Social Network Analysis of Health and Social Service Centers (HSSCs) in Finland, Focus on Integrated Care

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Introduction

HSSCs are the first point of contact for health and social service needs in Finland (1). Finland has a long history of integrated care, however due to an ageing population and increasing demands on the healthcare center, further integration has been prompted (2). Integrated care helps people with multi-morbidities, particularly with mental health issues, to obtain patient-centered care (3). Integration has been acknowledged as a social process, and effective collaboration and communication are vital for successful integration (4). Social network methodology has been identified as a method to investigate this process by identifying specific features and key individuals that can support integration of care (4).

Aims

1. Utilize Social Network Analysis (SNA) to describe HSSCs in Finland
2. Analyze SNA measures to identify important individuals within the network

Methods

Data Collection: Name lists were emailed by the THL to doctors, nurses, nutritionists, physiotherapists, psychiatrists, and social workers in eight HSSCs in Finland. Participants were asked to indicate who within their HSSC they worked with and how frequently. Some individuals worked across many HSSCs and were given multiple name lists. Frequency ranged from rarely to more than once daily. Data was also collected on profession, managerial position, work tenure, work experience, and gender.

Data Analysis: Sociographs and network measures were calculated and developed using R with the igraph and sna packages. To identify important individuals by profession using network measures, linear regression was used to control for the other background variables.

Social Network Analysis: Sociographs

How do we interpret these images?

In social network analysis, images can be used to analyze connections between people and individuals' importance based on their position in the network. Various network properties, which are described in the boxes below, are theorized to be important for integration (4).

Image Key:
- Each circle, called a node, represents one person, the color corresponds to their profession
- Each line is called an edge. The arrow originates from one person and points to the node that they have listed as a contact

Legend:
- Doctor (blue)
- Nurse (red)
- Physiotherapist/Nutritionist (orange)
- Psychiatry (green)
- Social Work (pink)

Size:
The number of actors in the network (5). Network C is the largest network.

Density :
How many connections exist in a network out of all possible connections (if everyone was connected to everyone else) (5). Network B is the densest network.

Strength:
The frequency of contact between individuals. Represented by edge width (5). See ex. 1 for example of a strong tie and ex. 2 for an example of a weak tie.
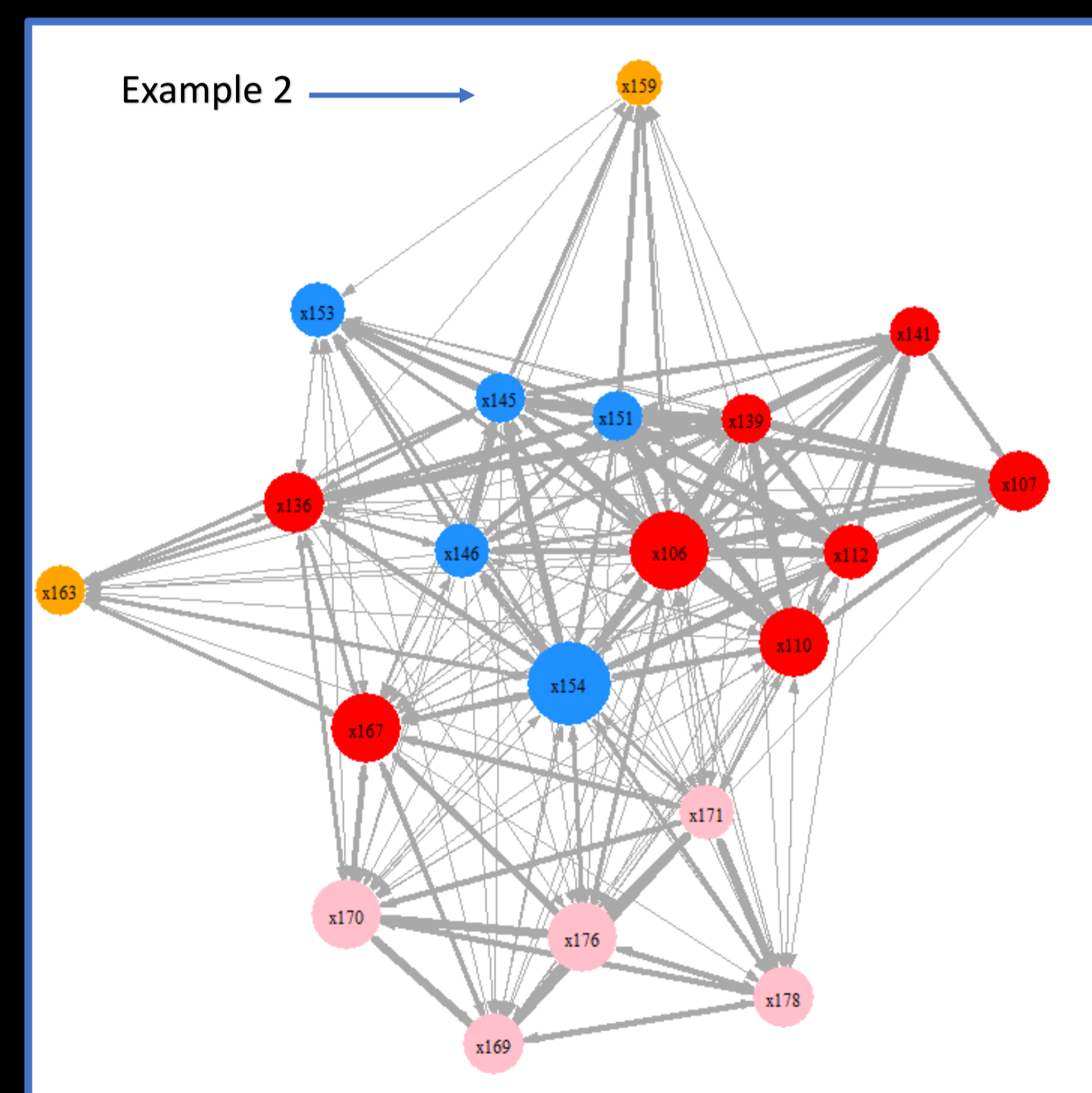
Degree Centrality:
The number of individuals who have listed the particular node as a contact (5). Represented below by the size of the node, larger nodes mean more incoming contacts. See ex. 3 below.
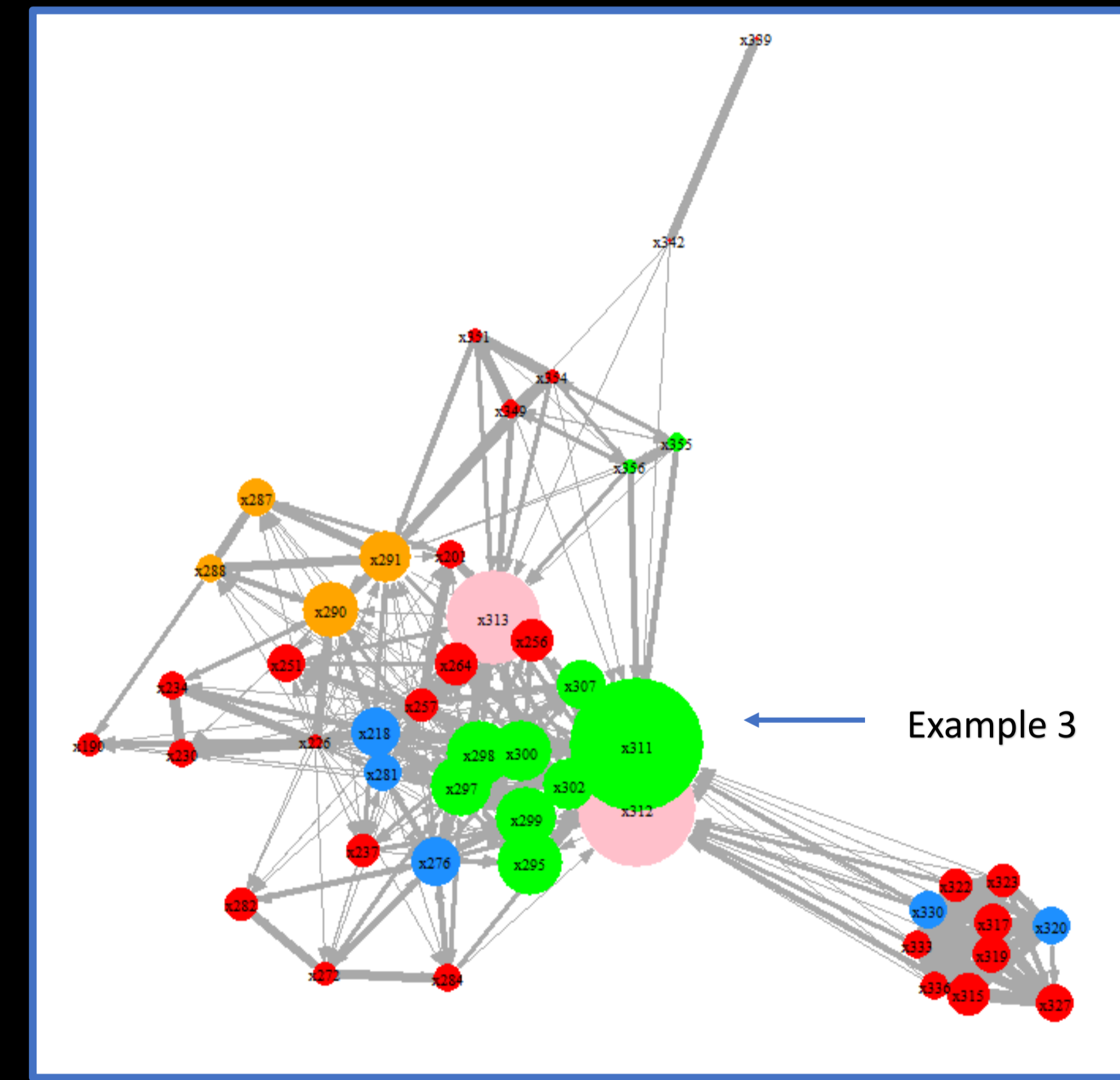

NETWORK A — Example 1

NETWORK B — Example 2

NETWORK C — Example 3
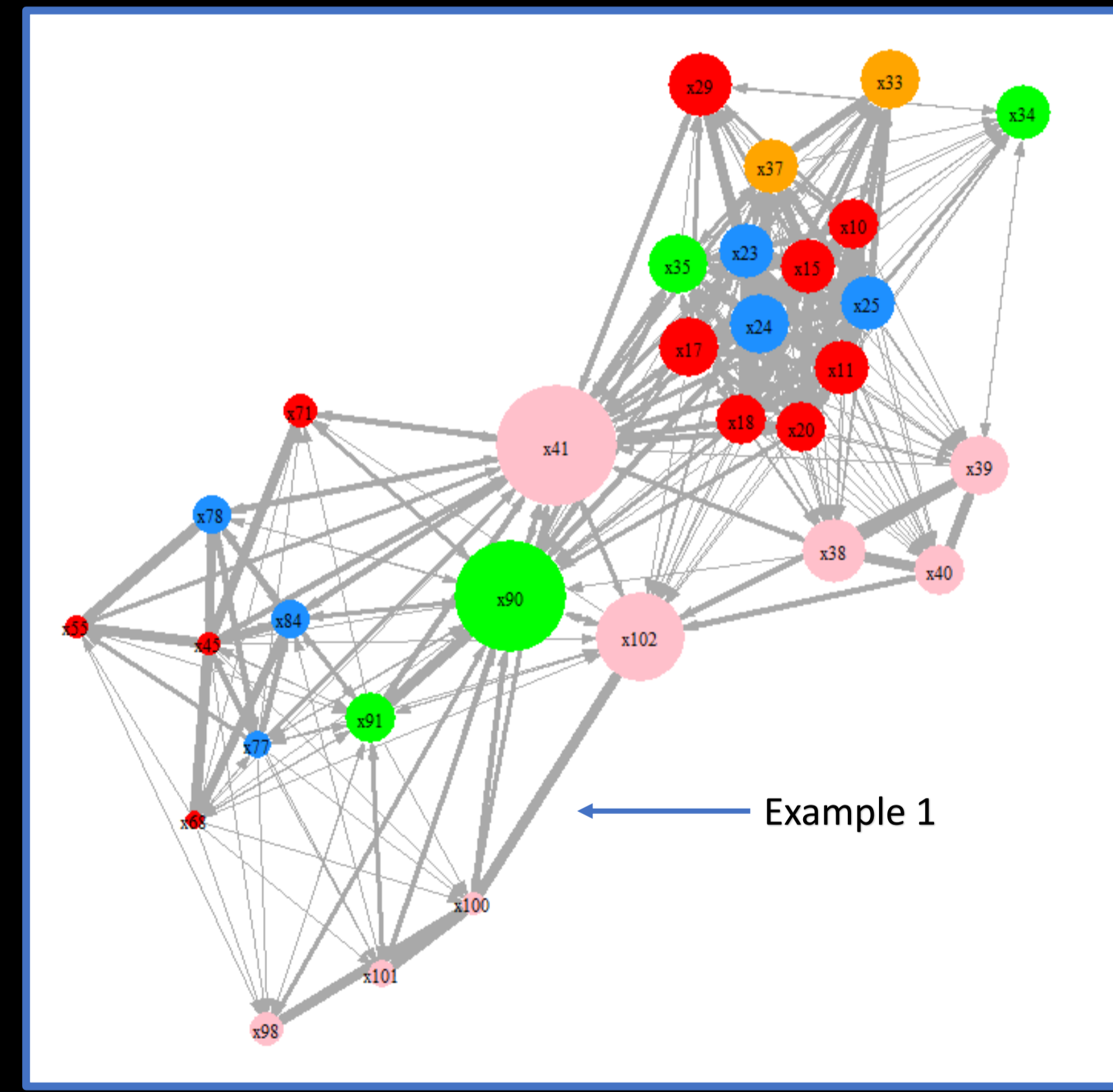
Overall Key Findings

98 professionals responded to the questionnaire. From this, three unconnected networks were developed. Network A consists of 2 HSSCs connected by shared workers. Network B is one large HSSC. Network C is composed of 4 small HSSCs which share multiple workers. Across these networks, measures varied greatly, although this is to be expected given the different compositions. For example, Network C is the largest network, and individuals on average have fewer connections (degree centrality). However, this is predicted, and it follows the corresponding trend of larger networks having fewer, but stronger, ties and relying on indirect connections (4).

From the regressions, leaders within the networks were identified. Key actors included psychiatry and social workers, who had high degree centrality. Nurses had the strongest (most frequent) ties with others.

Discussion

The high density of Network B is suggested to be conducive to creating common understanding amongst network members. The high centrality of these members generally suggests more access to resources (4). Weak tie theory suggests that within Network B (with the lowest tie strength), more innovative ideas may be fostered, as members are not just interacting within isolated groups of similar people. Strong ties are suggested to be important for transmitting more information and to be better for implementation (5:7). High degree centrality indicates that these professionals might be opinion leaders, to be targeted for innovation spread, to increase uptake efficiently amongst the network (8:11).

Implications

Nurses, social workers, and psychiatrists should be targeted for future interventions in order to take advantage of their position in the network. Policy makers should support these professionals in this and take into consideration the diversity of collaboration patterns across HSSCs. This research also demonstrated that SNA is a feasible approach to studying integrated care.

Competences Acquired for my Future Career in Public Health

This project increased my knowledge of social network analyses and application of theories, my familiarity with R, and my understanding of the Finnish health system.

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