127] as forms of interdisciplinary collaborations. Finally, only one paper made reference to a lack of collaboration in times of uncertainty,[120] suggesting that professionals working in MHC may not always collaborate during situations of uncertainty. Situations of professional uncertainty that were the basis for collaboration included: uncertainty pertaining to decision-making, role, information, and prognosis.

5.5. Discussion

The present systematic review sought to discover how professionals working in MHC collaborated when faced with uncertainty, and if the patterns of collaboration were dependent on the type of uncertainty. This review built upon the literature (Chapter 2) and the empirical findings of Study 1 (Chapter 4) as a framework to categorise the literature of the present review.

5.5.1. How do professionals working in mental health care collaborate when faced with uncertainty?

Research has previously suggested that the multiplicity of professionals working in MHC increases the support in dealing with complex MHC cases,[9] rooted in uncertainty, and may also lead to greater effectiveness of care.[15] The present review suggests that in these situations of uncertainty, professionals working in MHC tend to collaborate across professional boundaries, and this was generally studied through formally organised conferences or teams. Team meetings provide optimal opportunity for professionals with an array of expertise to discuss complex cases and tackle uncertainties.[9] However, there are limitations to this form of collaboration. While the literature suggests the value in the implementation of interdisciplinary meetings to deal with complex cases, characterised by high levels of decision uncertainty, it appears that integrated mental health models have not been as successful as originally proposed.[23] That is, initiatives that have implemented models of interprofessional interaction, such as the headspace model, have only found minimal improvements in MHC patient outcomes.[30] This may, in part, be due to hierarchical tendencies that prove a challenge when 'territories' are encroached,[128] particularly in health care settings.[129] For example, qualitative analysis of dual case conferences between physicians and pharmacists working in MHC

revealed that physicians generally assumed the dominant role in dealing with uncertainty by making the final decision about medication-related treatment for MHC patients.[9] This was suggested to be an attempt to claim back 'territory' and reinforce the boundaries between the disciplines. Thus, while interprofessional collaboration in the form of teams was the most common in the present review, further research is needed to gain deeper insight into the collaborative patterns to address challenges and foster mutuality and equal collaboration in the face of uncertainty.

In addition to interprofessional collaboration in the form of team meetings, the present review also found evidence for interdisciplinary collaboration during situations of uncertainty in the form of casual discussions.[116,119,127] In one study, support providers working in MHC reported informally turning to a familiar doctor for advice when they encountered uncertainty in their role.[116] This situation of uncertainty could be interpreted as less complex, given that the uncertainty was not on patient care, and thus does not require the multidimensional input of interdisciplinary team collaboration. This suggests that in cases of uncertainty, where clarity can be gained through discussion with colleagues, familiarity and ease supersede the inconvenience and pressure of team meetings. Another way in which professionals collaborate when they are uncertain about MHC delivery is through consultation-liaison psychiatric (CLP) services.[113,126] Physicians working in a hospital that encounter a patient with mental health concerns will often call on another health care professional with expertise in the field of mental health (often a psychiatrist).[113] While this is a form of collaboration, whereby the professional from general medicine turns to MHCPs for assistance when they are uncertain about what to do, the two disciplines do not work together. Rather, the CLP service acts as a mediator between psychiatry and other medical departments in the hospital.[126] CLP can be interpreted as collaboration whereby the individuals are working together formally, but independently. On the other hand, CMHTs and informal discussions are forms of interdisciplinary collaboration involving cooperation and teamwork. Given the high number of inappropriate referrals made to MHC professionals in hospitals,[126] it is plausible that interdisciplinary collaboration in the mode of CLP services limits the interaction and learning between the two professional groups. This implies that working together to understand the symptoms of mental health may decrease the number of unnecessary requests to CLP services,[126] resulting in potential benefits for staff and patients. Therefore, not all modes of interdisciplinary collaboration succumb to equal levels of interactivity and working across professional boundaries. Research must assess instances of interdisciplinary collaboration to understand the degree of interactivity in order to assess the extent to which interprofessional really are working effectively together.

Thus, this review suggests that professionals working in MHC typically interact across professional boundaries during situations of professional uncertainty. According to the literature, interdisciplinary forms of collaboration are beneficial in dealing with uncertainty, providing the opportunity to work together and draw on each other's skills and expertise. However, an interdisciplinary mode of collaboration does not guarantee the presence of team working. This review highlights that the nature of collaboration in the real world is a balance between maintaining professional distinctions and still coming together to achieve a common goal.[128] Hence, future research and policy should endeavour to facilitate more integrated collaboration in MHC for interprofessional teams, so that these professionals working in MHC will be better equipped to confront uncertainties.

5.5.2. Are collaborative patterns dependent on the situation of uncertainty?

A synthesis of findings of the literature and research conducted in Study 1, was used as a framework to categorise the present systematic review. The types of professional uncertainty from the health care literature (See Table 5.2) and context-specific mental health research (See Table 5.3) are detailed below. Collaborative patterns were assessed across these types of uncertainty. Findings of this review suggest that collaborative patterns during times of uncertainty are interprofessional, rather than intra-professional. However, there were slight differences in the manifestation of interprofessional collaboration dependent upon the type of uncertainty.

Table 5.2: Types of professional uncertainty in health care

Extracted from a scoping literature review (Chapter 2)

	DEFINITION
Decision	Uncertainty surrounding any type of decision
Role	Absence of clarity regarding the expectations and responsibilities of a particular health care position
Information	Unclear information; (a) epistemological or (b) doubt in own knowledge
Personal	Uncertainty associated with patient-physician communication and understanding patient wishes
Prognostic	Unpredictability of future patient outcome

Table 5.3: Types of professional uncertainty in mental health care

Extracted from qualitative research (Chapter 4)

	DEFINITION
External Factors	Uncertainty pertaining to uncontrollable factors; (a) related to system services & processes, and (b) the behavioural outcome of the client
Deciding Next Steps	Unclear on deciding on the best service and subsequent trajectory of care for a client
Professional Role	Uncertainty regarding one's own role, the role of others and the boundaries between.

According to the literature, when uncertain in making decisions, professionals working in MHC tend to collaborate in the form of interprofessional team meetings. Such team meetings are hierarchically imposed in order to bring an array of HCPs together to address uncertainties and complex situations.[123] Decision uncertainty was also addressed by other manifestations of interprofessional collaboration, such as casual discussions between two professionals when making suitable drug treatment decisions,[127] and referrals when uncertain about deciding on depressive symptomatology.[126] This reaching across professional bounds to address decision uncertainty in team meetings and referrals was analogous to situations of information uncertainty. When uncertainty pertains to a lack of, or ambivalence of information, interprofessional collaboration occurred in CMHT meetings aimed to address ambiguous criteria and decide who is an appropriate referral.[114] CMHTs are the interface between primary and specialist mental health care.[114] Interviews with GPs and team leads revealed a general confusion about the standard for patients being identified with "severe mental health problems". In such a situation, team workings allow for the exchange of knowledge to address the gaps and uncertainty. Further, interprofessional workings in the form of referrals were also used to overcome uncertainty in information.[115]

Similarly, in the case of role uncertainty, interprofessional collaborative patterns such as team meetings,[123] casual discussions[116] and consultations,[126] were employed. However, research suggests that interprofessional collaboration in the form of role uncertainty may not be as frequent as the other types. Interviews with various MHC professionals revealed that when asked about how they dealt with uncertainty in understanding the ethical requirements encompassed in their roles', respondents revealed that they seek interprofessional support but most often, they do not know to whom to turn.[120] This suggests that issues of role render professionals working in MHC hesitant to engage in interprofessional collaboration to address uncertainties. It is plausible that lack of clarity in one's role may be perceived as a weakness,

compared to decision uncertainty that is acknowledged as an omnipresent factor. Thus, the literature suggests that role uncertainty may consist of different collaborative patterns compared to the other, more understood types of uncertainty, such as 'deciding next steps'. In regards to how professionals working in MHC collaborate when faced with prognostic uncertainty, this systematic review suggests that collaboration also occurred in teams. Contrasting with the other types of uncertainty, prognostic uncertainty is unique in that only team meetings were categorised as a means to address this type of uncertainty. By collaborating in interprofessional teams, professionals attempt to address and manage the omnipresence of prognostic uncertainty by drawing on the diverse skills, knowledge and expertise of the many. This provides an opportunity for different ways of thinking when faced with uncertain, chronic, complex cases in MHC.[123]

The differences across the types of uncertainty may be explainable through deeper insight into context and the setting in which research studies were conducted.[16] While all studies were focused on MHC, setting varied from psychiatry, to hospital mental health problems, to community MHC. In a community mental health context, professionals are typically GPs working on their own,[125] thus engaging in interprofessional collaboration would be very different to in a psychiatric ward where various professionals are readily accessible.[119] It is plausible that collaborative patterns are contextually dependent upon the various professionals accessible. Thus, issues of uncertainty occur within varied contexts and such contexts must be considered when considering collaborative patterns.[118] Future research should aim to clarify what situation of uncertainty is best suited with which mode of collaboration by considering specific contextual differences.

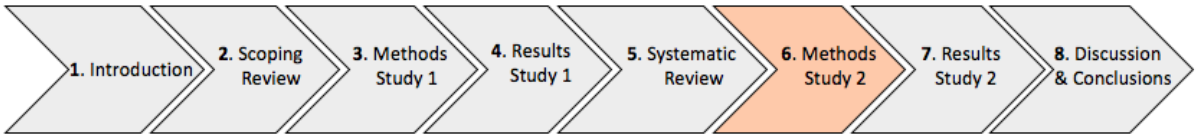
5.6. Limitations

It is plausible that the methods employed in completing this systematic review may have rendered an incomplete retrieval of the research. Given the variety and ubiquity of uncertainty in MHC,[52] it is unrealistic to assume the chosen search strategy would guarantee the inclusion of all relevant research. For example, studies that did not specify their focus on uncertainty, but discussed situations of uncertainty, may have been missed. To address this, the review was conducted on broad health care research, enabling this research project to identify specific research that included professionals working in MHC even when the MHC setting was not clearly stated. Further, widening the scope of this review to include non-English studies and non-empirical articles may have provided additional knowledge. Given the under researched area of mental health and uncertainties,[21] theoretical papers may have provided helpful insights. However, the search restrictions were justified in identifying relevant, evidence-based information.

5.7. Summary

In conclusion, the literature suggests that professionals working in MHC generally collaborate within interprofessional teams in the face of a variety of uncertain situations. Other modes of collaboration included: casual discussions, referrals, and consultations. Collaborative patterns of uncertainty were relatively similar between types of uncertainty, with slight differences specific to examples of role uncertainty. Context is a significant factor to consider in terms of collaborative patterns used to address uncertainties.[118] Thus, the present review suggests that professionals working in MHC collaborate across professional bounds when faced with uncertainty, and role uncertainty may be different to others in terms of collaborative patterns employed. Future research must assess collaboration during situations of uncertainty within the specific context of occurrence, such as in psychiatry or integrated mental health models (i.e., headspace), to gain deeper insight into the contextual and categorical differences of types of professional uncertainty.

CHAPTER 6. METHODS: STUDY 2 – A SOCIAL NETWORK APPROACH



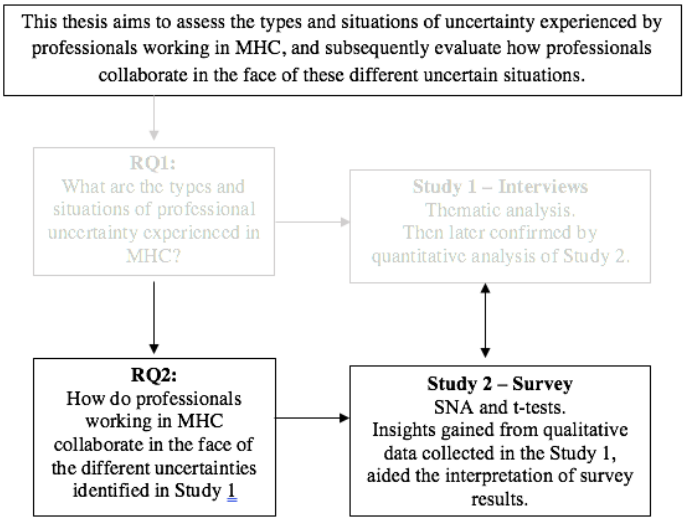
6.1. Overview of Chapter 6

Chapter 6 explains the methods used in Study 2, the second of two sequential studies aimed at understanding how professionals working in MHC collaborate in the face of different uncertainties. This chapter provides a detailed summary of social network methodology and its applicability to the current investigation.

6.2. Research project design

This study was the second in a sequence of exploratory mixed-methods studies examining professional uncertainty in MHC, using two headspace centres as case examples. The research project used a social network survey to examine how communication patterns among professionals working in MHC change during the situations of uncertainty identified in Study 1. Social network analysis (SNA) was used to analyse survey data on patterns of collaboration during uncertainties. Understandings of uncertainties discussed qualitatively in the interviews were also examined through the survey. Thus, Study 2 addressed the question; *How do mental health care professionals collaborate in the face of different uncertainties?* (See Figure 6.1 for the overall study design).

Figure 6.1: Research project design



6.3. Study setting and participants

Study 2 was conducted in the same settings as Study 1 (See Chapter 3). Participants were all staff members employed at one of two headspace centres (Centre A or Centre B) at the time of the research project.

6.4. Recruitment

All headspace staff were invited to participate via email invitation. This included participants involved in Study 1. Participants were invited to participate in the survey via an email sent from their centre manager (See Appendix F). Inclusion criteria comprised staff identified by the centre manager (including part-time, co-located employees). At the time of the research project, Centre A comprised 23 staff members and Centre B contained 27 employees, giving a potential study population of 50. This is a typical network size for research taking a social network approach in health care.[97,130-134] Research specific to MHC has been achieved with fewer sample sizes, conducting SNA with only 19 participants.[11] The aim of SNA is not to produce a sample of the network; rather a consensus that represents all network members[135] (i.e., all headspace staff). However, difficulty arises in defining boundaries and attaining data in a world of interrelated professional and organisational structures in health care.[136] Missing data may be a result of non-respondents and is problematic as the goal is to capture data on the whole network. While there does not seem to be a consensus on what constitutes a valid response rate, SNA does aim for a full response, ideally from all professionals within a defined network (i.e., all staff from each headspace centre).[135] Achieving such a high response rate is difficult, however, different researchers have reported and justified different response rates for whole network surveys. Adequacy of response rate can be justified by the inclusion to key players and/or by accounting for non-respondents with proxy data.

6.5. Procedure

A social network survey was designed based on the qualitative findings of Study 1 and with reference to standard social networking questions used in other studies.[97,137-139] The purpose of the survey was to measure patterns of collaboration during professional uncertainties, specifically: professional role and decision-making uncertainty. A detailed explanation of SNA, including its purpose and application to the present research project, is discussed below (See Section 6.8). The survey was piloted (N = 10) with a sample of experts in the field, representative of the facilities where the research was conducted. Based on feedback from this piloting, the survey appeared to be clear and well-suited to the context (See Appendix H for survey questions). Data collection for Study 2 then began; managers of the centres were emailed a survey link by the researcher, and asked to distribute the survey to all headspace staff. Thus,

participants were directed to the survey via a URL link in the email sent to their work email address by their centre manager (See Appendix F). This URL link was unique for each centre. Questions were identical barring the lists of staff members' names. The survey began with an information and consent form (See Appendix G), then followed with three distinct sections: demographic questionnaire, confirmation of situations of uncertainty, and the SNA. One follow-up reminder email was sent to staff two weeks later. The survey was self-administered online using the survey hosting website *Qualtrics.*[140] It was estimated to take approximately 5-10 minutes to complete.

6.6. Data gathering instruments

6.6.1. Demographic sub-section

Subsequent to providing informed consent, participants were asked to answer demographic questions. The nine-item demographic questionnaire (Appendix H) assessed: name, gender, education, and questions pertaining to their role at headspace (e.g., "In terms of your role at headspace, which professional groups would you most closely identify with?").

6.6.2. Questions pertaining to the uncertainties identified in Study 1

Participants then completed two questions pertaining to situations of uncertainty they, or other staff members, had experienced in at headspace. Participants were asked to indicate the prevalence of situations of uncertainty at their workplace in the past 6 months: "Below is a list of situations of professional uncertainty. Please indicate if YOU have experienced uncertainty in any of these situation(s) in the LAST 6 MONTHS. Please also consider if you have observed or been aware of OTHER staff of headspace being uncertain about the following situation(s)". The situations of uncertainty listed were extracted from thematic analysis of interview content in Study 1. An open-ended question allowed for the exploration of additional situations of uncertainty not listed: "Are there any other situations of uncertainty experience by headspace staff you are aware of?"

6.6.3. Social network survey

The next part of the survey constituted a social network survey, whereby relevant relational data was collected from each actor in the network[141] (each professional working at either of the two headspace centres). This part of the survey addressed collaboration in the respective headspace centres; this encompassed conventional SNA questions that list the names of all actors within the network and seek to ascertain the number and strength of interactions between network members,[135] for example: "Please scroll down the list of names of all the headspace

staff. Please select those people with whom you have collaborated in the last 6 months in your routine work" (See Appendix H for all survey questions). The included list of network actors (headspace staff) names is suitable for the present research project given that each network is fairly small (less than 50).[141] In larger networks, long lists of members can be onerous to work through and may lead to an inaccurate or incomplete response.[135] Participants were also asked to comment on such relationships during specific uncertainties identified in Study 1. Thematic analysis of Study 1 (See Chapter 4) revealed that uncertainties pertaining to *professional role* and *deciding next steps* were common situations of uncertainty experienced by headspace staff. Thus, the subsequent survey further explored these types in regards to the collaborative patterns, for example: "Please select the people whom you would turn to when you are unsure in making any kind of decision related to your work at headspace. Please also indicate if those people turn to YOU when they are uncertain about making a decision. Please only consider occurrences in the last 6 months." Participants were then asked to indicate if they had used other sources in the face of this type of uncertainty, such as, policy documents, search engines, a specific website, colleague not at the centre, colleague from a different headspace centre, and/or journal articles. The questions were then repeated with clear reference to the second type of uncertainty: *professional role*.

6.7. Data analysis

6.7.1. Deepened understanding of Study 1

Mixed-methods survey data was used to deepen the understanding of uncertainties identified in Study 1. Quantitative data consisted of participants' answers to survey questions regarding the demographic questionnaire and prevalence of situations of professional uncertainty at headspace. Qualitative data included open response answers asking to provide other situations of professional uncertainty. Quantitative data was analysed using the statistical program SPSS Version 23.0.[142] Independent samples t-tests of demographic variables and types of uncertainty experienced were employed. Open response answers were subjected to basic overview and content analysis. An integration of quantitative and qualitative data (including thematic analysis in Study 1) permitted a holistic understanding of the situations of professional uncertainty experienced by headspace staff, while also permitting understanding of how they might vary by professional group, centre and contract of employment. These findings contribute to RQ1: *What are the types and situations of uncertainty experienced in mental health care?*

6.7.2. Collaboration in the face of different uncertainties

RQ2: *how do mental health care professional collaborate in the face of different uncertainties*, was assessed using SNA, including network visualisation and analysis of network parameters.

SNA is an integral tool in revealing patterns of communication between members and highlighting key players within a defined group.[135] Social network questions were analysed using UCInet v.6[143] and diagrams (sociograms) of collaborative patterns were constructed using NetDraw software.[144] The data was symmetrised and proxy data was used to account for missing data.[136] Network visualisation allows for the visual analysis of graphical depictions of sociograms in order to reveal information that may not be apparent from statistical network parameters.[145] Network parameters of density, centralisation, centrality and sub-group cohesion were computed and used to assess the nature and quality of collaborative activities between members, the effectiveness of the network, and to highlight efficient operation of the network and suggest areas for improvement[146] (See Table 6.1 for some key terms and their definitions). Number of ties, isolates and network components were also measured in each network. Such parameters, along with network visualisation, were used to classify patterns in terms of with whom collaboration occurs. SNA output allowed for the comparison of collaborative patterns in the face of different uncertainties and routine work, as well as comparisons between headspace centres. Qualitative data from Study 1 was also used to provide further insight into the perceptions and desired outcomes of collaborative functioning during situations of uncertainty in MHC. The addition of qualitative interviews in the present research project were advantageous to ground the quantitative SNA data within the specific context of the reported relations;[147] headspace centres.

Table 6.1: Definitions of key terms

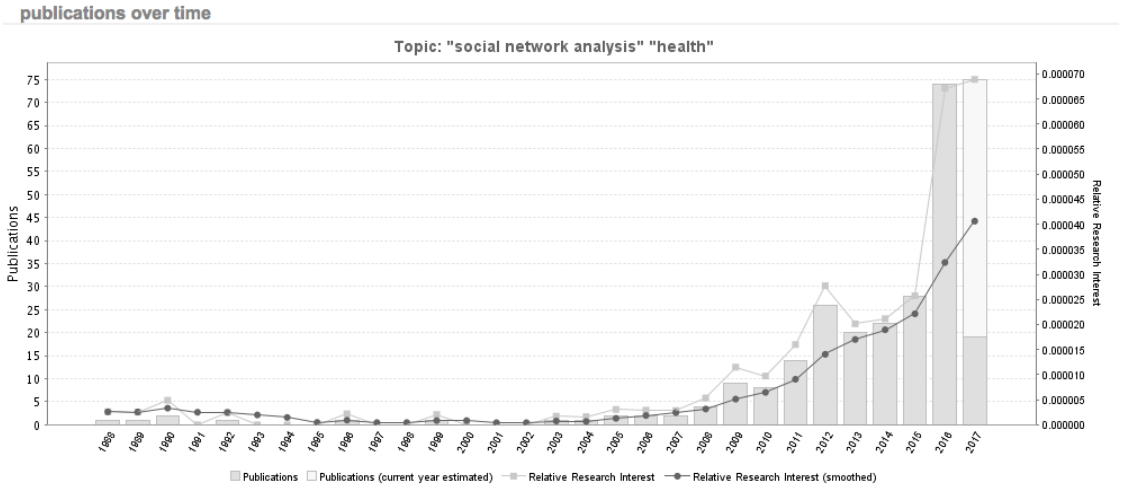
	Definition
Social Network	A system of social interactions and personal relationships with interactions between them.[13]
Collaboration	Sharing and/or collective actions of HCPs towards a common goal.[148]
Actor	Network members; may be individual (e.g., HCP) or collective units (e.g., health organisation).[141]
Node	Nodes are the visual representations of actors on graphs.[141]
Tie	Connections between actors within a network.[141]
Line	Lines are visual representations of the connections between actors.[141]
Symmetrisation	The formation of a non-directional tie between two actors, when one actor indicates the presence of the relationship.[149]
Density	Degree of concentration within the network,[13] the number of connections as a proportion of the number of total possible connections.[150]
Silo	A group of people characterised by their limited interaction with others.[151]
Sub-group cohesion	A sub-group is defined as a group of people directly connected to one another with no connections to other people in the network,[149] sub-group cohesion is the tendency to which links are within the group rather than to external players.
Centrality	A measure to identify which players have the most interaction with others, [152] i.e., the most prominent, "key" players.[141]
Centralisation	Extent to which the network is focused around one or few central points.[135]

6.8. Social network methodology

A social network is a group of people (actors) with interactions (ties) between them,[135] which in health care, might be bounded by those working on a ward, department, or in a headspace centre. SNA encompasses not only an analysis but a method. The method typically involves a survey that includes a roster of names of all the actors within a network of defined boundaries; participants are asked to rate the frequency and strength of their relationship to each individual within that network typically in relation to some specific prompt.[135] An example of a typical SNA survey prompt used to examine collaboration patterns in health care research is, "How often do you seek advice from [each person's name] about medication decisions and tasks?"[153] Hence, the question elucidates collaborative patterns of health care in relation to a specific task or health care issue (such as uncertainty). SNA is particularly appropriate for the present research project given the theoretical framework of complexity theory. As mentioned earlier,

studying a CAS such as the health care system requires considering not only individual agents, but particularly the relationships among agents.[33] SNA is specifically tailored toward this goal of delineating patterns of relationships among agents (actors) and has hence been described as a complexity method.[154] A systematic review examining SNA in health care research found only 26 studies between 1995 and 2009.[155] Since this review, interest in SNA has grown considerably (see Figure 6.2), as was previously predicted.[141] Thus, SNA is a relatively new and emerging method in the health care literature.[150,156]

Figure 6.2: Illustration of publications in MEDLINE with keywords "social network analysis" and "health" over time since 1988.



Source: generated using http://www.gopubmed.org/web/gopubmed/ [g]

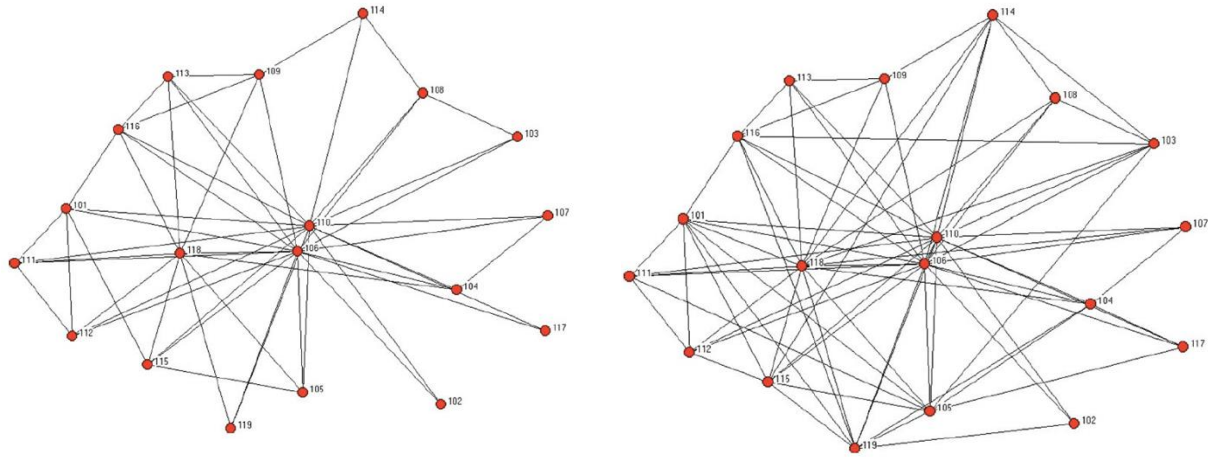
SNA provides a sophisticated analysis and neat approach for illustrating the network structure and displaying visual patterns of collaboration. A strength of SNA is that it not only provides a visual depiction of the network, but quantifies the strength of collaboration, including the strength of ties and how connected people are on average across an entire network, rather than individually.[135] Hence, it aggregates data to provide a holistic, overall picture of collaboration within a network, rather than just individual perspectives as are gleaned through interviews. Further, this method allows for the understanding of patterns of collaboration in relation to specific issues. For example, previous research used an SNA survey to measure interdisciplinary collaboration in a scientific collaboration to formulate complex population-based interventions.[157] The survey was distributed to all members of the network and was able to track collaboration patterns across 13 relationship networks.[157] Figure 6.3 displays a depiction of a social network of email relations at two different time points. As shown in the

[g] Based on meta-data from PubMED of year of publication, which, despite clear trends, should be considered cautiously due to likely issues with completeness of data at an individual and journal level.

figure, the SNA provides the ability to quantify, map and compare properties across different events. This is particularly useful in the present research project to compare collaboration patterns for different types of uncertainty and different headspace centres.

Figure 6.3: Social network analysis example: (a) Network of email contact at baseline, and (b) Network of email contact at Time 1

a) b)



.

Source: Haines VA, Godley J, Hawe P. Understanding interdisciplinary collaborations as social networks. *Am J Community Psychol.* 2011;47(1-2):1-11.

6.9. Ethical considerations

It is important to acknowledge the ethical issues inherent in the novelty of SNA. Prior to the commencement of the study, ethical approval was granted from the Macquarie University Human Research Ethics Committee [HREC ref 5201700297] (See Appendix A) and local sites (headspace centres) granted research governance approval. This research project faced ethical challenges in that participants were asked to give their name in the survey, and thus could not be assured anonymity from the research team. This ethical issue was mitigated through the de-identification of participants' names and roles in the immediate storage of results; all identifiable elements have been excluded from this thesis and future write-up of the findings. Further, consent was not obtained prior to sending out the email invitation and creating the survey that included personal information (name and profession). It was not feasible to attain consent to collect names and job roles as it was not possible to get in contact with these potential participants without prior gaining this information. Given that access and use of this information is essential in conducting SNA, which requires knowledge of all actors within the network, we ensured that the infringement on privacy was not large given that some of this information (e.g., who are the headspace staff) remains publicly available online, and poses little risk to participants because it will be used only to identify staff who are already working together to one another (i.e., familiar with the names and roles of their colleagues). These ethical issues

associated with SNA were acknowledged to the headspace staff and addressed with beneficence and reciprocity; an executive summary providing relevant implications was issued to each headspace centre at the conclusion of the research project.

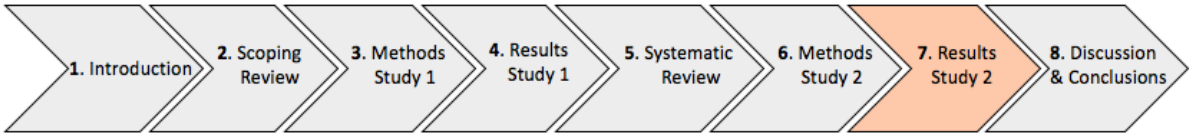
6.10. Limitations

Methodological limitations for SNA consist of those generalisable to all self-report methods and those specific to social network methodology. A common weakness of self-report methods is vulnerability of memory. That is, people are generally not very good at remembering or recognising their own behaviour patterns. When remembering many instances of the same experience, such as past collaboration with colleagues, it is common that separate occurrences are blended together as a prototypical experience.[158] This risk is addressed in the present social network survey through the roster of names and the concrete delimiter of: "in the last six months", to aid participants' recall. Another limitation of self-report methods, such as SNA, is the risk of social desirability. Social desirability refers to answering questions in a way that presents the participant in a favourable light.[159] Increased collaboration with colleagues is often presented as socially desirable; this may lead to a biased remembering and tendency to exaggerate interprofessional collaborative ties. However, such limitations are circumvented in SNA through reciprocity testing, whereby the tie is measured in both directions. Further, the social nature of the questions is another methodological limitation of the social network survey. The social network survey asks for information on social relations, a social construct. Social constructs can be conceptualised and interpreted in various ways by different people, thus resulting in different interpretations of the questions.[135] This risk way mitigated in the present research project as Study 1 was used to develop the social network survey, along with the piloting of survey questions, thus efforts to ensure consistency of interpretation were employed.

6.11. Summary

The online social network survey was used to elucidate previous findings on types and situations situations of professional uncertainty and to explore how professionals working in MHC (headspace staff) collaborate when faced with these differing uncertainties. The survey first requested demographic information then deepened understanding of the situations of uncertainty identified in Study 1. The focus of the survey was the social network component. This included a roster of names and roles of colleagues, asking respondents to indicate the strength and frequency of relations in the face of uncertain situations. Collaborative patterns across two types of uncertainty and routine work were assessed using SNA. The results of Study 2 are presented in Chapter 7.

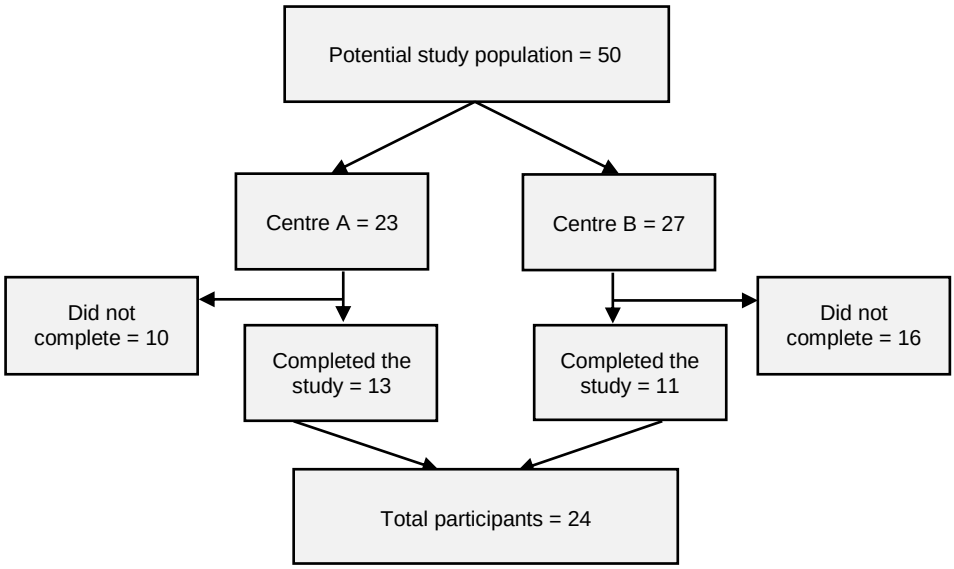
CHAPTER 7. FINDINGS: SOCIAL NETWORK ANALYSIS



7.1. Overview of Chapter 7

Chapter 7 presents findings from Study 2, an online survey conducted with professionals working in MHC. The survey first extracted responses on professional uncertainties explored previously in Study 1, then concluded with a social network component to assess patterns of collaboration during these specified uncertainties. Survey data was analysed using t-tests and SNA.

Figure 7.1: Recruitment and response of survey participants



7.2. Participants

From a potential study population of 50 (Figure 7.1), 24 participants from two headspace centres in Australia, participated in Study 2. Participants' demographic information is presented in Table 7.1. A comparison of respondents and non-respondents revealed no significant differences in the representation of professional groups (non-clinicians; administrative staff, management, and clinicians; specialist clinicians, intake clinicians):[h] $\chi 2(1, N = 50) = 1.29$,[i] $p = .26$, and gender distribution: $\chi 2(1, N = 50) = 0.45$, $p = .83$. The composition of professionals in

[h]Professionals groups were split into two (clinician and non-clinician) to reach adequate cell count for chi-square analysis.
[i] An alpha of .05 was set to determine significance.

each of these group is outlined in Table 7.2. The length of time of experience at the respective headspace centres ranged from less than three months to greater than five years. Of the 24 participants, approximately half worked full time (45.8%), with the other half working one or two days at their respective centre. This is characteristic of the headspace model that employs several contracted specialist clinicians that only work at headspace for one or two days a week. The demographic data highlight the multidimensional nature of headspace as an integrated MHC facility; each centre was comprised of not only MHC professionals, but also administrative staff, primary health care clinicians, managers and contracted specialists.

Table 7.1: Summary of participant demographic characteristics[j]

Characteristic	Item	Frequency	Percentage (%)
Sex	Female	18	75.0
	Male	6	25.0
Perceived professional Seniority	Junior	5	20.8
	Senior	8	33.3
	Not Sure	11	45.8
Professional Group	Leadership/Management	2	8.3
	Intake Clinicians[k]	5	20.8
	Specialist Clinicians[l]	11	45.8
	Administration	6	25.0
Professional Qualification	Psychiatry	2	8.3
	Psychology	7	29.2
	Medicine	2	8.3
	Nursing	1	4.2
	Social work	2	8.3
	Occupational therapy	2	8.3
	Admin	6	25.0
	Other	2	8.3
Contract of Employment	Full time	11	45.8
	Part time	13	54.2
	Casual	0	0
Experience at Headspace	<3 months	4	16.7
	3 – 6 months	3	12.5
	6 months – 1 year	5	20.8
	1 – 2 years	5	20.8
	2 – 5 years	6	25.0
	5+ years	1	4.2

[j] Percentages may not add to 100% due to rounding.
[k] Intake clinicians are staff employed to conduct initial assessment of clients, assess immediate risk and determine if admission will occur.
[l] Specialist clinicians see clients after admission to the service has been determined by the intake clinicians, include: psychologist, psychiatrist, general practitioner, nurse.

Table 7.2: Composition of professional roles in professional groups

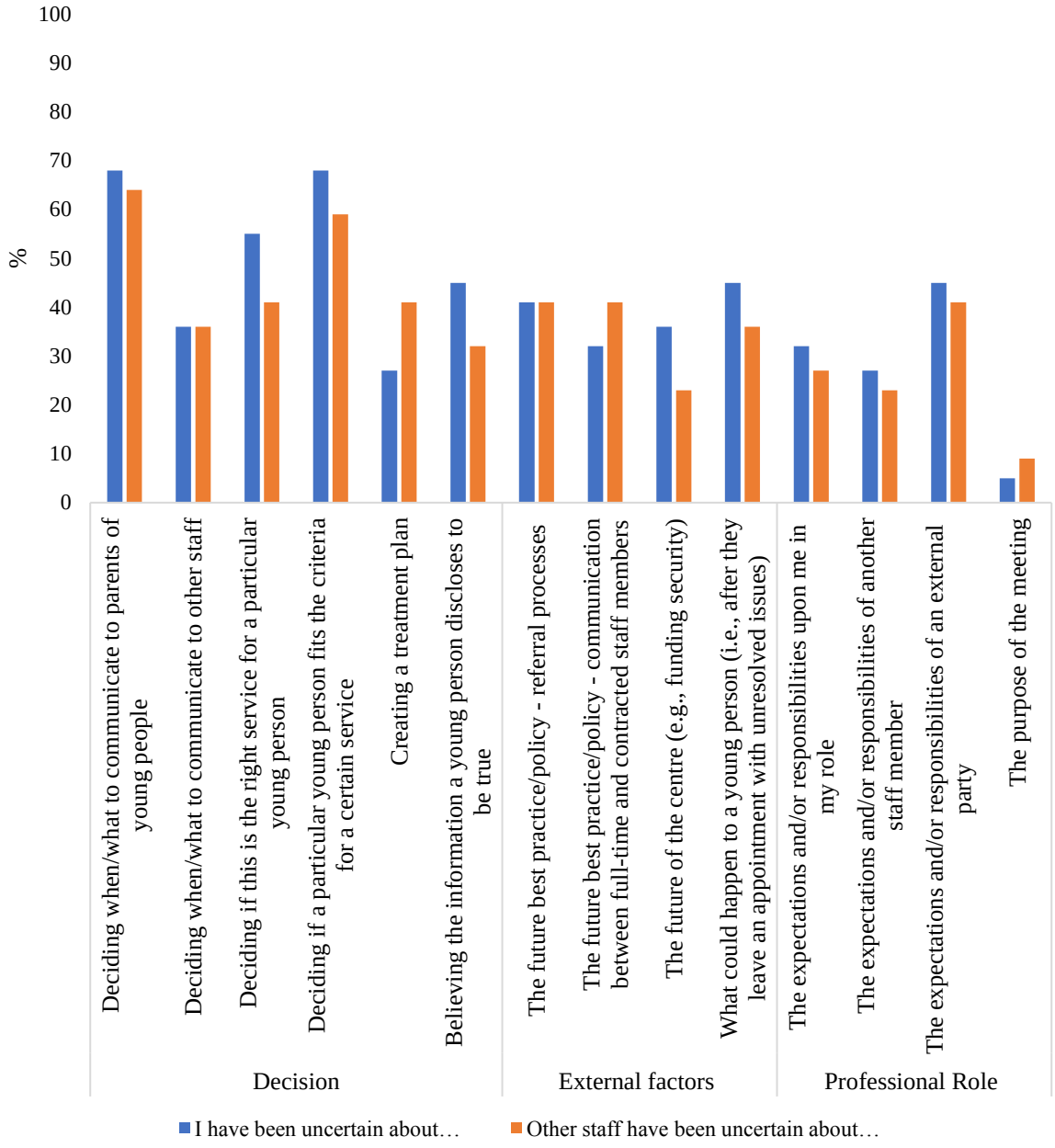
	Professional Qualification	% within group
Leadership/Management (*n* = 2)	Health Sciences/Management	50.0
	Administration	50.0
Intake Clinicians (*n* = 5)	Social Work	20.0
	Occupational Therapy	40.0
	Psychology	40.0
Specialist Clinicians (*n* = 11)	Psychiatry	18.2
	Psychology	45.5
	Medicine (GP)	18.2
	Nursing	9.09
	Family Therapy	9.09
Administrative Staff (*n* = 6)	Administration	83.3
	Social Work	16.7

7.3. Professional uncertainties: Explored further

Situations of uncertainty identified in Study 1 (through thematic analysis of semi-structured interviews) were confirmed in the present study. Participants (N = 24) reported that situations of professional role, decision, and external factor uncertainty were experienced by headspace staff (See Figure 7.2). Participants were asked to report if they, or other staff had experienced specific situations of uncertainty. Average scores were computed to determine the most frequently reported type of uncertainty among headspace staff depending on the various situations. On average, situations of decision uncertainty were the most frequently reported by participants (M = 0.47, SD = 0.30), followed by external factors uncertainty (M = 0.34, SD = 0.30) and role uncertainty (M = 0.25, SD = 0.28). Responses to open ended questions asking for any other situations of uncertainty were consistent with situations already listed on the survey.

Professional groups were further classified into clinician (specialist clinicians and intake clinicians) and non-clinician (management and administrative staff), in order to assess the prevalence of uncertainties experienced by different professional roles in MHC. Mean scores were computed to indicate the total professional uncertainties experienced by the self for each overarching type of uncertainty. Independent sample t-tests revealed no significant differences in the uncertainties reported between groups of clinicians and non-clinicians for decision uncertainties: $t(22) = 0.80$, $p = .43$, role uncertainties: $t(22) = 0.08$, $p = .70$, and uncertainties pertaining to external factors: $t(22) = -1.89$, $p = .07$. This implies that situations of uncertainty are not specific to clinical staff, but are common among all staff working in headspace centres. This is reflective of qualitative findings of Study 1 (See Chapter 4).

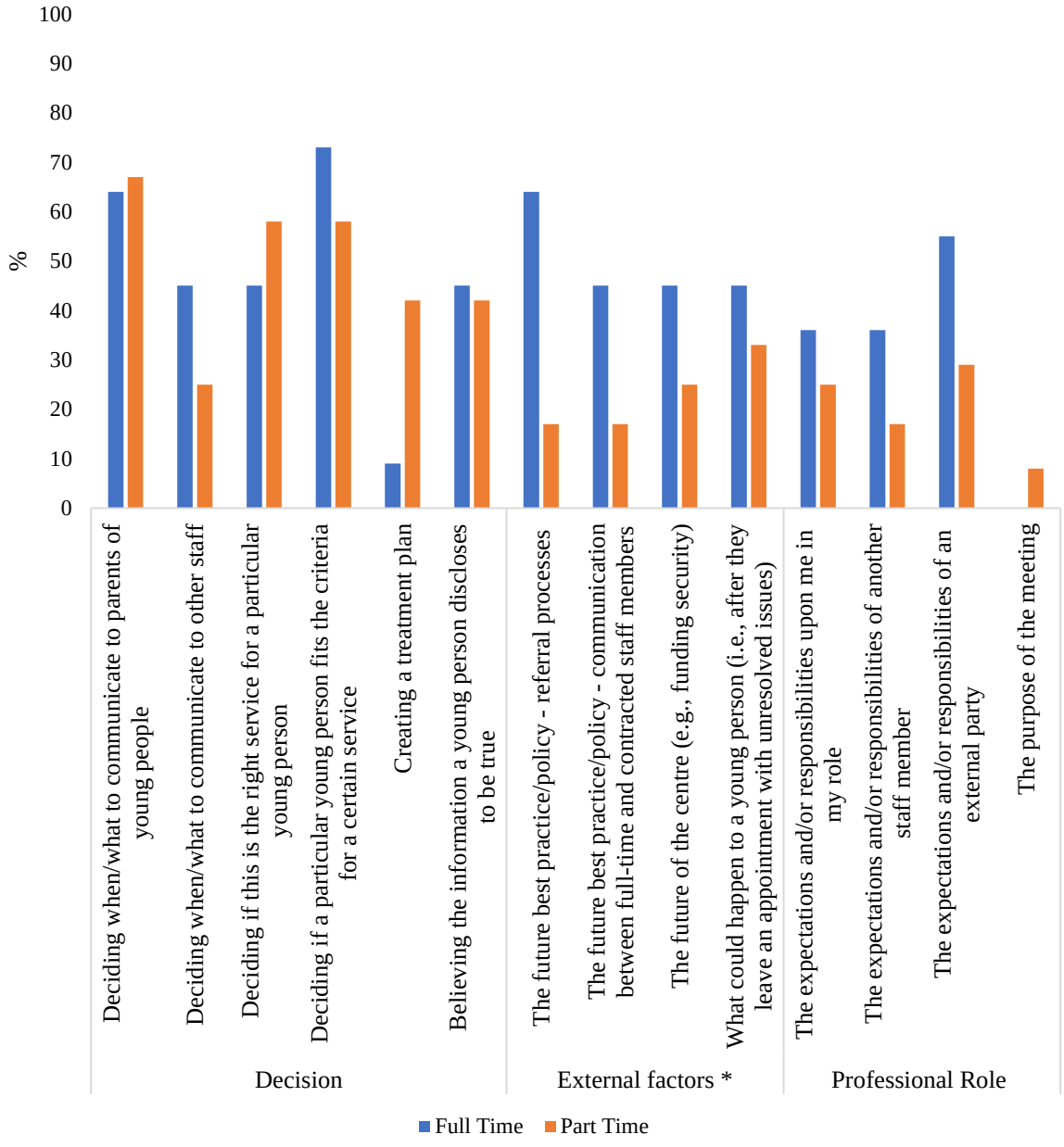
Figure 7.2: Perceived situations of uncertainty experienced by professionals working in mental health



Further independent samples t-tests revealed no significant differences between situations of uncertainty based on the two headspace centres, for decision uncertainties: $t(22) = -0.75$, $p = .47$, role uncertainties: $t(22) = -1.12$, $p = .28$, and uncertainties pertaining to external factors: $t(22) = 0.04$, $p = .97$. Results revealed a significant difference in the scores for full-time ($M = 0.50$, $SD = 0.27$) and part-time staff ($M = 0.21$, $SD = 0.27$): $t(22) = 2.61$, $p = .02$. This indicates that full time headspace staff members are more likely to experience uncertainty related to external factors (such as uncertainty about funding security), compared to staff that are only there on a part time basis (See Figure 7.3). This significance was not found for the other types of decision: $t(22) = 0.07$, $p = .95$, and role uncertainty: $t(22) = 1.12$, $p = .28$. It is

important to note that despite the fact that all variables were normally distributed and all skew was within normal limits, given the low sample size (N = 24), statistical significance must be interpreted with caution.

Figure 7.3: Perceived situations of uncertainty across levels of employment



7.4. Collaboration among professionals working in mental health care

When participants were asked if they collaborate (i.e., work with) other staff at their headspace centre, all but one (95.8%) answered yes. The one participant who answered no was sent to a page that prematurely ended the survey so they did not get a chance to answer questions pertaining to the situations of uncertainty and the social network survey. This was inferred as a misinterpretation of the question by this participant, as other staff (n = 9) reported collaborating with this staff member (Admin 1 – Centre B). Descriptive statistics revealed that in the last six

months, professionals working across the two headspace centres most frequently reported collaboration in terms of taking part in discussion, teleconference or email exchange (91.3%), followed by seeking advice from colleagues (87.0%) and socialising with other staff in the corridor or over lunch (87.0%). The least frequent mode of collaboration reported was formal supervision (47.8%). All activities of collaboration were reported by all four groups of professionals (intake clinicians, management, specialist clinicians and administrative staff), and for both full-time and part-time staff. Patterns of collaboration are hereafter explored in more depth using SNA.

7.5. Social network analysis: Collaboration during times of uncertainty

Collaboration was assessed in three conditions: routine work, decision uncertainty, and professional role uncertainty. Collaboration was not assessed across situations of external factors uncertainty given the lack of controllability associated with this type of uncertainty, as was revealed in Study 1 (See Chapter 4). Response rates on the social network questions varied between the two headspace centres (37%-57%), with an average response rate of 45%. For Centre A, the response rate was slightly higher (57%) for the collaborative network, compared to the two networks of uncertainty (52%). This was due to one participant prematurely closing the survey. Response rates are reported in Table 7.3, along with other network parameters. Sociograms are presented in Figures 7.6(*a-f*).

7.5.1. Missing data: Symmetrisation

Missing data is a common issue in SNA; in this case, missing data was a result of non-respondents. Consistent with past SNA research in health care,[160] the present study employed symmetrisation to deal with missing data. Symmetrisation refers to the creation of a non-directional tie between two actors, when one actor indicates the presence of the relationship.[136,149] This is appropriate in the present study given the research endeavour to examine collaboration, with little focus on directionality. In regards to the uncertainty networks, both outward ("I have turned to this person") and inward ("This person has turned to me") ties were measured. Inward ties were collected as proxy information for missing data; thus where baseline (outward) data was not available for a staff member, the inward data was used as symmetrised proxy. Ties were maximally symmetrised, meaning a tie was added to the dataset if the following conditions were met: (i) if both people responded and agreed on the tie, or (ii) if only one person responded but nominated the other as someone they turned to or has turned to them. The tie "I turned to …" is considered a more reliable tie to report than "they turn to me". So if, in a third condition where the two responding people disagree, i.e., one says the

other turns to them but the second person disagrees by say I do not turn to them – the outward "I do not turn" tie is recorded.

Table 7.3: Network parameters and response rates of social networks of headspace staff

	Collaboration network (routine work)	**Collaboration when uncertain about professional role**	**Collaboration when uncertain about decisions**
Centre A (N = 23)	**Figure 7.6(a)**	**Figure 7.6(b)**	**Figure 7.6(c)**
Response rate	57% (13/23)	52% (12/23)	52% (12/23)
Number of ties reported	200	74	159
Number of isolates	0	0	0
Centralisation	0.66	0.67	0.70
Network components	1	1	1
Density	0.40	0.15	0.31
Centre B (N = 27)	**Figure 7.6(d)**	**Figure 7.6(e)**	**Figure 7.6(f)**
Response rate in %	37% (10/27)	37% (10/27)	37% (10/27)
Number of ties reported	198	51	158
Number of isolates	0	7	0
Centralisation	0.78	0.46	0.59
Network components	1	8*	1
Density	0.73	0.24	0.76

* 1 major component and 7 isolates

7.5.2. Density, centrality, and centralisation

Density is the degree of concentration within the network.[13] It is measured by calculating the number of ties as a proportion of the number of total possible connections.[150] This measure allows for an interpretation of the general level of cohesion of the two separate networks

investigated in Study 2 (Centre A and Centre B). Density can be valued between 0 and 1, where 0 represents no interaction, and 1 indicates a robust network where all possible connections are employed.[161] Given that the data has been symmetrised to account for non-respondents, density was calculated relative to the number of unique pairs. This is common practice in social network research.[162] Thus, in this study, a measure of density at 1 would represent a maximum level of connectedness occurring between all possible pairs of staff. As can be seen in Table 7.3, the density of the role uncertainty network in Centre A only uses 15% of all possible connections (Figure 7.6(*b*)). This is a much sparser network compared to the routine collaboration networks for Centre B (Figure 7.6(*d*)), representing approximately three quarters of the possible ties.

While density describes the general level of cohesion in a network, centralisation describes the extent to which this cohesion is organised around particular focal points.[135] In this study, a higher degree centralisation and density score (approaching 1), indicates a highly connected network dominated by central hubs (e.g., Centre B – Figure 7.6(*d*)). Contrastingly, as can be seen in Figure 7.6(*e*), collaboration during role uncertainty in Centre B is a sparse network with few interactions centred around fewer hubs. While density and centralisation are SNA measures from the network level, centrality is a social networking measure used to identify node level parameters. Freeman's degree centrality measures which players have the most interaction with others.[152] This indicates which players have the most connection, power and thus the most influence.[141,163] Maintaining a central position in the network allows a person to influence decision and the spread of information.[149] See Table 7.4 for the most central players of each network, and Figures 7.4 and 7.5 for visual depictions of the distribution of degree. These figures illustrate the number of contacts each player has within the routine collaboration network of Centre A and B respectively. Centrality measures revealed that players with most interaction did not restrict these interactions to one professional group.

Table 7.4: Freeman's degree centrality: Players with highest interaction

(Normalised score in brackets)

	Collaboration network (routine work)	Collaboration when uncertain about professional role	Collaboration when uncertain about decisions
Centre A (*N* = 22)	1. Manag1A (1.00) 2. Manag2A* (1.00) 3. Clin3A (0.96) 4. Admin1A (0.91)	1. Manag2A (0.96) 2. Admin1A (0.77) 3. Clin1A (0.55) 4. Clin3A (0.46)	1. Manag1A (1.00) 2. Manag2A* (1.00) 3. Clin3A (0.86) 4. PHClin1A (0.77)
Centre B (*N* = 27)	1. Clin1 (0.87) 2. Manag2* (0.87) 3. Admin2 (0.78) 4. Clin2* (0.78)	1. Admin2 (0.50) 2. Clin1 (0.39) 3. Clin4 (0.26) 4. Manag1 (0.22)	1. Manag2 (0.84) 2. Clin1 (0.76) 3. Clin2 (0.71) 4. MHClin1 (0.68)

* Equal to previous player

Figure 7.4: Distribution of network degree (Networks a-c: Centre A)

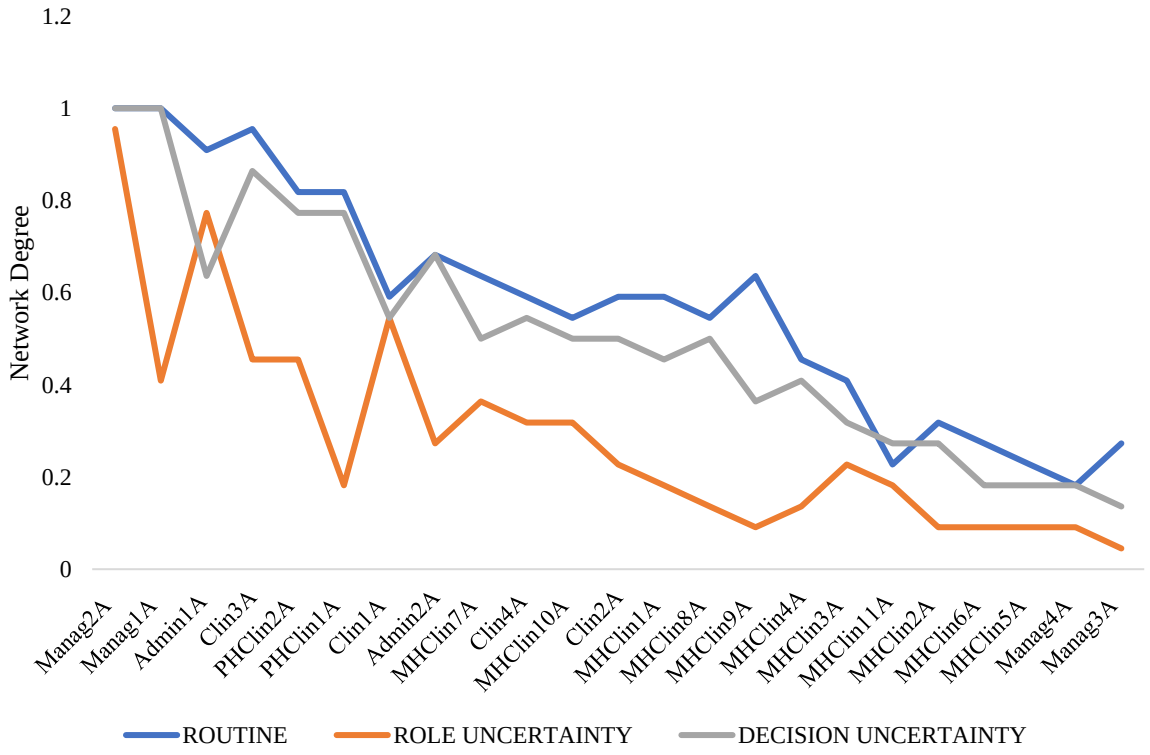
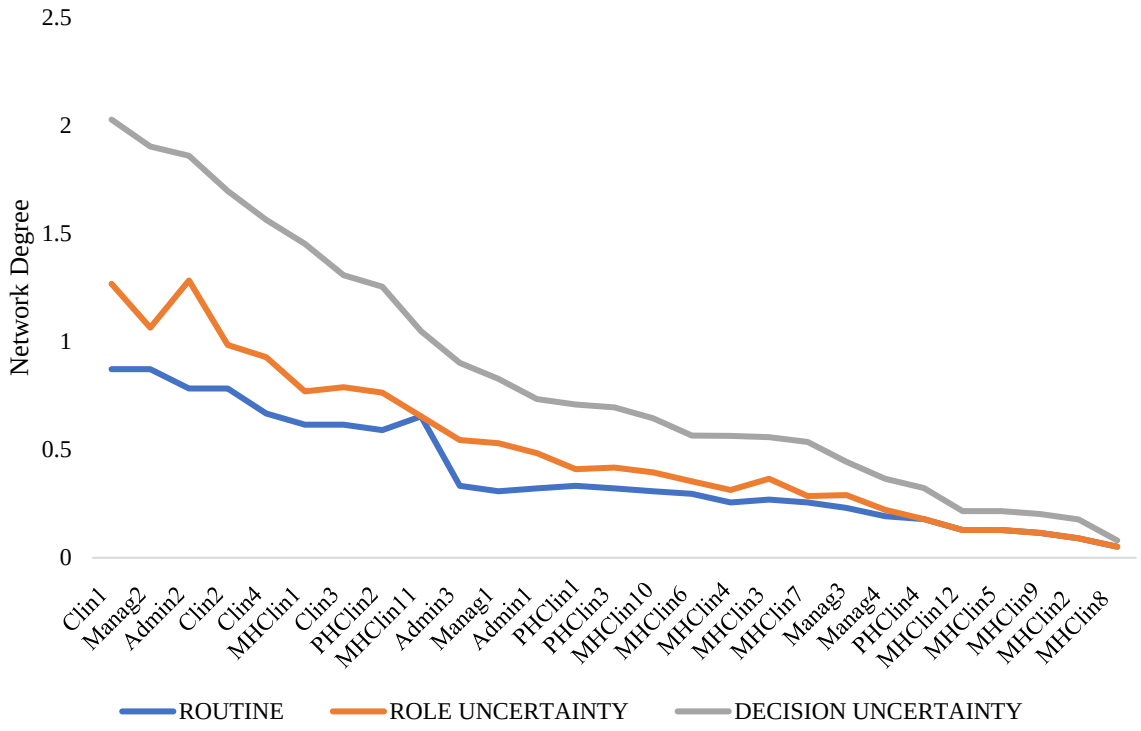


Figure 7.5: Distribution of network degree (Networks d-f: Centre B)



7.5.3. Sub-group cohesion

Network visualisation of sociograms revealed interprofessional collaboration, rather than only intra-professional collaboration, occurred in headspace centres. All six networks, representing routine and two types of uncertainty, included ties between four professional groups (See Figure 7.6*a-f*). For example, in headspace Centre B when one of the key managers (Manag2) felt uncertain about deciding next steps, he/she reported collaboration with clinicians, specialist clinicians, administrative and other management staff. This pattern was consistent across all networks despite the number of ties or density of the network. There was no evidence of headspace staff collaborating solely within their professional group.

Network visualisation was confirmed quantitatively using a network analysis measure of sub-group cohesion: E-I Index[m]. E-I Index is a measure of the difference between the number of external and internal-group ties, divided by the total number of ties. This value can range between -1 and 1, whereby the closest to -1 represents the extent to which a group choses themselves.[164] In this case, the groups are defined by professional group (specialist clinician, general intake clinician, administrative staff, management). An external link is characterised by collaboration across professional bounds, for example from management to specialist clinicians, whereas internal links are within the same professional group. As can be seen in

[m] While the E-I index was developed through ideas about homophily, the actual measure is a measure of sub-group cohesion.

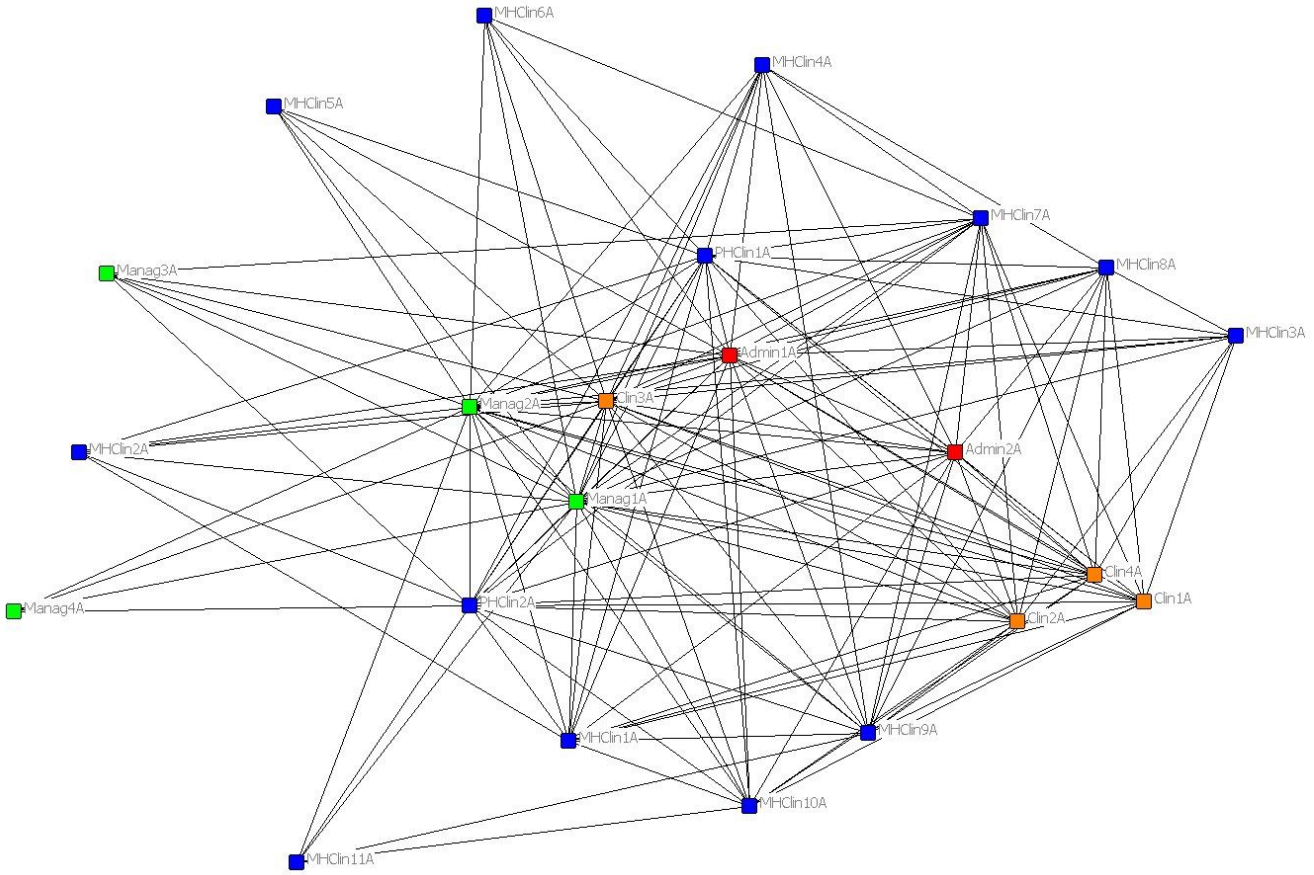
Table 7.5, all six networks had a higher tendency towards external ties. This indicated that headspace staff show a tendency to not form ties within professional groups; rather collaboration occurred across professional bounds. This tendency was significant beyond random expectations for the two role uncertainty networks. This indicates, that for role uncertainty, the tendency to not form ties within the internal sub group was significantly different than expected.

Table 7.5: E-I Index scores: Professional proximity

	Collaboration network (routine work)	**Collaboration when uncertain about professional role**	**Collaboration when uncertain about decisions**
Centre A (*N* = 22)	7.6(a)	7.6(b)	7.6(c)
Re-scaled E-I Index	0.033	0.726*	0.099
Centre B (*N* = 27)	7.6(d)	7.6(e)	7.6(f)
Re-scaled E-I Index	0.095	0.120*	0.032

* Significant ($p<.05$)

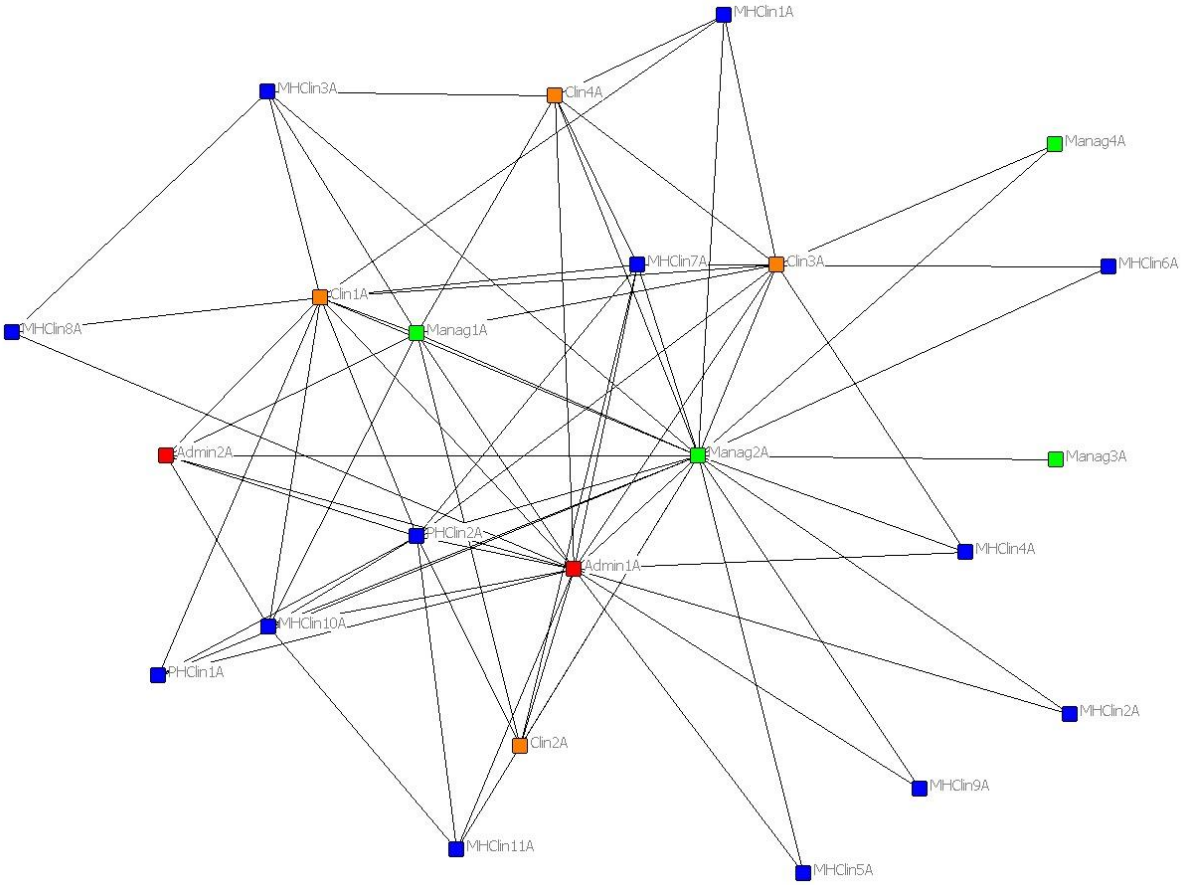
Figure 7.6a: Collaboration network (routine work) – Centre A.



	***Professional group* – Colour**
	Specialist clinicians
	Administrative staff
	Management staff
	General intake clinicians

Each node represents a staff member and each line indicates a tie defined by the question: "Please select those people with whom you have collaborated with in the last 6 months in your routine work".

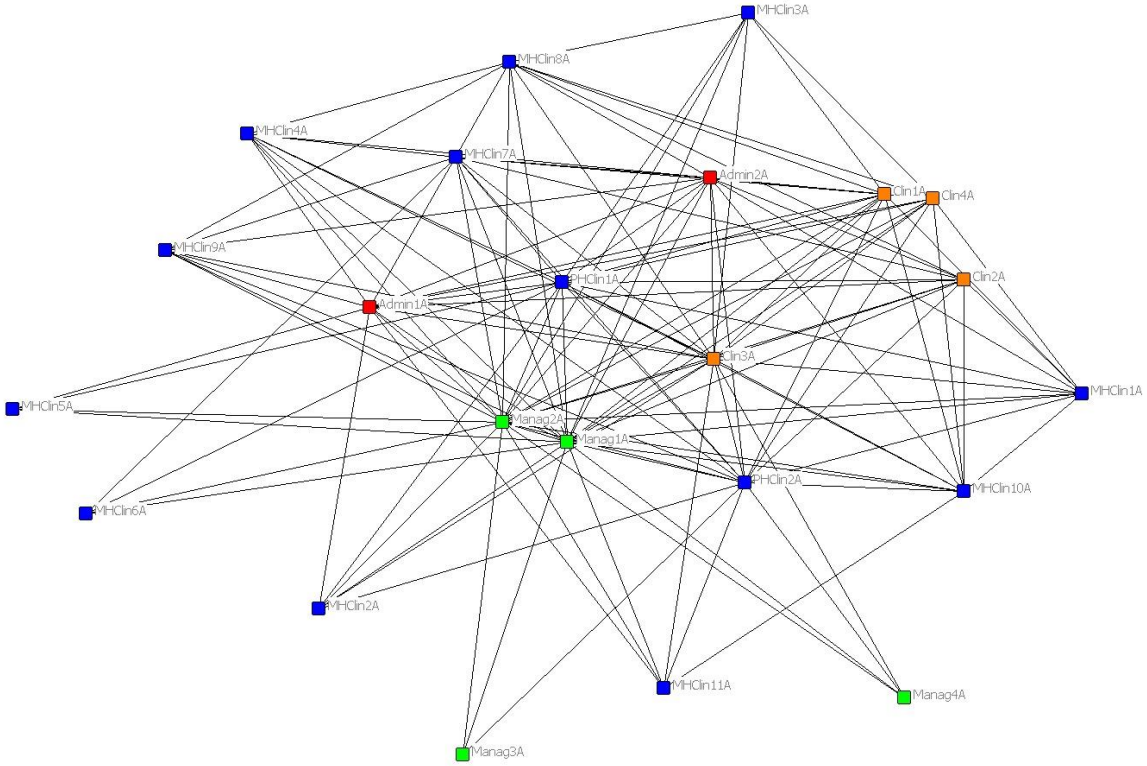
Figure 7.6b: Collaboration network (role uncertainty) – Centre A.



	***Professional group* – Colour**
	Specialist clinicians
	Administrative staff
	Management staff
	General intake clinicians

Each node represents a staff member and each line indicates a tie defined by the question: "Please select those people with whom you would turn to (e.g., to ask for clarity or advice) when you experience role ambiguity. Please also indicate if those people turn to you".

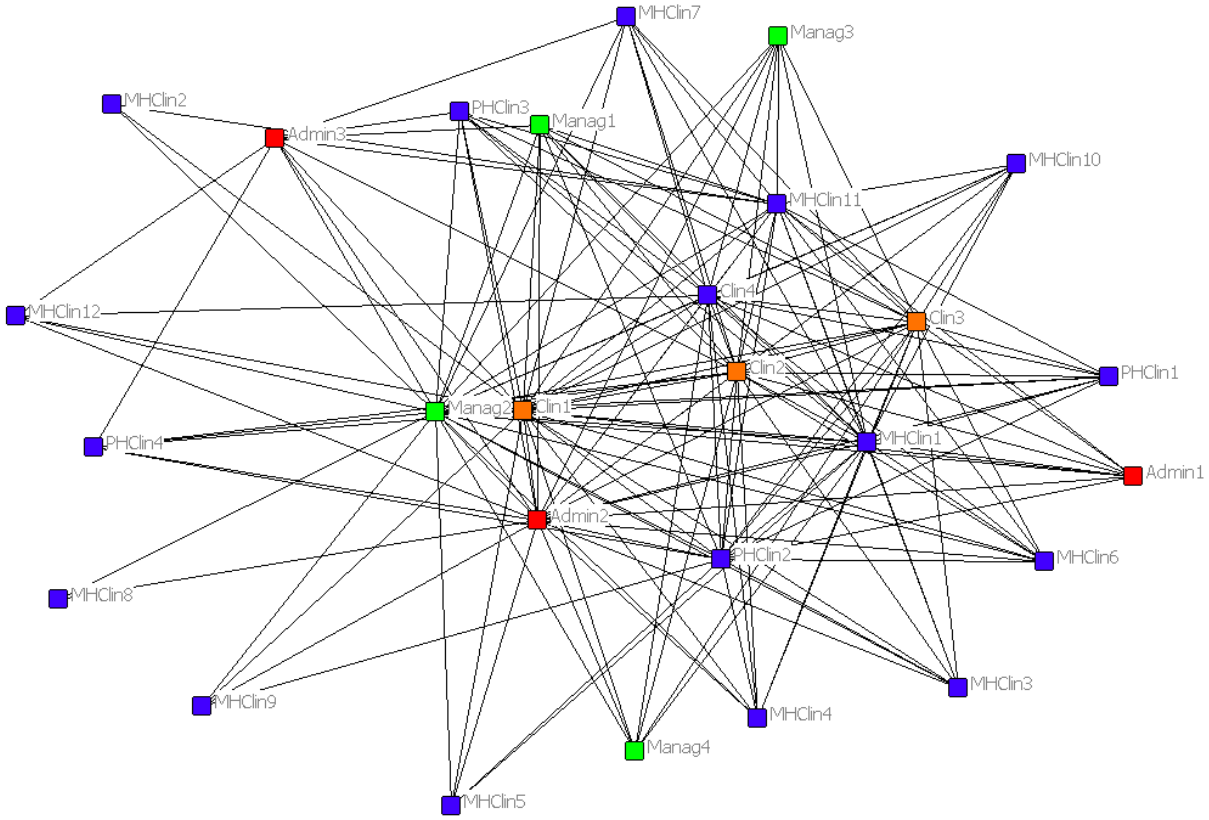
Figure 7.6c: Collaboration network (decision uncertainty) – Centre A.



	***Professional group* – Colour**
	Specialist clinicians
	Administrative staff
	Management staff
	General intake clinicians

Each node represents a staff member and each line indicates a tie defined by the question: "Please select those people with whom you would turn to when you are unsure in making any kind of decision related to you work at [the centre]. Please also indicate if those people turn to you".

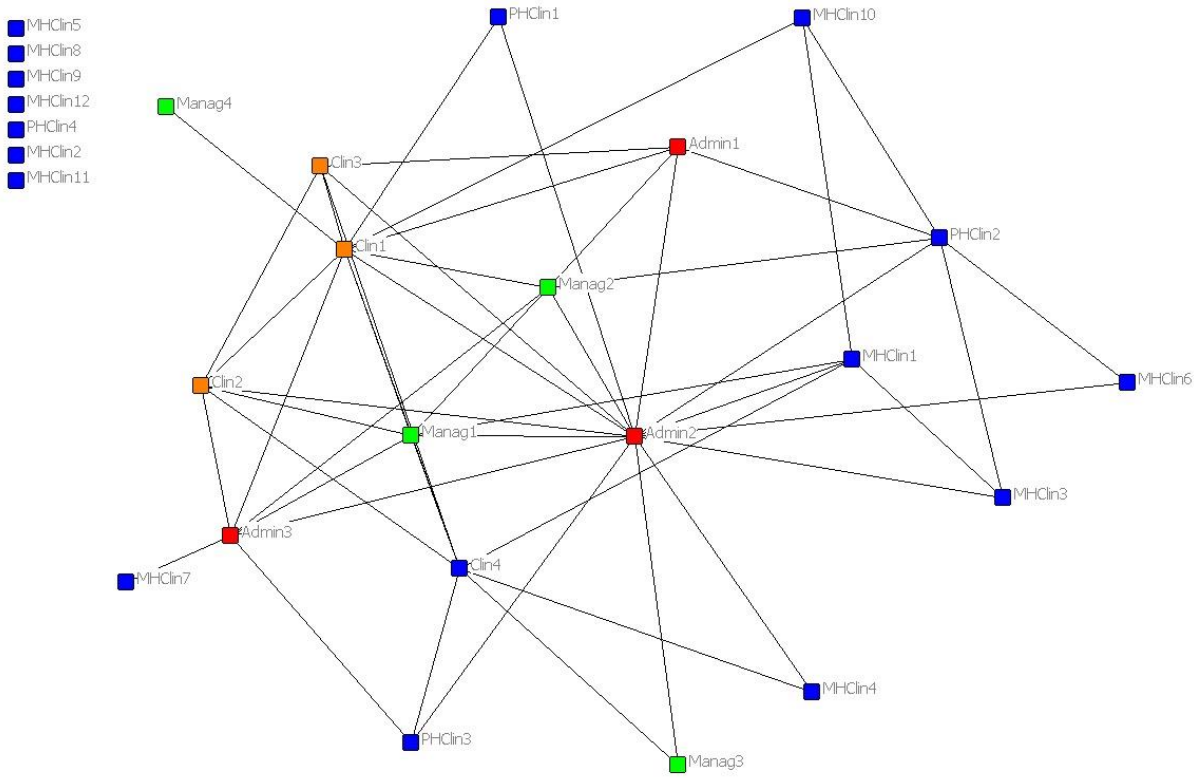
Figure 7.6d: Collaboration network (routine work) – Centre B.



	***Professional group* – Colour**
	Specialist clinicians
	Administrative staff
	Management staff
	General intake clinicians

Each node represents a staff member and each line indicates a tie defined by the question: "Please select those people with whom you have collaborated with in the last 6 months in your routine work".

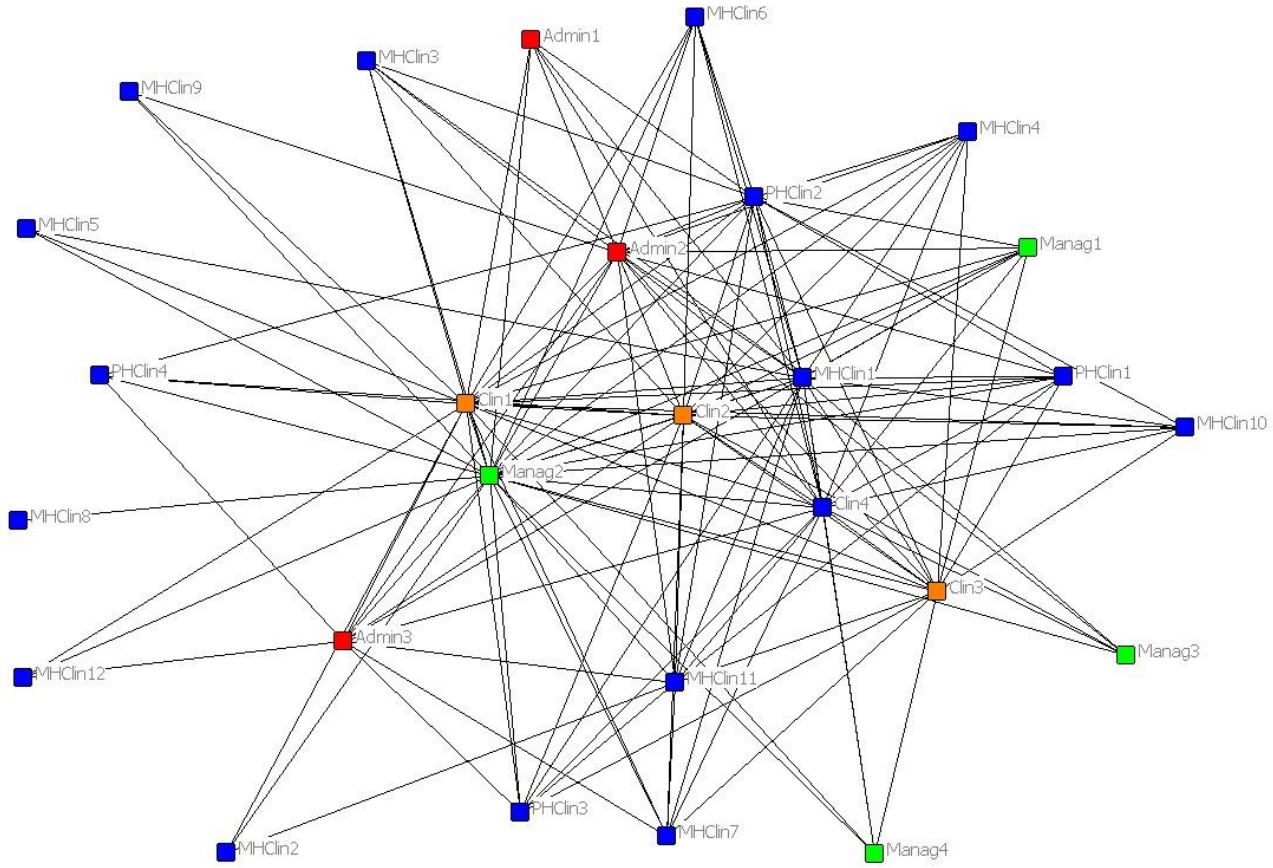
Figure 7.6e: Collaboration network (role uncertainty) – Centre B.



	***Professional group* – Colour**
	Specialist clinicians
	Administrative staff
	Management staff
	General intake clinicians

Each node represents a staff member and each line indicates a tie defined by the question: "Please select those people with whom you would turn to (e.g., to ask for clarity or advice) when you experience role ambiguity. Please also indicate if those people turn to you".

Figure 7.6f: Collaboration network (decision uncertainty) – Centre B.



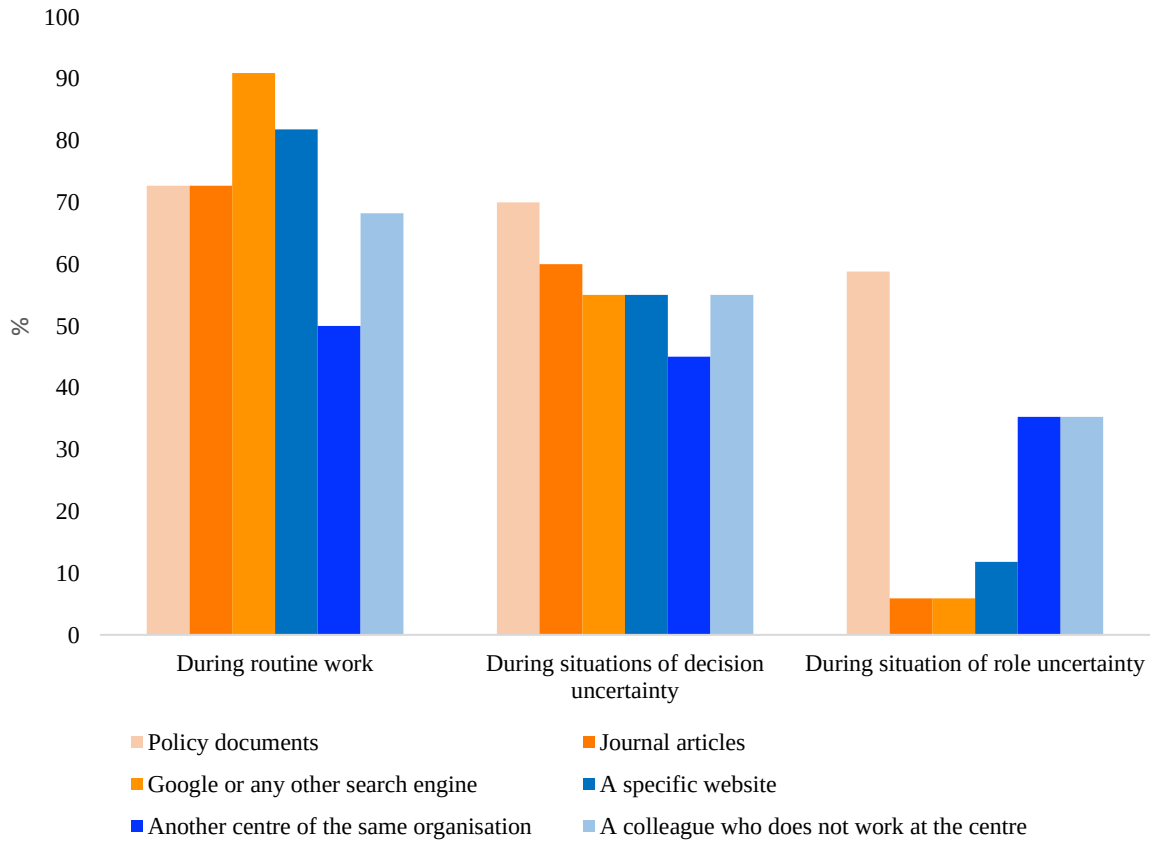
	***Professional group* – Colour**
	Specialist clinicians
	Administrative staff
	Management staff
	General intake clinicians

Each node represents a staff member and each line indicates a tie defined by the question: "Please select those people with whom you would turn to when you are unsure in making any kind of decision related to you work at [the centre]. Please also indicate if those people turn to you".

7.5.4. Other resources used when uncertain

In addition to collaborating with other headspace staff when faced with uncertain situations, data revealed that professionals working in MHC consulted other resources to aid in their navigation of uncertain situations (See Figure 7.7). Descriptive statistics revealed that during routine work, headspace staff most commonly use Google or any other search engine (90.9%), when addressing uncertainty, while policy documents were the most common resource used for situations of decision uncertainty (70%), and role uncertainty (58.8%). As can be seen in Figure 7.7, substantially fewer resources were used during role uncertainty compared to decision uncertainty and routine work.

Figure 7.7: Other resources used in (a) routine work, (b) during situations of decision uncertainty, and (c) role uncertainty.

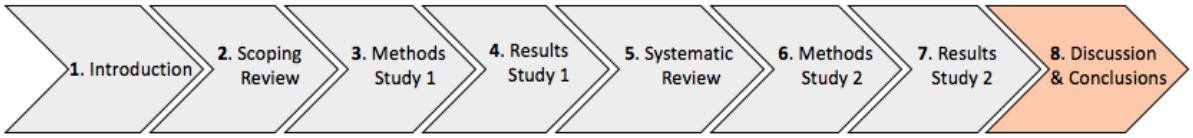


7.6. Summary

In summary, results of the survey (Study 2) revealed that professional uncertainties were experienced by clinical and non-clinical staff working in MHC. Headspace staff reported collaboration across professional boundaries during routine work, and in times of decision uncertainty, and professional role uncertainty. The concluding chapter, Chapter 8, discusses the

details of these collaborative patterns, including differences between uncertainties and headspace centres in light of the limitations and future directions for research and policy.

CHAPTER 8. CONCLUSIONS AND REFLECTIONS: COLLABORATION, UNCERTAINTY AND MENTAL HEALTH CARE



8.1. Overview of Chapter 8

Chapter 8 provides a summary and integration of the results of the research project as a whole, to address the research questions: (RQ1) *What are the types and situations of uncertainty experienced in mental health care?* and (RQ2) *How do professionals working in mental health care collaborate in the face of different uncertainties?* This is followed by a discussion of the implications and unique contribution of the research. The strengths and limitations are then considered and directions for future research proposed. The concluding section of this chapter provides an overarching summary of the research project.

8.2. Discussion of key findings: RQ1

8.2.1. Situations of professional uncertainty in mental health care

The present research project has proposed a contextually generalisable definition for professional uncertainty in health care: *A subjective, yet ubiquitous experience in health care, related to the unpredictability of a future outcome.* This was in response to a call in the literature for a consolidated definition that will be applicable to all situations of uncertainty experienced in health care (See Chapter 2),[2] and can also be applicable to the specificities of MHC. In addition to the proposed definition, the present research project offers a conceptualisation of the types and situations applicable to professionals working in integrated MHC delivery, such as headspace centres (See Chapter 4, Figure 4.1). This is important given that situations of uncertainty are context-dependent and must be isolated in their specificity to MHC.[16] Thematic analysis in Study 1 revealed three prominent types of uncertainty experienced by professionals in MHC: external factors, deciding next steps, and professional role. Subsequent statistical analysis of survey responses in Study 2 demonstrated that these types and situations are generalisable to a larger sample of headspace staff, including primary care physicians, MHC specialists, general intake clinicians, administrative and management staff.

Results revealed no significant differences between clinicians and non-clinicians for uncertainties reported. This highlights that in integrated MHC sites, such as headspace centres, a diverse range of situations of uncertainty are experienced by all staff, not just the clinicians dealing with patient care. This is consistent with the qualitative data from Study 1, where key staff members reported common situations of uncertainty between administrative and clinical

staff, thus suggesting that a demarcation between types of uncertainty dependent on professional role is unnecessary. This research project thus highlights the importance of considering the role of auxiliary staff in supporting treatment in MHC. For example, organisation level policy documents should include guidelines for non-clinical staff regarding how they can help. Consistent with the health care literature (See Chapter 2), results revealed that uncertainty pertaining to decision-making, for example, deciding if the patient met criteria to call the medical emergency team,[46] was the most prevalent in this study. Furthermore, findings revealed that experiences of uncertainty may vary dependent on employment contract, however, for the most part these situations are an omnipresent burden that must be understood and managed to benefit the strain they pose on both staff[7] and clients.[6]

8.3. Discussion of key findings: RQ2

The SNA results of Study 2 (see Chapter 7) revealed that headspace staff collaborate across professional bounds, however, differences in collaborative patterns existed depending on the type of uncertainty and the headspace centres within which collaboration was assessed (See Table 8.1 for all hypotheses and associated findings; hypotheses were previously stated in Chapter 1). Collaboration in the face of professional role uncertainty differed to collaboration during routine work or decision uncertainty, with role uncertainty networks being considerably more sparse. This is discussed in more detail below.

Table 8.1: Hypotheses and key findings

Hypotheses	Categorisation	Were findings supportive of hypotheses?
H1.1 – Collaborations are interprofessional; that is, they are occurring across professional boundaries	Supported	E-I index scores of sub-group cohesion demonstrated that all networks showed a propensity towards external links. Permutation tests were significant for role uncertainty networks.
H1.2 – Collaboration between staff varies between headspace centres.	Supported	Differences between the two headspace centres were apparent, Centre B was denser across all three networks.
H2.1 – Networks of routine collaboration utilise different collaborative patterns, compared to collaborations during types of uncertainty.	Not supported	SNA network parameters (density, number of ties, centralisation) revealed similarity between routine collaboration and decision uncertainty networks.
H2.2 – Collaboration between individuals working in MHC vary across types of uncertainty.	Supported	SNA network parameters yielded differences in collaborative patterns dependent upon the type of uncertainty.

8.3.1. Interprofessional collaboration or sub-group cohesion?

For all six networks, there was a tendency to form ties with staff external to professional group, rather than internal. This indicates that when engaging in routine work, making decisions, or confronting role uncertainty, headspace staff tend to collaborate across professional bounds, thus Hypothesis 1.1 was supported. Interprofessional collaborative patterns were particularly strong for role uncertainty, as both networks representing collaboration during role uncertainty yielded significant permutation scores. This suggests that interprofessional collaboration during role uncertainty cannot be attributed to chance. Insights from qualitative data (Chapter 4) suggest an explanation for this; it is plausible that headspace staff turn to a colleague of another professional group in regards to uncertainties of role in order to clarify the boundaries of their responsibilities. Such patterns of interprofessional collaboration allow the flow of useful information (i.e., which role does what) to other members of the network.[165,166]

The interprofessional collaboration evident from the SNA of Study 2 as well as the thematic analysis of Study 1, is consistent with the headspace model that aims to execute collaborative care[18] and previous research in MHC indicating interprofessional collaboration (See Chapter 5).[11,123] Alternatively, the present findings are inconsistent with theoretical underpinnings of SNA and health care research not specific to MHC. According to the developers of the E-I index formula of sub-group cohesion,[164] obtaining a positive E-I value (as was obtained in the present project; indicative of interprofessional collaboration) is rare given the natural human tendency to form ties within sub-groups. According to Krackhardt,[164] even when groups are co-located (such as in headspace centres) the tendency still prevails for sub-groups to develop friendships and internal ties, and thus eventuate in a negative E-I score. This makes these counterintuitive findings here noteworthy.

Similarly, previous research conducted in health care indicated that professionals maintain a tendency towards collaborating within sub-groups rather than collaborating between professional groups.[134,160,167,168] The inconsistency between the present research project and previous theory and research can be attributed to contextual differences. MHC has been acknowledged for its unique contextual characteristics,[23] rendering MHC systems distinctive to broader systems of health care. In the present research project, more than half of the headspace employees were part-time; it is important to acknowledge the potential impact of this on the collaborative patterns reported. Part-time staff working on opposite days may not have the opportunity to collaborate intra-professionally, thus interprofessional collaboration may be a means to mitigate this. For example, if two psychiatrists are employed at one headspace centre but work on different days, intra-professional collaboration would be rare. While these two professionals of the same group may be isolated from one another, ties to professionals of other groups working on the same day may be employed. This assertion is supported by the lower scores of density, indicating that the total number of possible pairs may not be achievable given that part-time employees working on different days may not have ample opportunity for collaboration. It is plausible that a compromise is sought by professionals to replace the lack of opportunity for internal group working, with interprofessional collaboration. Thus, these findings of interprofessional collaboration are unique to MHC facilities of co-located, interdependent professionals, such as headspace centres.

8.3.2. Comparing collaborative patterns between situations of uncertainty and routine work

Network visualisation and social networking parameters revealed that decision uncertainty and routine collaboration networks were more similar than role uncertainty networks. Thus, Hypothesis 2.1 was not supported, yet Hypothesis 2.2 was supported. Results revealed that

decision uncertainty was more common and familiar to professionals working in MHC. Given the omnipresence of decision uncertainty identified in the literature (See Chapter 2), and the frequently reported decision uncertainties discussed in semi-structured interviews (See Chapter 4) and reported in the online survey (Chapter 7), it is plausible that decision uncertainty is considered as familiar as routine work and, therefore, addressed with everyday collaborative patterns. This is evident through the similar sociograms and network parameters of these two networks for both headspace centres.

In contrast, role uncertainty yielded substantially fewer collaborative ties and lower scores of density across both headspace networks. This was particularly prominent in Centre B, where seven actors (headspace staff members) were deemed isolates; not connected to any other staff in the network during situations of professional role uncertainty. This indicates that when faced with role uncertainty, headspace staff collaborate less and with fewer colleagues. This is consistent with previous research that found instances of role uncertainty rendered professionals in MHC unsure of who to turn to.[120] Similarly, previous research found that interprofessional collaboration during uncertainties of role occurred in casual discussion between two professionals,[116] as opposed to cohesive and interdisciplinary collaborative team meetings. Thus, patterns of collaboration for situations of role uncertainty significantly differ from decision uncertainty; ties between players were fewer, rendering networks less concentrated and connected.

In this thesis, professional role uncertainty was conceptualised to include situations of self-doubt in professional competency, for example: *Am I doing this right*? Hence, it is plausible that admission to such professional incompetency may act as a barrier to collaboration in the face of such uncertainties. Unlike decision uncertainty that is normalised through regular discussion in team meetings, role uncertainty is less familiar, which may inhibit advice-seeking and collaboration in the face of such situations. Given the consistency in research attributing positive patient outcomes to interdisciplinary collaboration,[15] it is vital that when navigating uncertainties encapsulated in professional role, the expertise and skills of the many are employed. This is particularly relevant in MHC given the complexity of comorbid, chronic cases, which may necessitate treatment by a myriad of professionals, resulting in blurred professional boundaries. Thus, the improvement of cohesive interdisciplinary collaboration during uncertainties of role is an area of intervention for future research endeavours. Future research should also explore the relationship between cohesive networks of decision uncertainty, routine work, and client and staff outcomes in order to determine the efficacy of such interdisciplinary collaborative patterns.

8.3.3. Heterogeneous headspace centres

In support of Hypothesis 1.2, results revealed that headspace Centre B was more dense, well-connected and prepared to face uncertainties, compared to Centre A. Thus, consistent with past headspace research, this study confirms that there is heterogeneity between headspace centres.[90] All three Centre B networks had higher density scores than their comparable Centre A networks. Networks of high density represent cohesiveness, and thus are indicative of good coordination of activity among the actors.[141] These findings of network parameters suggest the importance of context and history, that headspace centres are more cohesive when they have been operating for longer, as Centre B had more experience over Centre A. The higher connectedness between the players of Centre B, was expected given that relationships between the players have existed for longer, resulting in a more dense network.[92,169] This is further confirmed with the network degree scores representing connectedness on the individual player level. Centre B appears to have lower interaction on the player level (See Figures 7.4 and 7.5 for network degree); this implies that individual players in Centre B are personally connected to fewer contacts than in Centre A, while maintaining higher density scores of cohesion. Therefore, consistent with past research,[90] this study highlights that despite the governing operationalisation of headspace, individual centres are heterogeneous. Headspace centres are relatively autonomous, allowing for each system (headspace centre) to emerge and evolve to the relevant needs of their staff, local clients and community.

8.4. Implications & unique contributions

This research project is, to our knowledge, the first of its kind to explore professional uncertainties experienced in MHC and examine collaborative patterns based on those uncertainties. Related research has either focused on collaboration around routine work,[11] or understanding specific situations of professional uncertainty,[50] yet no study has brought these concepts together. The project puts forth a consolidated definition and conceptualisation of professional uncertainty that can be used to better define, shape and integrate research on uncertainty in health care.

The research project also makes a unique contribution to MHC research by approaching the topic with a complexity science lens, a recent endeavour in the mental health literature.[23] Complexity science acknowledges the interrelated and evolving nature of actors (headspace staff), thus by using a method that acknowledges characteristics of a CAS (SNA),[154] the present project was able to capture the interactivity and interprofessional nature of collaborative care models. Hence, as complexity science suggests, rather than focusing only on individual responses, an examination of patterns of interaction during times of uncertainty is more

important in terms of understanding the functioning of a system, such as that which delivers MHC; this is a premise that has guided the research in this thesis.

Lastly, this project is unique in that, thus far, no SNA has been conducted in headspace centres, rendering the findings of this project directly applicable and relevant to headspace centres all over Australia. While we acknowledge that there is heterogeneous activity between headspace centres,[90] all centres strive for collaborative care in order to promote and facilitate youth mental health in Australia.[18] The efficacy of such collaborative care has been called into question given the minimal improvements in headspace client outcomes.[30] Thus, the present research project provides evidence to the interprofessional functioning within headspace and also highlights areas for improvement. For example, collaboration is cohesive and inclusive of a myriad of professionals during routine and familiar work of making a decision in the face of uncertainty. However, when headspace staff are faced with situations of professional role uncertainty, regular cohesive collaboration may breakdown.

8.5. Strengths & limitations

The limitation of the research project lies in the response rate and generalisability of the information obtained from the two headspace centres. Given the novelty of this methodology (SNA), there remains no consensus as to what constitutes a valid response rate. Adequacy of response rate is typically justified dependent upon the nature of the analysis, the inclusion of key players, and the nature of the ties. The response rate of the present research project (average 45%) was addressed through symmetrisation and the use of proxy data to deal with non-respondents and maximise the representation of data. However, results remain limited to the representation of the whole network by the 24 respondents (See Chapter 6 for limitations of SNA methodology). Further, the specificity of SNA research limits the generalisability of findings. While this research project provides helpful insights into the collaborative patterns and uncertainties encountered by professionals working in MHC, collaboration may be specific to protocol and job roles of these specific headspace centres. However, these results have relevance to many similar networks of integrated MHC delivery.

While we have debated what may constitute interdisciplinary collaboration in integrated MHC delivery, thus far the literature has not specified what constitutes an ideal network structure in terms of delivery of interprofessional care. For example, while it is expected that a network without isolates and high density is desirable, the most effective degree of interactivity is unclear. This is because of the time intensive data collection and ethical hurdles that are inherent in SNA, which render this methodology challenging. Further, even when SNA is computed successfully the findings are not widely applicable to all networks of

interprofessional collaboration; the different types of network structures are better suited for different types of interdisciplinary endeavour.[170] This may be due to the fact that there remains a lack of a distinct and cohesive language to describe networks and collaborative patterns.[19] While we cannot be certain that the degree of interprofessional collaboration observed in this research project is sufficient, consistent with previous longitudinal SNA research in health,[157,171] this baseline data should be used to track changes in these network structures at a later point in time. Thus, a notable strength of the present research project was the collection of quantitative data on both uncertainties and collaboration in MHC that can be treated as baseline to assess the changes in collaboration over time and compare the effectiveness of future interventions.

An additional strength of the present research project is the mixed-methods approach of combining qualitative interviews with quantitative SNA. By combining qualitative data to understand the quantitative SNA, contextual processes are acknowledged and networks recognised in natural "real world" settings.[147] It is important to recognise the naturally occurring characteristics of a CAS (headspace),[172] in order to locate an agenda for change. Thus, the qualitative interviews in the present research project integrate social and contextual features to the SNA, that would otherwise be absent from the dominant quantitative approach.[147] However, while the qualitative component aided in providing contextual underpinnings to strict quantitative SNA, future research should endeavour to add to the mixed-method methodology by pursuing egonet research.[173] Egonet research refers to a combination of qualitative interviews and SNA, whereby the interviews are designed to be informative of the relational data extracted from the SNA survey.[173] For example, directly asking with whom collaboration occurs in interviews. Qualitative relationship data supporting SNA, such as interviews[173] or observations,[147] would be advantageous in exploring the multiplicity of complex relationships,[173] particularly in integrated MHC models such as headspace.

8.6. Conclusion

Professional uncertainty is a ubiquitous and dynamic presence across health care,[8] and the present research project confirms the ubiquity of this phenomenon in the context of MHC. While professional uncertainty is not unfamiliar to the health care literature, there remains no consensus on a definition and conceptualisation of this phenomenon.[2] This thesis addressed the gap by proposing a definition and employing two literature reviews and a sequential, mixed-methods design to explore (1) the types and situations of uncertainty experienced by professionals working in MHC, and (2) investigate how collaboration varies dependent upon different uncertainties. The research project employed a complexity science perspective of

collaboration, uncertainty and MHC, in order to acknowledge the interactivity and dynamism of the MHC system.

Qualitative and subsequent quantitative analysis revealed that professionals working in MHC encounter uncertainties regarding: decision, professional role, and external factors. Uncertainty related to external factors (e.g., the outcome of a client based on their own behaviour) was deemed uncontrollable and not suitably addressed with collaborative efforts. Thus, the collaborative patterns of decision and role uncertainty were explored with SNA. Social networking parameters and network visualisation of sociograms revealed that collaboration occurred across professional bounds (interprofessional), maintaining a tendency away from sub-group cohesion. In general, networks were well-connected when collaborating in routine work and during times of professional decision uncertainty, however, networks differed substantially in the face of role uncertainty. Future research must endeavour to further understand uncertainties surrounding professional role, and develop interventions to navigate the challenges brought about by the lack of clarity about one's role and responsibilities.

By emphasising the strengths and limitations of this research project, guidance was provided for future research by highlighting the need to ensure a whole-network response and investigate further the present findings in relation to client and staff outcomes in order to be able to assess the efficacy of, and satisfaction within, networks. The research project has practical implications for national and organisational strategies for MHC to incorporate non-clinical (administration, managerial) staff, as well as clinical staff, and to provide guidance on facilitating interprofessional collaboration beyond the co-location of professionals. The feedback provided to the centres and staff will encourage collaboration in situations of role uncertainty and provide a consolidated conceptualisation to normalise and navigate uncertainties.

REFERENCES

1. Fox R. The Evolution of Medical Uncertainty. *Milbank Mem Fund Q Health Soc.* 1980;58(1):1-49.
2. Han P, Klein W, Arora N. Varieties of Uncertainty in Health Care: A Conceptual Taxonomy. *Med Decis Making.* 2011;31(6):828-838.
3. Rafalovich A. Exploring Clinician Uncertainty in the Diagnosis and Treatment of Attention Deficit Hyperactivity Disorder. *Sociol Health Illn.* 2005;27(3):305-323.
4. Williams A, Sibbald B. Changing Roles and Identities in Primary Health Care: Exploring a Culture of Uncertainty. *J Adv Nurs.* 1999;29(3):737-745.
5. Oishi A, Murtagh F. The Challenges of Uncertainty and Interprofessional Collaboration in Palliative Care for Non-Cancer Patients in the Community: A Systematic Review of Views from Patients, Carers and Health-Care Professionals. *Palliat Med.* 2014;28(9):1081-1098.
6. Gordon G, Joos S, Byrne J. Physician Expressions of Uncertainty During Patient Encounters. *Patient Educ Couns.* 2000;40(1):59-65.
7. Mann S, Cowburn J. Emotional Labour and Stress within Mental Health Nursing. *J Psychiatr Ment Health Nurs.* 2005;12(2):154-162.
8. Penrod J. Refinement of the Concept of Uncertainty. *J Adv Nurs.* 2001;34(2):238-245.
9. Bell JS, Aslani P, McLachlan AJ, Whitehead P, Chen TF. Mental Health Case Conferences in Primary Care: Content and Treatment Decision Making. *Res Social Adm Pharm.* 2007;3(1):86-103.
10. World Health Organisation. *Framework for Action on Interprofessional Education and Collaborative Practice.* Geneva, Switzerland WHO;2010.
11. Barnett T, Hoang H, Cross M, Bridgman H. Interprofessional Practice and Learning in a Youth Mental Health Service: A Case Study Using Network Analysis. *J Interprof Care.* 2015;29(5):512-514.
12. Archer J, Bower P, Gilbody S, et al. Collaborative Care for Depression and Anxiety Problems. *Cochrane Db Syst Rev.* 2012;10(1):1-229.
13. Bae S, Nikolaev A, Seo J, Castner J. Health Care Provider Social Network Analysis: A Systematic Review. *Nurs Outlook.* 2015;63(5):566-584.
14. Grumbach K, Bodenheimer T. Can Health Care Teams Improve Primary Care Practice? *Jama-J Am Med Assoc.* 2004;291(10):1246-1251.
15. Zwarenstein M, Goldman J, Reeves S. Interprofessional Collaboration: Effects of Practice-Based Interventions on Professional Practice and Healthcare Outcomes. *Cochrane Db Syst Rev.* 2009;1(3):1-31.
16. Leykum L, Lanham H, Pugh J, et al. Manifestations and Implications of Uncertainty for Improving Healthcare Systems: An Analysis of Observational and Interventional Studies Grounded in Complexity Science. *Implement Sci.* 2014;9(1):165.
17. Spencer J, Woodroffe J, Cross M, Allen P. "A Golden Opportunity": Exploring Interprofessional Learning and Practice in Rural Clinical Settings. *J Interprof Care.* 2015;29(4):389-391.
18. Hickie IB, McGorry PD. Increased Access to Evidence-Based Primary Mental Health Care: Will the Implementation Match the Rhetoric? *Med J Aust.* 2007;187(2):100.
19. Mandell M, Keast R, Chamberlain D. Collaborative Networks and the Need for a New Management Language. *Public Manag Rev.* 2017;19(3):326-341.
20. Gore FM, Bloem PJ, Patton GC, et al. Global Burden of Disease in Young People Aged 10–24 Years: A Systematic Analysis. *Lancet.* 2011;377(9783):2093-2102.
21. Patel V, Flisher AJ, Hetrick S, McGorry P. Mental Health of Young People: A Global Public-Health Challenge. *Lancet.* 2007;369(9569):1302-1313.

22. Kirk SA, Kutchins H. *The Selling of Dsm: The Rhetoric of Science in Psychiatry.* Transaction Publishers; 1992.
23. Ellis LA, Churruca K, Braithwaite J. Mental Health Services Conceptualised as Complex Adaptive Systems: What Can Be Learned? *Int J Ment Health Syst.* 2017;11(1):43.
24. Swanson J. Preventing the Unpredicted: Managing Violence Risk in Mental Health Care. *Psychiatr Serv.* 2008;59(2):191-193.
25. Rosenberg S, Hickie I. Managing Madness: Mental Health and Complexity in Public Policy. *Evid Base.* 2013;3:1-19.
26. Gilbody S, Bower P, Fletcher J, Richards D, Sutton AJ. Collaborative Care for Depression: A Cumulative Meta-Analysis and Review of Longer-Term Outcomes. *Arch Intern Med.* 2006;166(21):2314-2321.
27. Hickie IB, Davenport TA, Scott EM, Hadzi-Pavlovic D, Naismith SL, Koschera A. Unmet Need for Recognition of Common Mental Disorders in Australian General Practice. *Med J Aust.* 2001;175(2 Suppl):S18-24.
28. McGorry PD, Purcell R, Hickie IB, Jorm AF. Investing in Youth Mental Health Is a Best Buy. *Med J Aust.* 2007;187(7):S5.
29. Muir K, McDermott S, Gendera S, Flaxman S, Patulny R, Sitek T. *Independent Evaluation of Headspace: The National Youth Mental Health Foundation: Interim Evaluation Report.* Sydney: Social Policy Reseach Centre UNSW; 2009.
30. Hilferty F, Cassells R, Muir K, et al. *Is Headspace Making a Difference to Young People's Lives? Final Report of the Independent Evaluation of the Headspace Program.* 2015.
31. Rickwood DJ, Mazzer KR, Telford NR, Parker AG, Tanti CJ, McGorry PD. Changes in Psychological Distress and Psychosocial Functioning in Young People Visiting Headspace Centres for Mental Health Problems. *Med J Aust.* 2015;202(10):537-542.
32. McDaniel RR, Driebe D. *Uncertainty and Surprise in Complex Systems: Questions on Working with the Unexpected.* Springer Science & Business Media; 2005.
33. Luke DA, Stamatakis KA. Systems Science Methods in Public Health: Dynamics, Networks, and Agents. *Annu Rev Public Health.* 2012;33(1):357-376.
34. McDaniel R, Driebe D. Complexity Science and Health Care Management. *Adv Health Care Manag.* 2001;2(1):11-36.
35. Plsek P, Greenhalgh T. Complexity Science: The Challenge of Complexity in Health Care. *BMJ.* 2001;323(7313):625-628.
36. Briggs DS. So They Want Us to Collaborate and Innovate: How Do We Manage That? *Asia Pac J Public Health.* 2013;8(1):4-6.
37. Creswell JW. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches.* Sage publications; 2013.
38. Begun J, Kaissi A. Uncertainty in Health Care Environments: Myth or Reality? *Health Care Manage R.* 2004;29(1):31-39.
39. Arksey H, O'Malley L. Scoping Studies: Towards a Methodological Framework. *Int J Soc Res Methodol.* 2005;8(1):19-32.
40. *Endnote X8* [computer program]. Version X8. Philadelphia 2016.
41. Politi M, Han P, Col N. Communicating the Uncertainty of Harms and Benefits of Medical Interventions. *Med Decis Making.* 2007;27(5):681-695.
42. Arsksey H, O'Malley L. Scoping Studies: Towards a Methodological Framework. *Int J Soc Res Methodol.* 2005;8(1):19-32.
43. Newell R, Burnard P. *A Pragmatic Approach to Qualitative Data Analysis.* Hoboken, NJ: Wiley-Blackwell; 2010.

44. Braun V, Clarke V. Using Thematic Analysis in Psychology. *Qual Res Psychol.* 2006;3(2):77-101.
45. Moher D, Liberati A, Tetzlaff J, Altman D. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The Prisma Statement. *Int J Surg.* 2010;8(5):336-341.
46. Cranley L, Doran D, Tourangeau A, Kushniruk A, Nagle L. Nurses' Uncertainty in Decision-Making: A Literature Review. *Worldviews Evid Based Nurs.* 2009;6(1):3-15.
47. Vaismoradi M, Salsali M, Ahmadi F. Nurses' Experiences of Uncertainty in Clinical Practice: A Descriptive Study. *J Adv Nurs.* 2011;67(5):991-999.
48. Mayor E, Bangerter A, Aribot M. Task Uncertainty and Communication During Nursing Shift Handovers. 2012;68(9):1956-1966.
49. Lu C. Uncertainties in Real-World Decisions on Medical Technologies. *Int J Clin Pract.* 2014;68(8):936-940.
50. Lloyd K, Cella M, Tanenblatt M, Coden A. Analysis of Clinical Uncertainties by Health Professionals and Patients: An Example from Mental Health. *BMC Med Inform Decis Mak.* 2009;9(1):34.
51. Ledford C, Cafferty L, Seehusen D. Socializing Identity through Practice: A Mixed Methods Approach to Family Medicine Resident Perspectives on Uncertainty. *Fam Med.* 2015;47(7):549-553.
52. Tyreman S. Trust and Truth: Uncertainty in Health Care Practice. *J Eval Clin Pract.* 2015;21(3):470-478.
53. Buetow S. The Virtue of Uncertainty in Health Care. *J Eval Clin Pract.* 2011;17(5):873-876.
54. Thomas R, Hammond C, Bodger O, Rees M, Smith P. Identifying and Prioritising Epilepsy Treatment Uncertainties. *J Neurol Neurosurg Psychiatry.* 2010;81(8):918-921.
55. Tai-Seale M, Stults C, Zhang W, Shumway M. Expressing Uncertainty in Clinical Interactions between Physicians and Older Patients: What Matters? *Patient Educ Couns.* 2012;86(3):322-328.
56. Seely A. Embracing the Certainty of Uncertainty: Implications for Health Care and Research. *Perspect Biol Med.* 2013;56(1):65-77.
57. Schoonhoven C, Richard Scott W, Flood A, Forrest W. Measuring the Complexity and Uncertainty of Surgery and Postsurgical Care. *Med Care.* 1980;18(9):893-915.
58. Whaley L, Businger A, Dempsey P, Linder J. Visit Complexity, Diagnostic Uncertainty, and Antibiotic Prescribing for Acute Cough in Primary Care: A Retrospective Study. *BMC Fam Pract.* 2013;14(1):120.
59. Von Wild K, Terwey S. Diagnostic Confusion in Mild Traumatic Brain Injury (Mtbi). Lessons from Clinical Practice and Efns - Inquiry. *Brain Inj.* 2001;15(3):273-277.
60. Slade S, Molloy E, Keating J. The Dilemma of Diagnostic Uncertainty When Treating People with Chronic Low Back Pain: A Qualitative Study. *Clin Rehabil.* 2012;26(6):558-569.
61. Wagemans A, van Schrojenstein Lantman-de Valk H, Proot IM, et al. Do-Not-Attempt-Resuscitation Orders for People with Intellectual Disabilities: Dilemmas and Uncertainties for Id Physicians and Trainees. The Importance of the Deliberation Process. *J Intellect Disabil Res.* 2017;61(3):245-254.
62. Rapport F, Jerzembek G, Doel M, Jones A, Cella M, Lloyd K. Narrating Uncertainties About Treatment of Mental Health Conditions. *Soc Psychiatry Psychiatr Epidemiol.* 2010;45(3):371-379.
63. Vermeulen E. Dealing with Doubt: Making Decisions in a Neonatal Ward in the Netherlands. *Soc Sci Med.* 2004;59(10):2071-2085.

64. Bassett AM, Baker C. Normal or Abnormal? 'Normative Uncertainty' in Psychiatric Practice. *J Med Humanit.* 2015;36(2):89-111.
65. Udlis K, Mancuso J. Perceptions of the Role of the Doctor of Nursing Practice-Prepared Nurse: Clarity or Confusion. *J Prof Nurs.* 2015;31(4):274-283.
66. Stilos K, Moura S, Flint F. Building Comfort with Ambiguity in Nursing Practice. *Clin J Oncol Nurs.* 2007;11(2):259-263.
67. Tunc T, Kutanis R. Role Conflict, Role Ambiguity, and Burnout in Nurses and Physicians at a University Hospital in Turkey. *Nurs Health Sci.* 2009;11(4):410-416.
68. Tingle J. Expanded Role of the Nurse: Accountability Confusion. *Br J Nurs.* 1997;6(17):1011-1013.
69. Yoshie S, Saito T, Takahashi M, Kai I. Effect of Work Environment on Care Managers' Role Ambiguity: An Exploratory Study in Japan. *Care Manag J.* 2008;9(3):113-121.
70. Payne C, Farrell K. Balancing Ethical Uncertainty: The Dance of Interprofessional Roles. 2015;93(4):77-83.
71. Nelson W. Ethical Uncertainty and Staff Stress. Moral Distress Has Negative Consequences for Healthcare Organizations. *Healthc Exec.* 2009;24(4):38-39.
72. Beresford E. Uncertainty and the Shaping of Medical Decisions. *Hastings Cent Rep.* 1991;21(4):6-11.
73. Spafford M, Schryer C, Lingard L, Hrynchak P. What Healthcare Students Do with What They Don't Know: The Socializing Power of 'Uncertainty' in the Case Presentation. *Commun Med.* 2006;3(1):81-92.
74. Kirkegaard P, Risor M, Edwards A, Junge A, Thomsen J. Speaking of Risk, Managing Uncertainty: Decision-Making About Cholesterol-Reducing Treatment in General Practice. *Qual Prim Care.* 2012;20(4):245-252.
75. Kai J, Beavan J, Faull C, Dodson L, Gill P, Beighton A. Professional Uncertainty and Disempowerment Responding to Ethnic Diversity in Health Care: A Qualitative Study. *PLoS Med.* 2007;4(11):1766-1775.
76. French B. Uncertainty and Information Need in Nursing. *Nurse Educ Today.* 2006;26(3):245-252.
77. Hamui-Sutton A, Vives-Varela T, Gutierrez-Barreto S, Leenen I, Sanchez-Mendiola M. A Typology of Uncertainty Derived from an Analysis of Critical Incidents in Medical Residents: A Mixed Methods Study. *BMC Med Educ.* 2015;15(1):198.
78. Farnan J, Johnson J, Meltzer D, Humphrey H, Arora V. Resident Uncertainty in Clinical Decision Making and Impact on Patient Care: A Qualitative Study. *Qual Saf Health Care.* 2008;17(2):122-126.
79. Schneider A, Wübken M, Linde K, Bühner M. Communicating and Dealing with Uncertainty in General Practice: The Association with Neuroticism. *PLoS ONE.* 2014;9(7):e102780.
80. Pickles K, Carter S, Rychetnik L, McCaffery K, Entwistle V. General Practitioners' Experiences of, and Responses to, Uncertainty in Prostate Cancer Screening: Insights from a Qualitative Study. *PLoS ONE.* 2016;11(4):e0153299.
81. Lane J, Tsang S. Uncertainty in the Economics of Medical Decisions. *Singap Econ Rev.* 2008;53(1):81-101.
82. McGorry P, Tanti C, Stokes R, et al. Headspace: Australia's National Youth Mental Health Foundation - Where Young Minds Come First. *Med J Aust.* 2007;187(7):68-S70.
83. Australian Bureau of Statistics. Regional Data Summary. 2017.
84. Pope C, Ziebland S, Mays N. Qualitative Research in Health Care. Analysing Qualitative Data. *BMJ.* 2000;320(7227):114-116.

85. *Nvivo Qualitative Data Analysis* [computer program]. Version 11: QSR International Pty Ltd; 2015.
86. Daley B. Using Concept Maps in Qualitative Research. International Conference on Concept Mapping; 2004; Pamplona, Spain.
87. Patton MQ. Enhancing the Quality and Credibility of Qualitative Analysis. *Health Serv Res.* 1999;34(5 Pt 2):1189-1208.
88. Rosen M. Coming to Terms with the Field - Understanding and Doing Organizational Ethnography. *J Manage Stud.* 1991;28(1):1-24.
89. Tong A, Sainsbury P, Craig J. Consolidated Criteria for Reporting Qualitative Research (Coreq): A 32-Item Checklist for Interviews and Focus Groups. *Int J Qual Health Care.* 2007;19(6):349-357.
90. Rickwood D, Van Dyke N, Telford N. Innovation in Youth Mental Health Services in Australia: Common Characteristics across the First Headspace Centres. *Early Interv Psychiatry.* 2015;9(1):29-37.
91. Bower P, Jerrim S, Gask L. Primary Care Mental Health Workers: Role Expectations, Conflict and Ambiguity. *Health Soc Care Community.* 2004;12(4):336-345.
92. Barrera D, van de Bunt G. Learning to Trust: Networks Effects through Time. *Eur Sociol Rev.* 2009;25(6):709-721.
93. Heiligers P, de Jong J, Groenewegen P, Hingstman L, Völker B, Spreeuwenberg P. Is Networking Different with Doctors Working Part-Time? Differences in Social Networks of Part-Time and Full-Time Doctors. *BMC Health Serv Res.* 2008;8(1):204.
94. Tagliaventi M, Mattarelli E. The Role of Networks of Practice, Value Sharing, and Operational Proximity in Knowledge Flows between Professional Groups. *Hum Relat.* 2006;59(3):291-319.
95. Braithwaite J, Westbrook M, Nugus P, et al. A Four-Year, Systems-Wide Intervention Promoting Interprofessional Collaboration. *Bmc Health Serv Res.* 2012;12.
96. Fewster-Thuente L, Velsor-Friedrich B. Interdisciplinary Collaboration for Healthcare Professionals. *Nurs Adm Q.* 2008;32(1):40-48.
97. Creswick N, Westbrook J. Social Network Analysis of Medication Advice-Seeking Interactions among Staff in an Australian Hospital. *Int J Med Inf.* 2010;79(6):116-125.
98. Carroll C, Booth A, Leaviss J, Rick J. "Best Fit" Framework Synthesis: Refining the Method. *BMC Med Res Methodol.* 2013;13(1):37.
99. Hawker S, Payne S, Kerr C, Hardey M, Powell J. Appraising the Evidence: Reviewing Disparate Data Systematically. 2002;12(9):1284-1299.
100. Bishop FL, Dima AL, Ngui J, et al. "Lovely Pie in the Sky Plans": A Qualitative Study of Clinicians' Perspectives on Guidelines for Managing Low Back Pain in Primary Care in England. *Spine (Phila Pa 1976).* 2015;40(23):1842-1850.
101. Long J, Luckraz H, Thekkudan J, Maher A, Norell M. Heart Team Discussion in Managing Patients with Coronary Artery Disease: Outcome and Reproducibility. *Interact Cardiovasc Thorac Surg.* 2012;14(5):594-598.
102. Lamb BW, Sevdalis N, Mostafid H, Vincent C, Green JSA. Quality Improvement in Multidisciplinary Cancer Teams: An Investigation of Teamwork and Clinical Decision-Making and Cross-Validation of Assessments. *Ann Surg Oncol.* 2011;18(13):3535-3543.
103. Macintosh M, Goodacre S, Carter A. Organisational Influences on the Activity of Chest Pain Units During the Escape Trial: A Case Study. *Emerg Med J.* 2010;27(9):672-676.
104. Edens MJ, Eyler FD, Wagner JT, Eitzman DV. Neonatal Ethics: Development of a Consultative Group. *Pediatrics.* 1990;86(6):944-949.

105. Bijma HH, Van Der Heide A, Wildschut HIJ, Van Der Maas PJ, Wladimiroff JW. Impact of Decision-Making in a Multidisciplinary Perinatal Team. *Prenat Diagn.* 2007;27(2):97-103.
106. Arnaert A, Wainwright M. Providing Care and Sharing Expertise: Reflections of Nurse-Specialists in Palliative Home Care. *Palliat Support Care.* 2009;7(3):357-364.
107. Aldous K, Tolmie R, Worrall L, Ferguson A. Speech-Language Pathologists' Contribution to the Assessment of Decision-Making Capacity in Aphasia: A Survey of Common Practices. *Int J Speech Lang Pathol.* 2014;16(3):231-241.
108. Silén M, Tang PF, Wadensten B, Ahlström G. Workplace Distress and Ethical Dilemmas in Neuroscience Nursing. *Can J Neurosci Nurs.* 2008;40(4):222-231.
109. McClain MR, Cooley WC, Keirns T, Smith A. A Survey of the Preferences of Primary Care Physicians Regarding the Comanagement with Specialists of Children with Rare or Complex Conditions. *Clin Pediatr (Phila).* 2014;53(6):566-570.
110. Bokhour BG. Communication in Interdisciplinary Team Meetings: What Are We Talking About? *J Interprof Care.* 2006;20(4):349-363.
111. Ankem K. Influence of Information Sources on the Adoption of Uterine Fibroid Embolization by Interventional Radiologists. *J Med Libr Assoc.* 2003;91(4):450-459.
112. Porter SAT, Grey WL. Ethical Dilemmas Confronting Dentists in Queensland, Australia. *Aust Dent J.* 2002;47(3):241-248.
113. Arbabi M, Laghayeepoor R, Golestan B, et al. Diagnoses, Requests and Timing of 503 Psychiatric Consultations in Two General Hospitals. *Acta Med Iran.* 2012;50(1):53-60.
114. Chew-Graham C, Slade M, Montana C, Stewart M, Gask L. A Qualitative Study of Referral to Community Mental Health Teams in the Uk: Exploring the Rhetoric and the Reality. *BMC Health Serv Res.* 2007;7(1):117.
115. Verdoux H, Cougnard A, Grolleau S, Besson R, Delcroix F. How Do General Practitioners Manage Subjects with Early Schizophrenia and Collaborate with Mental Health Professionals?: A Postal Survey in South-Western France. *Soc Psychiatry Psychiatr Epidemiol.* 2005;40(11):892-898.
116. Asad S, Chreim S. Peer Support Providers' Role Experiences on Interprofessional Mental Health Care Teams: A Qualitative Study. *Community Ment Health J.* 2016;52(7):767-774.
117. Blomqvist S, Engstrom I. Interprofessional Psychiatric Teams: Is Multidimensionality Evident in Treatment Conferences? *J Interprof Care.* 2012;26(4):289-296.
118. Cook G, Gerrish K, Clarke C. Decision-Making in Teams: Issues Arising from Two Uk Evaluations. *J Interprof Care.* 2001;15(2):141-152.
119. Simpson A, Bowers L, Alexander J, Ridley C, Warren J. Occupational Therapy and Multidisciplinary Working on Acute Psychiatric Wards: The Tompkins Acute Ward Study. *Br J Occup Ther.* 2005;68(12):545-552.
120. Wall S, Austin W. The Influence of Teams, Supervisors and Organizations on Healthcare Practitioners' Abilities to Practise Ethically. *Nurs Leadersh (Tor Ont).* 2008;21(4):85-99.
121. Wilberforce M, Tucker S, Abendstern M, Brand C, Giebel CM, Challis D. Membership and Management: Structures of Inter-Professional Working in Community Mental Health Teams for Older People in England. *Int Psychogeriatr.* 2013;25(9):1485-1492.
122. McRae L. Admitting Offenders with Antisocial Personality Disorder to a Medium Secure Unit: A Qualitative Examination of Multidisciplinary Team Decision-Making. *J Forens Psychiatry Psychol.* 2013;24(2):215-232.

123. Mauthner N, Naji S, Mollison J. Survey of Community Mental Health Teams. *Psychiatr Bull.* 1998;22(12):733-739.
124. Lockhart C. Collaboration and Referral Practices of General Practitioners and Community Mental Health Workers in Rural and Remote Australia. *Aust J Rural Health.* 2006;14(1):29-32.
125. Chew-Graham C, Slade M, Montâna C, Stewart M, Gask L. Loss of Doctor-to-Doctor Communication: Lessons from the Reconfiguration of Mental Health Services in England. *J Health Serv Res Policy.* 2008;13(1):6-12.
126. Fisler M, Quante A. Psychiatric Liaison Consultations of Patients without Psychiatric Illness in a General Hospital in Germany: A Retrospective Analysis. *Wien Med Wochenschr.* 2015;165(21-22):436-444.
127. Grafham E, Matheson C, Bond CM. Specialist Drug Misuse Nurse's Motivation, Clinical Decision-Making and Professional Communication: An Exploratory Study. *J Psychiatr Ment Health Nurs.* 2004;11(6):690-697.
128. Ellingson LL. Communication, Collaboration, and Teamwork among Health Care Professionals. *Commun Res.* 2002;21(3):1-43.
129. Braithwaite J, Clay-Williams R, Vecellio E, et al. The Basis of Clinical Tribalism, Hierarchy and Stereotyping: A Laboratory-Controlled Teamwork Experiment. *BMJ Open.* 2016;6(7):e012467.
130. Blanchet K, James P. The Role of Social Networks in the Governance of Health Systems: The Case of Eye Care Systems in Ghana. *Health Policy Plan.* 2013;28(2):143-156.
131. Long J, Cunningham F, Carswell P, Braithwaite J. Who Are the Key Players in a New Translational Research Network? *BMC Health Serv Res.* 2013;13(1):338.
132. Shoham DA, Mundt MP, Gamelli RL, McGaghie WC. The Social Network of a Burn Unit Team. *J Burn Care Res.* 2015;36(5):551-557.
133. Zheng K, Padman R, Krackhardt D, Johnson M, Diamond H. Social Networks and Physician Adoption of Electronic Health Records: Insights from an Empirical Study. *J Am Med Inform Assoc.* 2010;17(3):328-336.
134. Chan B, Reeve E, Matthews S, et al. Medicine Information Exchange Networks among Healthcare Professionals and Prescribing in Geriatric Medicine Wards. *Brit J Clin Pharmaco.* 2017;83(6):1185-1196.
135. Scott J. *Social Network Analysis.* London, United Kingdom: Sage; 2012.
136. Kossinets G. Effects of Missing Data in Social Networks. *Soc Networks.* 2006;28(3):247-268.
137. Long J, Cunningham F, Braithwaite J. Network Structure and the Role of Key Players in a Translational Cancer Research Network: A Study Protocol. *BMJ Open.* 2012;2(3):e001434.
138. Keating N, Ayanian J, Cleary P, Marsden P. Factors Affecting Influential Discussions among Physicians: A Social Network Analysis of a Primary Care Practice. *J Gen Intern Med.* 2007;22(6):794-798.
139. West E, Barron D. Social and Geographical Boundaries around Senior Nurse and Physician Leaders: An Application of Social Network Analysis. *Can J Nurs Res.* 2005;37(3):132-148.
140. *Qualtrics* [computer program]. Provo, Utah, USA2005.
141. Hawe P, Webster C, Shiell A. A Glossary of Terms for Navigating the Field of Social Network Analysis. *J Epidemiol Community Health.* 2004;58(12):971-975.
142. *Ibm Spss Statistics for Macintosh, Version 23.0* [computer program]. IBM Corp Armonk, NY; 2012.

143. Borgatti SP, Everett MG, Freeman LC. *Ucinet for Windows: Software for Social Network Analysis.* Boston: Analytic Technologies; 2002.
144. Borgatti SP. *Netdraw: Network Visualization Software.* Boston: Analytic Technologies; 2002.
145. Luke DA, Harris JK. Network Analysis in Public Health: History, Methods, and Applications. *Annu Rev Public Health.* 2007;28:69-93.
146. Borgatti S, Mehra A, Brass D, Labianca G. Network Analysis in the Social Sciences. *Science.* 2009;323(5916):892-895.
147. Bishop S, Waring J. Discovering Healthcare Professional-Practice Networks: The Added Value of Qualitative Sna. 2012;7(3):308-322.
148. D'Amour D, Ferrada-Videla M, San Martin Rodriguez L, Beaulieu M. The Conceptual Basis for Interprofessional Collaboration: Core Concepts and Theoretical Frameworks. *J Interprof Care.* 2005;19(Sup1):116-131.
149. Wasserman S, Faust K. *Social Network Analysis: Methods and Applications.* Cambridge, United Kingdom: Cambrdge University Press; 1994.
150. Dunn AG, Westbrook JI. Interpreting Social Network Metrics in Healthcare Organisations: A Review and Guide to Validating Small Networks. *Soc Sci Med.* 2011;72(7):1064-1068.
151. Braithwaite J. Bridging Gaps to Promote Networked Care between Teams and Groups in Health Delivery Systems: A Systematic Review of Non-Health Literature. *BMJ Open.* 2015;5(9):e006567.
152. Borgatti S. Centrality and Network Flow. *Soc Networks.* 2005;27(1):55-71.
153. Creswick N, Westbrook JI. The Medication Advice-Seeking Network of Staff in an Australian Hospital Renal Ward. *Stud Health Technol Inform.* 2007;130:217-231.
154. Peters DH. The Application of Systems Thinking in Health: Why Use Systems Thinking? *Health Res Policy Syst.* 2014;12(1):51.
155. Cunningham F, Ranmuthugala G, Plumb J, Georgiou A, Westbrook J, Braithwaite J. Health Professional Networks as a Vector for Improving Healthcare Quality and Safety: A Systematic Review. *BMJ Qual Saf.* 2012;21(3):239-249.
156. Chambers D, Wilson P, Thompson C, Harden M. Social Network Analysis in Healthcare Settings: A Systematic Scoping Review. *PLoS One.* 2012;7(8):41911.
157. Haines VA, Godley J, Hawe P. Understanding Interdisciplinary Collaborations as Social Networks. *Am J Community Psychol.* 2011;47(1-2):1-11.
158. Baranowski T. Validity and Reliability of Self Report Measures of Physical Activity: An Information-Processing Perspective. *Res Q Exerc Sport.* 1988;59(4):314-327.
159. Podsakoff P, Organ D. Self-Reports in Organizational Research: Problems and Prospects. *J Manag.* 1986;12(4):531-544.
160. Van Beek A, Wagner C, Spreeuwenberg P, Frijters D, Ribbe M, Groenewegen P. Communication, Advice Exchange and Job Satisfaction of Nursing Staff: A Social Network Analyses of 35 Long-Term Care Units. *BMC Health Serv Res.* 2011;11(1):140.
161. Hanneman RA, Riddle M. *Introduction to Social Network Methods.* Riverside: University of California; 2005.
162. Quinlan E, Robertson S. Mutual Understanding in Multi-Disciplinary Primary Health Care Teams. *J Interprof Care.* 2010;24(5):565-578.
163. Newman M. *Networks: An Introduction.* Princeton New Jersey: Princeton University Press; 2013.
164. Krackhardt D. Predicting with Networks: Nonparametric Multiple Regression Analysis of Dyadic Data. *Soc Networks.* 1988;10(4):359-381.

165. Braithwaite J. Between-Group Behaviour in Health Care: Gaps, Edges, Boundaries, Disconnections, Weak Ties, Spaces and Holes. A Systematic Review. *BMC Health Serv Res.* 2010;10(1):330.
166. Long J, Cunningham F, Carswell P, Braithwaite J. Patterns of Collaboration in Complex Networks: The Example of a Translational Research Network. *BMC Health Serv Res.* 2014;14(1):225.
167. Cott C. "We Decide, You Carry It Out": A Social Network Analysis of Multidisciplinary Long-Term Care Teams. *Soc Sci Med.* 1997;45(9):1411-1421.
168. Mascia D, Cicchetti A, Fantini M, Damiani G, Ricciardi W. Physicians' Propensity to Collaborate and Their Attitude Towards Ebm: A Cross-Sectional Study. *BMC Health Serv Res.* 2011;11(1):172.
169. Lambright K, Mischen P, Laramee C. Building Trust in Public and Nonprofit Networks Personal, Dyadic, and Third-Party Influences. *Am Rev Public Adm.* 2010;40(1):64-82.
170. Monge PR, Contractor NS. *Theories of Communication Networks.* Oxford University Press, USA; 2003.
171. Long J, Hibbert P, Braithwaite J. Structuring Successful Collaboration: A Longitudinal Social Network Analysis of a Translational Research Network. *Implement Sci.* 2016;11(1):19.
172. Braithwaite J, Runciman W, Merry A. Towards Safer, Better Healthcare: Harnessing the Natural Properties of Complex Sociotechnical Systems. 2009;18(1):37-41.
173. Chamberlain D. Social Network Building: Combining Qualitative Interviews with Egonet Analysis. Paper presented at: Proceedings of The Australian Sociological Association Conference 2006.

Appendix A of this thesis has been removed as it may contain sensitive/confidential content

Appendix B: Summary of 54 studies included in the scoping review (Chapter 2)

Title	Author, Year	Setting	Empirical *Yes or no*	Method *Qual = 0, Quant = 1, Mixed Methods = 2, Review = 3*		Definition *N = no, B = broad, S = Specific*	Professional group	Uncertainty situation, example and insight gained	*1 = personal, 2 = informational, 3 = prognostic, 4 = decisional, 5 = role*
Religion, assessment and the problem of 'normative uncertainty' for mental health student nurses: A critical incident-informed qualitative interview study	Bassett, A. M.; Baker, C.; Cross, S. 2015	Mental Health	Y	0	'critical incident' (CI)-focused ethnographic interviews + follow up focus groups	N	Mental Health nurses	• Many of the student nurse participants expressed uncertainty about when a person's religious beliefs had become pathological - this is a question that could remain unresolved • Broad themes of the clinical significance of religious-type expression and experience: (1) identifying the difference between delusions and religious belief; (2) identifying whether an experience was hallucination or religious experience; (3) the clinical implications of such challenges; and (4) applying religion-specific knowledge.	4
Uncertainty in Health Care Environments: Myth or Reality?	Begun, J. W.; Kaissi, A. A. 2004	Health care	N			B		• Uncertainty increases when complexity and dynamism increases. - the highest uncertainty is found when environments are both complex and dynamic • Argue that by specifying the environment of health care with more clarity and breaking down the walls of uncertainty, researchers	

								can contribute to improved practice.	
Uncertainty and the Shaping of Medical Decisions	Beresford, E. B. 1991	Health care	Y	0	interviews (draws on interview data from previous study) -> discursive and descriptive approach to original data	N	Physicians	Types of clinical uncertainty, includes conceptual uncertainty (the inability to apply abstract knowledge to concrete situations), technical uncertainty, the absence/paucity of scientific data or practical skill and personal uncertainty [physician-patient relationship], or the lack of previous relationship with a patient and knowledge of their care wishes	1 2 4
Primary care mental health workers: Role expectations, conflict and ambiguity	Bower, P.; Jerrim, S.; Gask, L. 2004	Primary care mental health	Y	0	case study design - interviews	N	MH clinicians, managers, workers	suggest issues of role ambiguity/conflict →The role was clear between supervisor and workers, but the expectations of other members of the role set often contained ambiguities concerning the client work to be undertaken by the new PCMHW role, which in turn reflected ambiguities as to the roles of existing professionals. (e.g., difference between role of counsellor and psychologist)	5
The virtue of uncertainty in health care	Buetow, S. 2011	Health care	N			B		Reasons for uncertainty being a virtue or positive disposition: that uncertainty is natural, promotes creativity and a critical attitude, can signify wisdom, nurtures safety, sustains hope and protects against excess. these factors show why the ability to accept uncertainty in health care is necessary and a virtue. • uncertainty can be a positive condition that productively signifies mystery, critique, possibility and agency.	
Nurses' uncertainty in	Cranley, L.; Doran, D. M.;	Nursing	N	3	Narrative Lit Review	B	Nurses	hospital nurses' decision-making processes regarding uncertainty	1 4

decision-making: A literature review	Tourangeau, A. E.; Kushniruk, A.; Nagle, L. 2009							stemmed primarily from intervention decisions (e.g., deciding to call the medical emergency team), sources of uncertainty were unfamiliarity with the patient and doubts about whether the patient met criteria	
Resident uncertainty in clinical decision-making and impact on patient care: A qualitative study	Farnan, J. M.; Johnson, J. K.; Meltzer, D. O.; Humphrey, H. J.; Arora, V. M. 2008	General medicine service	Y	0	Critical incident technique (interviews)	S	Med residents	Six categories emerged and mapped to the domains of the Beresford Model of Clinical Uncertainty: technical uncertainty (procedural skills, knowledge of indicators for procedures); conceptual uncertainty (care transitions [specifically the determination of whether patients required escalation of care (eg, transfer to the intensive care unit) or were prepared for discharge.], diagnostic decision-making and management conflict [between the resident and the attending physician's preferences for patient management]) and personal uncertainty (patient wishes and goals of care).	1 4
Uncertainty and information need in nursing	French, B. 2006	Nursing	Y	0	participant observation of three groups of nurse specialists	N	Nurse specialists	Factors contributing to uncertainty fall into three main categories: lack of available evidence, differences in interpretation or disagreement with the evidence. More than one factor can be attributed to a single issue Data extrapolated into different types of uncertainty: 1. know/accepted uncertainty (where the available research was perceived as weak - variation in practice was accepted), 2. hidden uncertainty (where participants were unaware of their experience of uncertainty, occurred	2

								in areas of low variation where practice was relatively stable and unchanging - e.g., when there is lack of time for questioning what is culturally accepted), 3. unrecognised uncertainty (ignore information available form research [problem is 'invisible' to participant], or when there's a mismatch between understanding and research), and pragmatic uncertainty (visible problem with a potential workable solution - need opportunity to uncover it)	
On the challenges of using evidence-based information: The role of clinical uncertainty	Ghosh, A. K. 2004	Health care	N			N	Physicians	medical uncertainty = scientific, EBM = when physicians' encounter situations in their practices in which the evidence derived from basic or clinical science is inconclusive. Medical uncertainty remains inherent in clinical practice and contributes to significant variability in the way physicians and patients manage medical problems.	
The nature of medical evidence and its inherent uncertainty for the clinical consultation: Qualitative study	Griffiths, F.; Green, E.; Tsouroufli, M. 2005	General and secondary practices	Y	0	analysis of audio-taped consultations	N	GP, nurse, specialist, consultant	A key emergent theme from the audiotaped consultations was uncertainty and how it is discussed between health professionals and women, particularly the uncertainty inherent in medical evidence when it is applied to particular patients	2
A typology of uncertainty derived from an analysis of	Hamui-Sutton, et al. 2015	Hospital	Y	2	critical incident report followed by a questionnaire	N	Resident physicians	Extends Beresford's concepts of types of uncertainty (technical, communication, conceptual) by adding systemic and ethical view diagram	1 2 4

critical incidents in medical residents: A mixed methods study									
Varieties of uncertainty in health care: A conceptual taxonomy	Han, P. K. J.; Klein, W. M. P.; Arora, N. K. 2011	Health care	N			B		Conceptual framework - propose a three-dimensional taxonomy that depicts uncertainty in health care according to its fundamental sources (complexity, ambiguity and probability), issues (scientific, practical and personal) and loci (patient vs. staff)	
Balancing certainty and uncertainty in clinical medicine	Hayward, R. 2006	Clinical medicine	N			N	Physicians	(1) the role of anxiety – both rational and irrational – in the provision of health care; (2) the effects of uncertainty upon the doctor–patient relationship; (3) the threat uncertainty poses to medical authority (and the assumption of infallibility that props it up); (4) the contribution of clinical uncertainty to the rising popularity of alternative therapies; and (5) the clash between the medical and the legal understanding of how certainty should be defined, particularly as it affects the paediatric community	
Ethical decision-making: Pressure and uncertainty as complicating factors	Healy, T. C. 2003	Home health care	Y	0	Interviews	N	Social workers	Social workers in home health care experience similar interprofessional conflict regarding balancing autonomy and beneficence as those noted in the literature • clinical uncertainty exacerbated ethical tensions • ethical tensions, because of pressure from other professionals and uncertainty about what to do	4
Task uncertainty and rationality	Holmberg, L. 2006	Health care	N			S	HCPs	In a problem-solving process, a choice is made about what problems to attend to	

in medical problem solving								and what action to take—and uncertainty is attached to most choices. One type of uncertainty concerns the situation itself—raising the question of whether it presents a problem at all, and if so, how to define the problem. Another type of uncertainty relates to the course of action required and the various possible outcomes. A third type of uncertainty concerns the value of the possible actions or outcomes. The perceived uncertainty diminishes as more knowledge is acquired	
Professional uncertainty and disempowerment responding to ethnic diversity in health care: A qualitative study	Kai, J.; Beavan, J.; Faull, C.; Dodson, L.; Gill, P.; Beighton, A. 2007	Oncology	Y	0	Focus groups	N	diverse (physician, nurses, allied health)	• found that, as they sought to offer appropriate care, health professionals wrestled with considerable uncertainty and apprehension in responding to the needs of patients of ethnicities different from their own. • Participants emphasised their perceived ignorance about cultural difference and were anxious about being culturally inappropriate, causing affront, or appearing discriminatory or racist. • Challenges included communication, language, and working with patients in the context of their families.	1 2
Speaking of risk, managing uncertainty: Decision-making about cholesterol-reducing	Kirkegaard, P.; Risor, M. B.; Edwards, A.; Junge, A. G.; Thomsen, J. L. 2012	General practice	Y	0	exploratory qualitative (interviews + focus groups) anvethnographically informed approach was used	S	GP	The study identified two modalities of medical uncertainty: 1. <u>epistemological uncertainty</u> about scientific knowledge and evidence-based medicine; and 2. <u>situational uncertainty</u> produced in the one-to-one	2 3

treatment in general practice								relationship between the GP and the patient during the consultation. The two modalities of uncertainty exist side-by-side, without being mutually exclusive.	
Uncertainty in the economics of medical decisions	Lane, J.; Tsang, S. 2008	Health care	N			N		(1) uncertainty pertaining to the type of the patient's disease, based on the patient's 'apparent' symptoms… to cope with this the physician performs a diagnostic test, but with this comes the second type of uncertainty; (2) (2) aetiological information is subject to error and it is not infallible (e.g., possibility of 'false positives' *the model is mathematic/an equation	
Socializing identity through practice: A mixed-methods approach to family medicine resident perspectives on uncertainty	Ledford, C. J. W.; Cafferty, L. A.; Seehusen, D. A. 2015	Primary care	Y	2	semi-structured personal interviews and longitudinal self-report surveys	B	resident physicians	Residents defined uncertainty at four levels: scientific (emerging, dynamic evidence base that informs their practice, including population based evidence of literature and clinic-based evidence of practice), systems-oriented (administrative features of scheduling and patient access), patient-oriented (relationally), and individual (knowledge gaps or inexperience in patient care.) *identity: As they described this personal identity, they also discussed uncertainty in context of their relational roles of doctor-patient, learner-teacher, and primary care-specialist.	1 2 5
Manifestations and implications of uncertainty for improving healthcare	Leykum, L. K, et a., 2014	Health care	N	3	Review	B		system-level uncertainty (this does not refer to situations where uncertainty exists solely because of lack of information, but for situations that are inherently unpredictable - system-level	3 4

systems: an analysis of observational and interventional studies grounded in complexity science								outcomes), disease-related (= pace of evolution of disease and patient control over outcomes), task-related (= standardized vs. customised, routine vs. non-routine, and interdependencies required for task completion)	
Analysis of clinical uncertainties by health professionals and patients: An example from mental health	Lloyd, K.; Cella, M.; Tanenblatt, M.; Coden, A. 2009	Mental health	Y	1	Survey	B	Schizophrenia clinicians	treatment uncertainties - clinicians (and patients) questions regarding treatment of schizophrenia are more commonly about drug therapy	4
Uncertainty in clinical practice: implications for quality and costs of health care	Logan, R. L.; Scott, P. J. 1996	Health care	N			N		• the practice of medicine is becoming increasingly complex and paradoxically, despite greater knowledge, even more uncertain. • Certainty is a delusion - only uncertainty is definite • the uncertainties inherent in medical practice are the direct result of biological variability and an enormous range of interchanges between a host of factors.	
Uncertainties in real-world decisions on medical technologies	Lu, C. Y. 2014	Health care	N			B		Key uncertainties related to medical technology = (1) clinical benefits and harms of the new technology (2) adoption and diffusion (Uncertainties around the relative effectiveness and cost-effectiveness of new technologies in routine or widespread use or against existing interventions can affect coverage decisions)	2

								• economic uncertainties - the uptake of the technology and how it might be used in clinical practice; these would affect estimates of the budget impact	
Task uncertainty and communication during nursing shift handovers	Mayor, E.; Bangerter, A.; Aribot, M. 2012	Nursing	Y	0	Interviews	S	Nurses	• unit types facing higher uncertainty had high turnover duration per patient • clinical units facing higher uncertainty discussed fewer topics, discussing treatment and care and organisation of work less frequently • unit type affected functions of handover: sharing emotion was less often mentioned in unit types facing high uncertainty	4
Ethical uncertainty and staff stress. Moral distress has negative consequences for healthcare organizations	Nelson, W. A. 2009	Health care	N			S		ethical uncertainty, a situation in which a staff member is uncertain about the ethically appropriate course of action to take. *a different form… healthcare professional knows or believes he knows the ethically appropriate course of action to take but is unable to carry out the action because of an organizational obstacle. (e.g., An obvious example is the nurse providing aggressive care, as ordered by the physician or the patient's family, while believing such a level of care is inappropriate in the given situation. Despite his misgivings, the nurse continues to treat the patient, leading to frustration, anger and moral distress.	5

The challenges of uncertainty and interprofessional collaboration in palliative care for non-cancer patients in the community: A systematic review of views from patients, carers and health-care professionals	Oishi, A.; Murtagh, F. E. M. 2014	palliative care for non-cancer patients	N	3	systematic review and narrative synthesis	N	palliative care professionals	• The unclear boundaries of the roles of each professional are recognised by HCPs themselves, as well as by patients and carers. • Uncertainty of illness trajectory and lack of collaboration between health-care professionals were identified as barriers to effective care. • Uncertainty was recognised by health-care professionals as a great barrier to the provision of good palliative care.	3 5
Balancing Ethical Uncertainty: The Dance of Interprofessional Roles	Payne, C.; Farrell, K. 2015	Health care	Y	0	Interviews	N	physicians, nurses, social workers, genetic counselor..	(1) moral uncertainty (emerges when IP role interaction in patient care dilemmas creates tension and conflict), (2) ethical decision-making (ethical issues that arise when a group of IP healthcare practitioners attempt to work with each other - same as moral)… comes down to understanding each others roles	5
Refinement of the concept of uncertainty	Penrod, J. 2001	Nursing and broader health care	N	3	Concept analysis and review of the literature	B		• A theoretical definition was derived; the refined concept of uncertainty has been stripped of context, although there is still significant contextual influence on the dominance of state. • individuals' perceptions lie at the crux of this concept • medicine has a theoretically narrow scope, dealing primarily with physicians' clinical uncertainty	

General practitioners' experiences of, and responses to, uncertainty in prostate cancer screening: Insights from a qualitative study	Pickles, K.; Carter, S. M.; Rychetnik, L.; McCaffery, K.; Entwistle, V. A. 2016	Primary care	Y	0	Interviews	N	GP	suggest an extension to Han et al's taxonomy based on our analysis of data relating to the varied ways that GPs manage uncertainties in the context of PSA testing. We outline three broad strategies:(1) taking charge of uncertainty; (2) engaging others in managing uncertainty; and (3) transferring the responsibility for reducing or managing some uncertainties to other parties.	1 4
Communicating the uncertainty of harms and benefits of medical interventions	Politi, M. C.; Han, P. K. J.; Col, N. F. 2007	Health care	N	3	Review	N		5 main types or sources of uncertainty: 1) risk, or uncertainty about future outcomes; 2) ambiguity, or uncertainty about the strength or validity of evidence about risks; 3) uncertainty about the personal significance of particular risks (e.g., their severity, timing); 4) uncertainty arising from the complexity of risk information (e.g., the multiplicity of risks and benefits or the instability of risks and benefits over time); and 5) uncertainty resulting from ignorance. *communicating uncertainty - Exactly what is meant by the term uncertainty and the ethical justification for communicating different types of uncertainty are themselves uncertain.	1 2 3
Exploring clinician uncertainty in the diagnosis and treatment of attention deficit hyperactivity disorder	Rafalovich, A. 2005	Mental health	Y	0	Interviews	N	Clinicians who diagnose/treat ADHD. psychologists, psychiatrists, paediatricians and general practitioners	demonstrate a considerable ambivalence within the context of diagnosing and treating ADHD in children.. 24 of the clinicians interviewed express various types of uncertainty regarding the ADHD diagnosis and/or the ways in which they treat the disorder in clinical practice.	2 4
Narrating uncertainties	Rapport, F. L.;	Mental health	Y	0	free text response on questionnaire	N	individuals working with MH patients	Treatment uncertainty	4

about treatment of mental health conditions	Jerzembek, G. S.; Doel, M. A.; Jones, A.; Cella, M.; Lloyd, K. R. 2010				about uncertainties on mental health treatments			• Mental health service providers and professionals considered uncertainties surrounding medication and treatment from an 'evidence-base' perspective, concentrating on medication choices and the adoption of new approaches to care • expressed concerns about the complexity of mental health conditions and co-morbidity, and how this might inform effective treatment regimes rather than patient need and expectation	
Communicating and dealing with uncertainty in general practice: The association with neuroticism	Schneider, A.; Wübken, M.; Linde, K.; Bühner, M. 2014	General practice	Y	2	focus group, think out loud (interview or survey items), then cross-sectional survey	N	GPs & psychs in FG, then just GPs	The development process of the survey revealed 4 themes: 'communicating uncertainty', 'diagnostic action', 'intuition' and 'extended social anamnesis(med history)'	4 1
Measuring the complexity and uncertainty of surgery and postsurgical care	Schoonhoven, C. B.; Richard Scott, W.; Flood, A. B.; Forrest, W. H., Jr. 1980	Surgery	Y	1	Survey - asked to rate the relative complexity and uncertainty of 71 surgical procedures frequently performed in hospitals (more about the development of indicator questions)	B	surgeons and post-surgical nurses	Study on uncertainty regarding certain procedure. Measures of intercorrelations call into question the independence of the 2 dimensions; uncertainty and complexity, given their operationalisation in this study	4
Embracing the certainty of uncertainty: Implications for	Seely, A. J. E. 2013	Health care	N			B	physicians	• overall uncertainty as a sum of informational uncertainty, secondary to imprecise knowledge of the present or past, and intrinsic	2

health care and research								uncertainty, which is wholly independent of knowledge. • discusses that both intrinsic and informational uncertainty exist in the domain Beresford outlined; technical, personal and conceptual uncertainty	
The dilemma of diagnostic uncertainty when treating people with chronic low back pain: A qualitative study	Slade, S. C.; Molloy, E.; Keating, J. L. 2012	Primary care	Y	0	Focus groups	N	physiotherapists	The 'dilemma created by diagnostic uncertainty' emerged as a significant overarching theme with the following subthemes. Physiotherapists: 1) perceive that care-seekers want a clear diagnosis, 2) are challenged by diagnostic uncertainty, 3) are critical when patients fail to improve, 4) feel unprepared by traditional education models and 5) seek support from experienced colleagues.	4
A medical uncertainty principle	Sonnenberg, A. 2001	Health care	N	3	Review	N		calculates diagnostic uncertainty • describe and quantify the conflict between diagnostic knowledge and patient well-being (can't do all possible tests without harming the patient) • conceptualises health and knowledge as competing goals	4
What healthcare students do with what they don't know: The socializing power of 'uncertainty' in the case presentation	Spafford, M. M.; Schryer, C. F.; Lingard, L.; Hrynchak, P. K. 2006	Optometry	Y	0	Field observations and interviews	N	Optometry students	three important features 1. information and technology explosions within healthcare guarantee that knowledge in the field is constantly in flux with boundaries that are subject to displacement, growth, and dispute. 2. the shift toward evidence-based medicine (EBM) with its heavy reliance on information technologies and epidemiology	2

								creates a new kind of uncertainty as practitioners seek information from a system that is exponentially growing in volume and complexity 3. organizational communication theorists have illuminated the environmental uncertainty generated by the competition for resources, attention, and authority among an organization's co-existing, interdependent, and embedded activities	
Building comfort with ambiguity in nursing practice	Stilos, K.; Moura, S. L.; Flint, F. 2007	Oncology	Y	0	Case study	N	Oncology nurses	Case study revealed a situation of role ambiguity and discomfort … unsure of what to anticipate, what to say, or how to respond to their patients	5
Preventing the unpredicted: Managing violence risk in mental health care	Swanson, J. W. 2008	Psychiatry	N			N	Psychiatrists	uncertainty of patient behaviour - psychiatric patients acting on their violent tendencies. clinicians actually can predict and prevent violence if they consider their patients as a group from the perspective of public-health epidemiology, but don't know when it will occur.	3
Expressing uncertainty in clinical interactions between physicians and older patients: What matters?	Tai-Seale, M.; Stults, C.; Zhang, W.; Shumway, M. 2012	Health care	Y	2	Videotapes – qualitative and quantitative analysis	B	Physicians	We found that physicians expressed uncertainty in 20.21% of topics. physician's expression of uncertainty with more uncertainty being expressed with mental health topics (23.9%) than biomedical topics (12.56%, $p<0.05$).	
Identifying and prioritising	Thomas, R. H.;	Epilepsy	Y	0	Focus groups	B	Clinicians - consultants,	For clinicians, the most important themes were treatment programmes for	4

epilepsy treatment uncertainties	Hammond, C. L.; Bodger, O. G.; Rees, M. I.; Smith, P. E. M. 2010						practitioners, counsellor, dietician, nurse	non-epileptic attack disorder (NEAD), concerns about side effects in utero and uncertainties regarding prescribing in pregnancy.	
Expanded role of the nurse: accountability confusion	Tingle, J. 1997	Nursing	N			N	Nurses	It has now become difficult to distinguish the boundaries between nursing and medical health care Nurses and their employers are developing expanded roles to serve the local needs of their service area	5
Role conflict, role ambiguity, and burnout in nurses and physicians at a university hospital in Turkey	Tunc, T.; Kutanis, R. O. 2009	Hospital	Y	1	Questionnaire	N	Nurses, physicians	• Nurses experienced higher levels of burnout, role conflict, and role ambiguity compared to the physicians. • The residents who were in a residency program perceived higher levels of burnout, role conflict, and role ambiguity than the faculty members.	5
Trust and truth: Uncertainty in health care practice	Tyreman, S. 2015	Health care	N			B		not always being able to come up with a justifiable explanation for a person's illness, the existence of unexpected side effects or non-responsiveness to treatment, of not knowing the best thing to do in a difficult situation, mounting evidence of the effects of social deprivation and psychological confusion on health • uncertainty in health care is not so much about uncertain truth as about uncertain trust; not the validity of what is known, but what	

								is trusted (this is still knowledge, but the knowledge not cognitively explicitly but embedded in actions)	
Perceptions of the Role of the Doctor of Nursing Practice-Prepared Nurse: Clarity or Confusion	Udlis, K. A.; Mancuso, J. M. 2015	Health care	Y	1	Survey	S	Nurses	Multiple areas of confusion concerning the role of DNP-prepared nurse existed in academia, academia leadership, and scholarship; disagreement over what role should have what responsibilities	5
Nurses' experiences of uncertainty in clinical practice: A descriptive study	Vaismoradi, M.; Salsali, M.; Ahmadi, F. 2011	Hospital	Y	0	Semi-structured interviews	B	Nurses	three main themes: 'unclear domain of practice', 'compatibility with uncertainty' [manage uncertainty by losing sensitivity (improve skills, knowledge, self-confidence) and avoiding trouble occurring as the consequence of uncertainty and prevented occurrence of a probable problem], 'psychological reactions to uncertainty'	5
Performance management in healthcare: Performance indicator development, task uncertainty, and types of performance indicator	van der Geer, E.; van Tuijl, H. F. J. M.; Rutte, C. G. 2009	Medical rehab centre	Y	0	Semi-structured interviews	S	several medical disciplines (physiotherapists, psychologists, nurse)	Provides a task uncertainty framework - 3 levels of task uncertainty by 5 task elements according to previous theorists.	
Dealing with doubt: Making decisions in a neonatal ward in The Netherlands	Vermeulen, E. 2004	Neonatology	Y	0	Ethnographic research - non-participatory observations	N	Neonatal staff	decision-making in neonatology, it is assumed, takes part on another level to any other ward. Uncertainty is about prognosis (will the baby survive? What quality of life?) Parents play a central role in these judgements	4

Diagnostic confusion in mild traumatic brain injury (MTBI). Lessons from clinical practice and EFNS - Inquiry	Von Wild, K.; Terwey, S. 2001	Neurology	Y	1	Survey	N	Neurosurgeons	confusion concerning definition and management of mild traumatic brain injury.	4
Do-Not-Attempt-Resuscitation orders for people with intellectual disabilities: dilemmas and uncertainties for ID physicians and trainees. The importance of the deliberation process	Wagemans, et al., 2017	Intellectual disability	Y	0	semi-structured interviews, focus groups and an expert meeting	N	Physicians and trainees	example of uncertainty with treatment recommendations (DNAR). The physicians experienced tensions between the ideas of the relatives, their own professional arguments and the physician's position as decision maker. Conflicts because physicians were UNSURE of their legal position.	4
Visit complexity, diagnostic uncertainty, and antibiotic prescribing for acute cough in primary care: A retrospective study	Whaley, L. E.; Businger, A. C.; Dempsey, P. P.; Linder, J. A. 2013	Primary care	Y	0	Retrospective analysis of acute cough visits (written text notes)	N	Clinicians/physicians	Clinicians expressed diagnostic uncertainty in 16% of all visits	4
Changing roles and identities in primary health care: Exploring a culture of uncertainty	Williams, A.; Sibbald, B. 1999	Primary care	Y	2	Interviews plus literature review	N	Physicians and nurses	number of over-lapping factors which contribute to uncertainty and which may impair the potential for innovation in primary health care nursing. (1) breakdown in professional identity, (2) working in a risk environment, (3) uncertainty in relation to new roles	5

Effect of work environment on care managers' role ambiguity: An exploratory study in Japan	Yoshie, S.; Saito, T.; Takahashi, M.; Kai, I. 2008	Health care	Y	1	Survey	N	Case managers (social workers, nurses, case workers)	Role uncertainty in the work environment between and within care manager roles.	5

Appendix C: Systematic Review (Chapter 5): Characteristics of included studies with relevance to mental health care (*N* = 15)

Author & Date	Methods	Context	Country of study	Professional groups involved	Situation of Uncertainty	How they collaborated
Arbabi, M. Laghayeepoo, R., et al. (2012)[113]	Quantitative – retrospective analysis of consultation data	General hospital	Iran	Physician, psychiatrist	○ Decision – unsure on how to proceed when client shows signs of mental illness ○ Informational – uncertain about mental symptoms	Psychiatric consultations
Asad, S. & Chreim, M. (2016)[116]	Qualitative – Interviews with peer support providers	Mental health	USA	*Peer support providers, doctor, psychiatrist, psychologist, social worker, recreational therapist, nurse	○ Role – responsibilities and expectations of the peer support provider are unclear.	Casual discussion or team meeting
Bell, J., Aslani, P. et al. (2007)[9]	Qualitative – Case conferences were audio taped and transcribed	Primary care	Australia	Pharmacists, physicians	○ Decision – making treatment decisions in uncertain, complex cases. ○ Prognostic – these cases were complex and often chronic, the outcome was unpredictable	Case conferences
Blomqvist, S. & Engstrom, I. (2012)[117]	Qualitative – observation of psychiatric team meetings	Psychiatry	Sweden	*Physician, psychologist, psychiatric social worker, nurse, nursing assistant	○ Decision – unclear what is the best treatment option	Team meetings
Chew-Graham, C., Slade, M., et al. (2008)[125]	Qualitative – interviews with GPs about their referrals to community mental health teams (CMHT)	Community mental health	UK	*GP and CMHT (psychiatrist, mental health nurse, community psychiatric nurse, social worker, occupational therapist)	○ Decision – GPs were uncertain about how to manage a patient (once reach their threshold of knowledge)	Referrals

Chew-Graham, C. Slade, M. et al., (2007)[114]	Qualitative – interviews and recordings of the CMHT meetings	Community mental health	UK	*GP and CMHT (psychiatrist, mental health nurse, community psychiatric nurse, social worker, occupational therapist)	○ Role – uncertainty in the role of members of the team and the CMHT in itself ○ Informational – lack of clarity over the criteria for referral ○ Decision – as a result of the above two factors, the decision is unclear	Team meetings
Cook, G., Gerrish, K. & Clarke, C. (2001)[118]	Qualitative – focus groups (evaluation 1= mental health, 2 = nursing)	Community mental health	UK	*Social worker, GP, community psychiatric nurse, community support worker, health and social service manager	○ Decision – uncertain approach to client care ○ Information – uncertainty stemming from a lack thereof or ambivalent knowledge	Team meetings
Fisler, M. & Quante, A. (2015)[126]	Quantitative – retrospective analysis of consultation-liaison psychiatric (CLP) service among non-psychiatric patients in a general hospital	General hospital	Germany	Physicians, psychiatrist	○ Decision – uncertain about diagnosing depressive symptoms or what to do in situations of suicidal ideation or acts of suicide. ○ Role – physicians making referrals were often uncertain about the working areas of psychiatrists	Consultation-liaison psychiatric service
Grafham, E. Matheson, C. & Bond, C. (2004)[127]	Qualitative – interviews with nursing staff	Primary care	UK	Nurse, GP	○ Decision – uncertainty in deciding the suitable amount of drug treatment	Casual discussions
Mauthner, N. Naji, S. & Mollison, J. (1998)[123]	Mixed-methods – interviews, a focus group and a questionnaire	Community mental health	Scotland	*Community psychiatric nurse, social worker, psychiatrist, psychologist,	○ Prognostic – uncertainty about patients with chronic mental illness. ○ Decisional – how to care for those patients? ○ Role – confusion over definition of CMHTs	Team meetings

				occupational therapist, doctor		
McRae, L. (2013)[122]	Qualitative – interviews with multidisciplinary staff involved in decision-making	Psychiatry specialist ward in a medium secure unit	UK	*Psychiatrist, nurse, psychologist, occupational therapist	○ Decision – unsure whether to admit sentenced offenders with antisocial personality disorder to a medium secure unit. ○ Prognostic – complexity of these cases renders the outcome of the patient unpredictable	Team meetings
Simpson, A. Bowers, L. Alexander, J. Ridley, C. & Warren, J. (2005)[119]	Qualitative – interviews with staff on a psychiatric ward	Acute psychiatric ward	UK	*Occupational therapist, ward manager, mental health nurse, consultant psychiatrist	○ Decision – uncertain about the course of care for psychiatric patients	Casual discussion or team meeting
Verdoux, H. Cougnard, A., et al. (2005)[115]	Quantitative – survey for GPs	Primary care	France	GP, psychiatrist	○ Informational – Doubt in own knowledge ○ Decision - uncertain in how to manage clients with early psychosis	Referrals
Wall, S. & Austin, W. (2008)[120]	Qualitative – interviews with various MHCPs	Mental health	Canada	*Psychiatrist, psychologist, social worker, psychiatric aide	○ Decision – deciding on an ethically uncertain situation ○ Role – uncertainty about the ethically appropriate path to take in their role	Approaching a team member for support
Wilberforce, M. Tucker, S., et al. (2012)[121]	Quantitative – questionnaire sent to CMHTs	Community mental health	UK	*Doctor, occupational therapist, psychologist, social worker, support worker	○ Decision – uncertainty in deciding what to do for aged mental health care patients	Team meeting

* Professionals worked

Appendix D of this thesis has been removed as it may contain sensitive/confidential content

Appendix E: Semi-structured interview guide

Hi,
Thank you for taking part in the interview today. These interviews will help us to understand specific uncertainties experienced by professionals working in mental health care. As you read in the participant information and consent form, the interview will be audio-taped and should take no longer than 30-45 minutes.

Are you okay to proceed?

First of all, would you mind telling me about your role at Headspace?

- *What sort of interactions do you have with the headspace clients?*
  - Formally? Informally?
- *Other staff at headspace? What sort of interactions to do you have with your colleagues?*

In today's interview, we are going to talk largely about UNCERTAINTY. In health care, uncertainty is an inevitable phenomenon associated with ambiguity, probability and complexity.
In simple terms, uncertainty is the state of being unsure.

In your own words, what does professional uncertainty mean specifically for professionals working in mental health care?

- Probes:
  - Is there a particular scenario that comes to mind?
  - Can you take me through what happened?
    - Where, when and how?
  - In your opinion is this a common scenario within MHC?
  - How was the uncertainty dealt with?
- IF DON'T PERSONALLY EXPERIENCE PROF UNCERTAINTY:
  - Have other staff come to you when they feel uncertain?
  - Can you think of what other staff would experience in terms of prof uncertainty?

Now we are going to talk about particular events of uncertainty.

*Do you think _____ is an area of professional uncertainty in MHC**?***

1. Diagnosis	When identifying mental illness, or broader problems
2. Prognosis	The likely outcome/course of the issue
3. Causal explanation	To explain or simply understand why something has happened
4. Treatment recommendations	Such as when deciding how to help a young person at headspace
5. Health care system	The way headspace functions as a system. - I.e., are roles and processes of care clear? Who does what?
6. Are there particular uncertainties regarding communication?	Communication with other staff, a patient, their family. Could be formal or informal communication.

Probes:

- Why is this an issue of uncertainty?
- Do you think this is common among all staff working in MHC?
- Is there a particular situation that comes to mind?
- Have you personally dealt with this kind of uncertainty?
  - How did you deal with this kind of uncertainty?
  - Looking back on that now, would you have dealt with is differently?

Out of all these uncertainties we have discussed today, in your opinion, what is the most prominent?

In your opinion, how does headspace deal with situations of professional uncertainty?

- Prompt collaboration – *Do you talk to other staff?*

That is the end of the interview. Thank you for your time.

Appendix F: Survey email invitation

Subject line: Headspace [location of centre] Collaboration Survey

Dear staff,
Below is a link to a social network survey conducted by a research team at Macquarie University. The survey only takes around 10 minutes to complete.

CLICK ON THIS LINK!!

The team has asked me to send through this survey with the request that all staff at headspace [location] take part. If you decide NOT to take part, please click on this link to the survey and answer the first question as "no." That way you will not receive any further correspondence from the survey administration.

While the survey does ask for your name, please note that **you and this specific headspace centre will remain anonymous in all wider reporting of results** – no headspace staff, managers included, will see raw data, or be able to identify you from your responses.

The results will directly benefit our centre as well as the future of mental health care more broadly! So, once you've filled it in, please encourage your colleagues to do it too! If you have any questions about the survey and the research project contact:
Chiara.pomare@students.mq.edu.au

Appendix G: Participant information and consent form (Survey)

PROFESSIONAL UNCERTAINTY IN MENTAL HEALTH CARE: A SOCIAL NETWORK APPROACH

What is the study about?

You are invited to participate in a study of interprofessional collaboration in mental health care. The purpose of the study is to identify some of the key professional uncertainties in the delivery of holistic mental health care and use social network analysis to examine how communication patterns among staff change during these times of uncertainty.

Who is carrying out the study?

The study is being conducted by Chiara Pomare (chiara.pomare@students.mq.edu.au) to meet the requirements of a Master of Research in Medicine and Health Science, under the supervision of Professor Jeffrey Braithwaite of the Australian Institute of Health Innovation (Jeffrey.braithwaite@mq.edu.au).

What does the study involve?

You are being invited to participate in this study because you are a staff member of headspace. If you decide to participate, you will be asked to fill in a survey about your role at headspace and the nature of your interactions with other employees. This will take around 10 minutes.

Survey questions include questions on professional uncertainty. Please note: uncertainty is commonly described in the literature as a normative experience among health care professionals – acknowledging instances of uncertainty is not a weakness but an integral part of working in health care, particularly mental health care.

Although it is not envisaged that you will experience any negative consequences, if you do experience distress or any extreme emotions please contact Lifeline on 13 11 14 or beyondblue on 1300 22 4636. Please note you are able to withdraw from the study at any time, without consequence.

How will my data be used?

Any information or personal details gathered in the course of the study are confidential, except as required by law. No individual will be identified in any publication of the results. Access to the data will be restricted to the chief and co-investigators of this study. A summary of the results of the data will be made available to all headspace staff in the format of an executive summary.

Do I have to take part?

Participation in this study is entirely voluntary: you are not obliged to participate and if you decide to participate, you are free to withdraw at any time without having to give a reason and without consequence.

If you have read this information and are happy to participate in this survey, please select 'YES' then click '>>' and you will be taken to the survey.

If you don't agree or don't wish to participate, simply click 'NO' and close this webpage

The ethical aspects of this study have been approved by the Macquarie University Human Research Ethics Committee [HREC ref 5201700297]. If you have any complaints or reservations about any ethical aspect of your participation in this research, you may contact the Committee through the Director, Research Ethics & Integrity (telephone (02) 9850 7854; email ethics@mq.edu.au). Any complaint you make will be treated in confidence and investigated, and you will be informed of the outcome.

Appendix H: Social network survey

Welcome!

You are invited to participate in a study on professional uncertainty in mental health care. You have been chosen to participate in this survey because you are a staff member of headspace - our aim is for ALL staff at your centre to complete this survey! It will take around 10 minutes to complete.

Uncertain about discussing uncertainty?

Uncertainty is commonly described in the literature as a normative experience among health care professionals – acknowledging instances of uncertainty is not a weakness but an integral part of working in health care, particularly mental health care. You will remain anonymous and unidentifiable in any write up of the results.

1. I have read the above information and agree to participate in this survey.
   - ☐Yes
   - ☐No [To thank you page. No further questions]

About me!

1. What is your full name?

(We require your name in order to track who you collaborate with at headspace – You will later be de-identified in the write up of this research project)

_____

2. Gender:
   - ☐Male
   - ☐Female
   - ☐Other
3. How long have you worked at headspace?
   - ☐< 3 months
   - ☐3 - 6 months
   - ☐6 months – 1 year
   - ☐1 – 2 years
   - ☐2 – 5 years
   - ☐5+ years
4. In terms of your role at headspace, which of the following professional groups would you <u>most closely</u> identify with? (Please select one)
   - ☐Youth Access team
   - ☐Management/leadership team
   - ☐Contracted clinicians
   - ☐Administration
   - ☐Other (please specify: ……)
5. Are you a part of the HEIPS (Headspace Early Intervention Psychosis Services) team?

□Yes
□No
□Not sure

6. What is the field of your professional qualification?
□Psychiatry
□Psychology
□Counselling
□Medicine (GP)
□Nursing
□Social Work
□Occupational Therapy
□Admin
□Other (please specify: ……)

7. Which of the following best describes your role?
□Full time
□Part time [if selected go to Q8, all others skip Q8]
□Casual
□Other (please specify: ……)

8. How many days a week do you work at this headspace centre? _____

9. Which of the following best describes you?
□Senior staff member
□Junior staff member
□Not sure

Situations of professional uncertainty

1. Below is a list of situations of professional uncertainty. Please indicate if YOU have experienced uncertainty in any of these situation(s) <u>in the last 6 months.</u> Please also consider if you have observed or been aware of OTHER staff of headspace being uncertain about the following situation(s).
Please select all that apply for both columns.

	I am/have been uncertain about...	Other staff at headspace have been uncertain about...
Deciding when/what to communicate **to parents of young people**	☐	☐
Deciding when/what to communicate **to other staff**	☐	☐
Deciding if headspace is the right service for a particular young person	☐	☐
Deciding if a particular young person fits the criteria for a certain service	☐	☐
Creating a treatment plan	☐	☐
Believing the information a young person discloses to be true	☐	☐
The best practice/policy that headspace should follow in terms of **referral processes**	☐	☐
The best practice/policy that headspace should follow in terms of **communication between full-time and contracted staff members**	☐	☐
The future of the headspace centre (e.g., funding security)	☐	☐
What could happen to a young person (i.e., after they leave an appointment with unresolved issues)	☐	☐
The expectations and/or responsibilities upon me in **my role** (or **their** role, respectively)	☐	☐
The expectations and /or responsibilities of **another staff member**	☐	☐
The expectations and/or responsibilities of an **external party** (i.e., a service that you have had contact with but is not part of headspace)	☐	☐
The purpose of the meeting	☐	☐
None of the above	☐	☐

2. Are there any other situations of uncertainty experienced by headspace staff you are aware of?

3. [only if 1.3 selected]
When you are uncertain about deciding if headspace is the right service for a young person, how have you moved forward and reached a decision on what to do?
Free text response……..

Collaboration in the headspace team

1. Since you started working at headspace, have you collaborated (i.e., worked with) other headspace staff?

☐No [That is the end of the survey, thank you]

☐Yes

2. For what activities have you collaborated with other headspace staff in the last 6 months? (Please select all that apply)

☐I have attended a formal meeting (clinical review) [if not selected, skip Qn9]
☐I have taken part in supervision with another headspace employee
☐I have taken part in a discussion, teleconference or email exchange about work at headspace
☐I have provided advice to others
☐I have sought advice from others
☐I have talked to other staff over lunch, passing in the corridor, in the shared office space or other social settings
☐Other (please specify: ……)

Who do you collaborate with?

3. We want to know with whom among the staff at headspace you are routinely collaborating. By '*collaboration*' we mean formally (e.g. on a particularly case in case review meeting, on the electronic medical record) or informally (e.g. have discussed concerns about work or about a young person, supplied expertise or advice to others outside of scheduled meetings).

Please scroll down the list of names of all the headspace staff. Please select those people with whom you have **collaborated** in the last 6 months in your routine work.

		This is me!	I have not interacted with this person	I have collaborated with this person once or twice	I collaborate with this person on a regular basis (e.g. daily, once a week)
Person A[14]	Psychologist	o	o	o	o
Person B	General Practitioner	o	o	o	o
Person C	Receptionist	o	o	o	o
Person D					
Person …					

4. Please select other resources you have used in the last 6 months in your routine work (Please select all that apply)

☐Headspace policy documents
☐Journal articles
☐Google or any other search engine
☐A specific website
☐Another headspace centre
☐A colleague that does not work at my headspace centre

[14] Names and corresponding job role removed to preserve the anonymity of participants. In the survey, names and roles of all staff were listed.

□None of the above

Uncertain about making the right decision?

5. Being unsure about making the right decision may include having uncertainties about diagnosis, treatment plan, the right criteria to apply, who/what/when to communicate information to etc.

Please select those people with whom you **would turn to when you are unsure in making any kind of decision related to your work at headspace**. Please also indicate if those people **turn to YOU** when they are uncertain about making a decision. Please only consider occurrences in the last 6 months.

		This is me!	I have turned to this person once or twice	I turn to this person on a regular basis	This person has turned to me once or twice	This person turns to me on a regular basis	I have not interacted with this person
Person A	Psychologist	o	o	o	o	o	o
Person B	General Practitioner	o	o	o	o	o	o
Person C	Receptionist	o	o	o	o	o	o
Person D							
Person…							

6. Please select other resources you have used in the last 6 months when you are unsure about making the right decision (Please select all that apply)

□Headspace policy documents
□Journal articles
□Google or any other search engine
□A specific website
□Another headspace centre
□A colleague that does not work at my headspace centre
□None of the above

Role ambiguity

7. Role ambiguity is the absence of clarity about the expectations and responsibilities of a particular position.

Please select those people whom you **would turn to (e.g. to ask for clarity or advice) when you experience role ambiguity about your role at headspace**. Please also indicate if those people **turn to YOU** when they experience role ambiguity. Please only consider occurrences in the last 6 months.

		This is me!	I have turned to this person once or twice	I turn to this person on a regular basis	This person has turned to me once or twice	This person turns to me on a regular basis	I have not interacted with this person
Person A	Psychologist	o	o	o	o	o	o
Person B	General Practitioner	o	o	o	o	o	o
Person C	Receptionist	o	o	o	o	o	o
Person D							
Person…							

8. Please select other <u>resources</u> you have used in the last 6 months when you are unsure about your role (Please select all that apply)

☐Headspace policy documents
☐Journal articles
☐Google or any other search engine
☐A specific website
☐Another headspace centre
☐A colleague that does not work at my headspace centre
☐None of the above

9. [if 2.1 selected]
To what extent do you think the clinical review meeting is helpful when you are uncertain in deciding the next steps for a client/young person? (E.g., when deciding if a client/young person fits the headspace model, deciding where to refer the young person on to etc.)

5 pt likert scale
1 [not at all] …2……3……4… 5[extremely]

That is the end of the survey. Thank you for your time.
If you are experiencing distress, or any extreme emotions, please contact Lifeline on 13 11 14 or beyondblue on 1300 22 463.

If you have any questions about the content of this survey please feel free to contact Chiara Pomare (chiara.pomare@students.mq.edu.au).

Appendix I: Quality appraisal check

	Study abstract, title	Aim and background	Appropriateness of method	Rigour of data analysis	Potential for bias	Clarity of results	Generalisability	Implications of the study	Quality assessment score (%)x/32
Arbabi, M. Laghayeepoo, R., et al. (2012)[39]	4	4	3	4	4	4	3	4	**93.8**
Asad, S. & Chreim, M. (2016)[26]	2	4	4	3	4	4	2	3	**81.3**
Bell, J., Aslani, P. et al. (2007)[37]	4	4	4	3	4	4	3	4	**93.8**
Blomqvist, S. & Engstrom, I. (2012)[27]	4	3	4	4	4	3	4	4	**93.8**
Chew-Graham, C., Slade, M., et al. (2008)[28]	3	3	3	4	4	4	4	4	**90.1**
Chew-Graham, C. Slade, M. et al., (2007)[34]	3	4	4	4	4	4	3	4	**93.8**
Cook, G., Gerrish, K. & Clarke, C. (2001)[29]	3	4	4	4	4	4	3	4	**93.8**
Fisler, M. & Quante, A. (2015)[40]	4	3	3	4	4	3	3	4	**87.5**
Grafham, E. Matheson, C. & Bond, C. (2004)[41]	4	3	3	3	3	4	3	3	**81.3**
Mauthner, N. Naji, S. & Mollison, J. (1998)[35]	4	3	4	4	4	4	4	3	**93.8**
McRae, L. (2013)[33]	4	3	3	3	3	3	2	3	**75.0**
Simpson, A. Bowers, L. Alexander, J. Ridley, C. & Warren, J. (2005)[30]	3	4	4	3	3	3	3	3	**81.3**
Verdoux, H. Cougnard, A., et al. (2005)[38]	4	3	3	3	3	3	4	4	**84.4**
Wall, S. & Austin, W. (2008)[31]	3	3	3	3	4	4	3	4	**84.4**
Wilberforce, M. Tucker, S., et al. (2012)[32]	4	4	3	4	4	4	4	4	**96.7**

** Quality assessment legend: 1. Very poor; 2. Poor; 3. Fair; 4. Good.*