Report from a Workshop held July 21-23, 2003:

Networks and their Role in Enhancing Research Impact in Alberta

Prepared for:

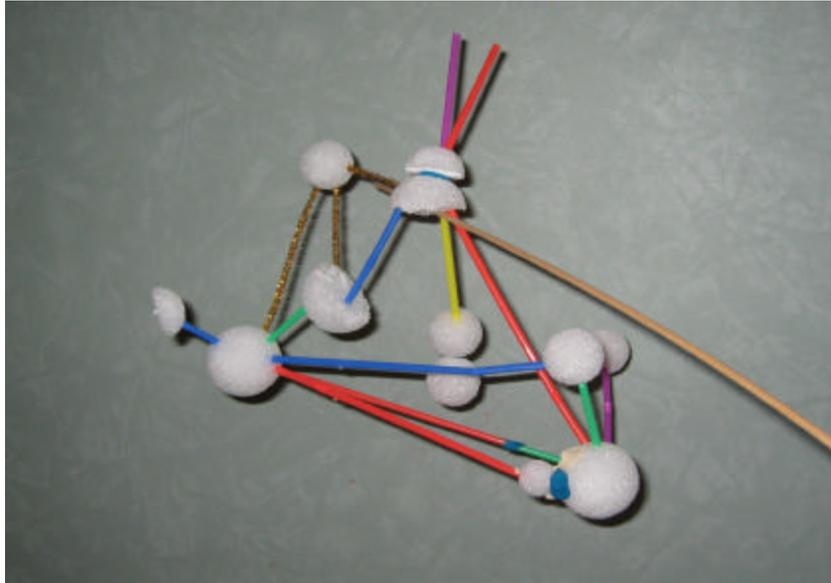**The Alberta Heritage Foundation for Medical Research**

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HIGHLIGHTS

From Workshop on Networks and their Role in Enhancing Research Impact in Alberta
Canmore, July 21-23, 2003

- Networks are valuable tools for accomplishing a wide range of objectives. Network activity is particularly well suited in some contexts.

- Networks can be purposefully stimulated and supported but not controlled. Appropriate support is enough to nurture growth and momentum but not enough to remove the need for reaching out and expanding connections.

- The form of network can be important. Some forms are better for dissemination of information and others better for stimulating behavior change.

- There are two dimensions to measuring impact and activity of networks: the substantive outcomes that the network is designed to address and the activity and maturity of the network.

- Networks can be a valuable tool for AHFMR to improve research capacity in both creating and applying evidence, and for innovation.

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Networks and their Role in Enhancing Research Impact in Alberta

Report from a Workshop

Date: July 21 - 23, 2003
Location: Canmore, Alberta
Sponsored by: Alberta Heritage Foundation for Medical Research

Workshop Participants

Invited Experts:
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NOTE: This document captures the process and discussions at a workshop and subsequent deliberations about the relevance of these discussions for AHFMR. It is meant to be formative in nature, and as such represents one component of work in a process designed to assist AHFMR approach the support and evaluation of networks in ways that make important contributions to achieving its mission. This work is in progress. For updated information, please contact Ms. Sarah Hayward or Mr. Richard Thornley.

If you wish to quote this document, the following is the suggested reference:

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*Participants of a workshop held in Canmore Alberta July 21-23, 2003.

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Executive Summary

Networks are valuable tools that can be used to contribute to the accomplishment of a wide range of objectives, and there are specific contexts where network activity is particularly well suited. That is the conclusion of a process sponsored by the Alberta Heritage Foundation for Medical Research (AHFMR) to examine the potential contribution of networks to the accomplishment of its mission.

The AHFMR has supported a variety of network-related initiatives over the past 10 years and wanted to pause and reflect consciously on this locus of its activity. In essence, the Foundation wanted to increase its understanding of what networks are, what they can do, and how their effectiveness can be evaluated.

To facilitate this discussion, the AHFMR enlisted the assistance of experts who had been deeply involved with networks, either through leading them, conducting research into them, or both. Over the course of two days in July 2003, these experts from Canada, the United States and the United Kingdom grappled with the concept of networks and the application of what they knew to the particular context of interest. The context of interest was the use of network forms by a research foundation interested in enhancing the impact of research in its jurisdiction.

What are networks?

Networks as organization forms are defined by several characteristics. None of these are observed ONLY in networks, and yet, when considered together, they do present a particular profile. Perhaps the feature which is most definitive is that networks are not the primary organizational connection for most members. In addition to that feature, the following are typical network characteristics:

- There are nodes and connectors in every network. The nature of the connections varies between members and over time.
- Involvement in networks is almost always voluntary.
- Networks can operate in the 'white space' or opportunity space which often provides an opportunity for action that is not feasible within one's home organization.
- Networks can exist quite effectively without tangible formal organizational characteristics.
- Networks are particularly well suited to be responsive to changes in the environment.
- Networks are similar to other organization forms in that they have life stages; these stages may be more important to acknowledge in networks, as due to their very nature they are more likely to wax and wane in their activity levels. A general formulation of the stages of a network might include: formative, identity, solidification of purpose and governance

arrangements, fully functioning, mature, and declining or (re-)emerging (into something else).

For what purposes are networks well suited?

Networks are particularly appropriate in some kinds of situations. These include situations where:

- Knowledge is not codified and the fit of information with context is particularly relevant;
- Varying levels of activity are needed at different points in time;
- Resources or expertise are scarce and widely distributed;
- Innovation is needed. Outcomes of a network cannot be completely predicted;
- Diverse entities need to connect or work together;
- The problem to be addressed is particularly complex; and
- There is sufficient time to mature a network to address the problem.

Can networks be purposefully stimulated?

Networks can, and have been, purposefully stimulated. Careful thought should be given to whether (and when) they 'should' be stimulated. Networks can be stimulated either by nurturing nascent or emerging activity that is already present, or by stimulating them de novo.

There are a number of things to consider:

- Networks are at differing stages of development. Like a seedling, a network needs nurturing but also needs freedom to explore and grow.
- Sometimes it may be wise to stimulate a network indirectly – by implementing an activity that has a high degree of likelihood of a network emerging as a byproduct.
- The art of supplying the 'right' amount of support is not straightforward. Support (most often interpreted as money) needs to be applied judiciously; enough to nurture growth and momentum but not enough to remove the need for reaching out and expanding connections.
- Although money is often the identified means of support or stimulation, there are other important resources. For example, network start up and facilitation skills are important.

What can networks accomplish, and under what circumstances?

In theory, networks can contribute to the accomplishment of a very wide range of outcomes and goals. Some types of networks are better for dissemination of information and others are better for stimulating behavior change. It is not so much a question of asking what can networks accomplish, as much as asking 'If

a network is being stimulated for a particular purpose, what types of connections are more likely to fulfill that particular purpose?'.

As noted earlier, networks are particularly well suited to 'working in the white space' and therefore for producing innovative outcomes as well as disseminating information about innovation.

How do you measure the activity and impact of networks?

There are two dimensions along which activity and impact might be measured, the substantive outcomes that the network is designed to address and measures of the activity and maturity of the network.

There are no specific outcomes that are unique to networks and the outcomes of interest to be measured are the substantive ones associated with the desired purpose, whether they are tackled through a network form or some other mechanism. The substantive outcomes of interest are as wide ranging as the purposes of the various networks.

The concept of 'life stages' of a network provides the second dimension along which to assess the activity of networks. Evaluating networks appropriately requires some knowledge of the path of evolution and the particular life stage of the network being evaluated. Potential indicators that relate to recognizing whether a network is evolving in maturity include:

- Ability of members to discuss money seriously;
- Agreement about key issues (governing structure; criteria for success);
- Resolving a conflict successfully;
- Members voluntarily subjugate their own interests to those of the collective in the short run;
- Acknowledgement that sustainability is about more than funding;
- Referral among members;
- Exhibiting respect for various perspectives;
- Using the network as a problem solving mechanism; and
- Varying levels of activity over time may be an appropriate indicator of a successful network, depending on its purpose.

As a network matures, one could realistically assess the accomplishments of the network with respect to the substantive outcomes originally hoped for. Network growth trajectories are not necessarily constant, or linear; nor are activity levels constant after a network is fully functioning or mature.

Part I: Foundations

The Alberta Heritage Foundation for Medical Research and Its Interest in Networks

This report summarizes initial work done by AHFMR in an effort to examine the use of networks as one strategic mechanism through which to enhance research impact in Alberta.

The Alberta Heritage Foundation for Medical Research was created in 1980 with a mandate to support a community of researchers who generate knowledge whose application improves the health and quality of life of Albertans and people throughout the world.

In a general sense, the Foundation is interested in enhancing research capacity and achievements in the province. It uses a very inclusive definition of research capacity in its deliberations. Research capacity includes activities whose aim is to generate new knowledge for the international community; and also activities that are designed to enable the use of research knowledge to enhance the health of Albertans or the effective operation of the health system; or to assist with the commercial development of products or services with origins in Alberta funded research.

Support for the development of individuals has always been the primary strategy of AHFMR. While this has most often taken the form of salary support for researchers located in universities, in the 1990's the Foundation undertook to sponsor several initiatives that targeted people interested in contributing to the research enterprise who were not located in universities and for whom research was not their primary role. This included approaches to capacity building among family physicians, professionals and managers employed within the health system, and those with a particular interest in research related activities, such as the use of research information in decision-making.

In light of this interest in developing capacity in the practice as well as the academic setting, and enhancing the linkage of the two, AHFMR supported several initiatives that were called networks. By 2003, AHFMR has supported, through various mechanisms, networks involving family physicians interested in integrating research activity into their practice (AFPRN), participants in an AHFMR-led training program to assist health organizations and personnel to create and use research appropriately (SEARCH), people with responsibilities for health research transfer (RTNA), and individuals from universities and health organizations wanting to improve research capacity in the health system (ACHRN). More details about these networks are included in Appendix 1.

In the spring of 2003, the Foundation initiated a process through which it would review the contribution and potential of networks within its portfolio of strategies.

The Foundation wishes to pause, and reflect consciously on this group of initiatives. In essence, the Foundation wishes to increase its understanding about <u>what networks are</u>, <u>what they can do</u>, <u>and how their effectiveness can be evaluated</u> In the short to medium term, AHFMR is particularly interested in applying an improved understanding of networks to the evaluation of the SEARCH Program. It is also interested in learning more generally applicable lessons to inform evaluation and support of networks.

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Approach to this Project

This project was designed to increase the understanding and effective use of networks as a strategic mechanism through which to enhance research capacity. An incremental approach was taken, including the following phases:

I.	Literature and Environmental Scan
II.	Expert Workshop and Analysis
III.	Identifying Implications for AHFMR

The literature and environmental scans were done to identify
a) The range of perspectives and approaches that it is possible to take when examining networks, and
b) Experts who would bring key perspectives to a workshop focusing on networks.
No attempt was made to do a comprehensive or systematic review of literature. A brief package of articles and reports was pre-circulated to workshop participants in order to provide them with some sense of the 'conceptual space' within which the facilitators saw the workshop beginning.

A workshop involving 20 experts was held for the purposes of describing:
- key characteristics of networks,
- the range of impacts that networks could have and
- how networks can be used as a strategic mechanism to increase research impact.

Those attending were drawn from researchers who have studied networks and from 'practitioners' who are developing or running networks. A detailed description of the workshop process is included in Appendix 2.

This report summarizes the knowledge gained from the workshop, and identifies its implications of this knowledge for AHFMR, and other similar organizations. Reference to key literature is included where it provides useful illumination to the concepts discussed.

Part II: Workshop Dialogue and Deliberations

The Workshop Process

The workshop was structured with the objective of creating an open, 'frank'/free 'space for dialogue' among a group of wise individuals with particular expertise about networks. The AHFMR has been a leader in exploring 'research transfer' oriented activities, and in some modest way, we were hoping to engage in that process for a specific policy related purpose in this workshop.

The workshop's objectives were:

1. To articulate a concept(s) of networks that is appropriate for the AHFMR and to use as it considers nurturing and supporting networks in Alberta.

2. To identify the range of effects and outcomes that networks funded to increase research capacity in the province could reasonably be expected to achieve.

3. To reach a new level of understanding about networks as a strategic tool that research funding agencies may use to affect change.

The workshop involved two different processes, structured dialogue initially and then interactive small working groups. The purpose of the first part was to generate a broad range of input about networks in an open-ended way. This structured dialogue involved one group of informants located in the inner 'talking' circle' while the other group was listening and reflecting (i.e. located in the outer circle), with the circles changing their position for each segment of the dialogue. A question oriented either to researching networks or to leading networks was asked, to stimulate the thinking of those in the 'talking circle'. While participants will have been influenced in their thinking by others' comments, the process was not primarily interactive or discursive but rather an opportunity for each participant to provide his or her thoughts and experience of networks in a non-competitive environment.

The intent of the second part of the workshop was to assess and consolidate the earlier input. This occurred through plenary and small group working sessions, with membership in the small groups being self-selected on the basis of interest. The groups also determined insights and lessons that would help inform AHFMR's future work regarding networks. (Refer to Appendix 2).

Expert Reflections on Networks

The choice of questions used to stimulate the thinking of the participants was determined by a desire to generate a wide-ranging array of information on the structure, characteristics, behavior, and outcomes of networks. The stimulating questions are provided, with a description of the type of information that was expected to be generated, and whether the question was oriented to researching or leading networks. Note that the conversation in a circle can take unexpected turns and the authors' summary attempted to capture all aspects of the conversation, not just those that responded directly to the question. The body of information from all questions was then considered as a whole in developing the implications for AHFMR in Part III.

Question 1: Networks as an Appropriate Organizational Form.

Oriented to researching networks: If you had just been granted the opportunity to catalyze some sort of organizational form to stimulate research capacity, and you were not constrained by time or money, what would cause you to think about a network as an organizational form that might help you accomplish this? What would make you cautious?

Several themes emerged:

- It is important to recall that networks **are often 'emergent' and 'self directed'** and in some sense; this is an ideal type of network, as it is more likely that when they emerge without external stimulation that they will come to function effectively. It is instructive (even when learning how to 'stimulate' networks) to understand how networks which occur naturally work well in a particular environment or group (described as working 'in the wild').
- Networks involve **connections of varying strength and importance**. Proximity is important; those who are most closely connected experience a higher level of interaction, trust and reciprocal benefit. Those more distant are perhaps activated within the network when a particular need arises.
- **Constant interaction is not necessarily a pre-requisite** or even a desirable attribute of a network. Networks perhaps work most effectively when they can be activated efficiently for a specific purpose.
- **Trust and reciprocity** among members seem to be universal attributes necessary for highly functioning networks.
- The **use of technology for network support is a mixed blessing**. It enables collaboration around the world, but does not necessarily help to identify 'what network members know'. Interpersonal interaction (e.g. conversation and observation) is key to developing an understanding of what someone knows. (This assumes that knowledge transfer is a key component of network effectiveness).

- To be effective, **network structure and processes must be adapted to the purpose for which it is created**. There is a wide range of formal structures and processes that can be legitimately incorporated into a network, ranging from hierarchies to no formal structure at all. Networks designed to support knowledge generation are different than those designed for knowledge transfer.
- **Networks are not limited to human nodes**. In a knowledge transfer network, it is appropriate to include non-human nodes. These non-human nodes nevertheless may convey important aspects about humans in the network, over and above serving as a knowledge repository. For example, in the case of a knowledge repository node, the fact that a human member contributes information to the repository not only provides the substantive content knowledge but also signals that the individual is willing to share information.
- **Networks are cyclical in nature**. This is both in the internal or growth and development cycle of a network; as well as to outside forces that lead to the cyclical activity of a network. Networks operating within a public policy environment are often dormant at times of uncertainty in a political cycle; and conversely need to be able to be activated quickly and on short notice as the need arises.
- Given the evolving nature of networks, it is **important to know what interim indicators or milestones** one could observe to be confident that the network is developing as planned. This is especially important in the case of networks which are externally stimulated, such as by a funding organization.
- The purposes for which networks are created often include, implicitly if not explicitly, a desire to **influence change in one or more of the organizations t**o which network members are primarily affiliated. An understanding of routines and practices in those member organizations is needed in order to influence the 'parent' organizations.

Question 2: Membership and Evolution of Networks.

Oriented to researching networks: Is it possible for an individual to be a member of a network? Is it possible for an organization to be a member of a network? And…. Do networks change over time?

Emerging themes were:
- Networks exist for **different purposes**: innovation versus control; practice versus learning.
- There may be value in thinking more carefully about the characteristics of individuals. Perhaps **there is an 'ideal type' of individual** who is a

boundary spanner[1]. It may be worthwhile putting extra effort into identifying and nurturing these folks.

- Very few people make their livings from networks; they **work in hierarchies but live in networks**. Networks interpenetrate organizations.
- **Effective networks have a distinctive culture** that is similar among successful networks. This is a difficult concept to capture and measure, but has been observed. It goes beyond trust and reciprocity. There is a sense that effective networks have common characteristics that are not observed in formal organizations. There is rather a consciousness among network members that goes beyond the organizational self interest. **Networks are ubiquitous**. They are everywhere and display huge variation in purpose, size, characteristics (e.g. permeability of boundaries).
- There is a natural evolution of a network. Over time, some of the purpose of the network may be achieved by changing behaviour or components, e.g. adding knowledge repositories or developing shared language. Once the purpose is achieved to a higher degree, fewer interactions are needed and individuals involved can go on to join other networks. There is no room for sedimentation around networks.
- There are **simple techniques through which to build network momentum**, such as encouraging discussion about crosscutting issues and topics, rather than those of primary interest to any one member.
- Networking sometimes **creates 'space to operate'** which would be difficult in other organization forms.

Question 3: Behavior of Networks and Leader Competencies.
Oriented to leading networks: When you are managing or directing or creating a network, what is it that ultimately terrifies you? Brings you joy?

- Things which give joy or satisfaction include:
  - Realizing the **power of shared vision;**
  - Realizing the wisdom of **empowering** network members;
  - **Creating something concrete;**
  - Seeing individuals **grow** through their involvement;
  - Realizing that networks don't really die, but rather component parts are **unleashed creatively** and can apply know-how in other ways;
  - Establishing **outcomes** for a network;
  - Watching networks (probably under resourced) demonstrate their ability to network and **create partnerships** (including equity partnerships) ;
  - Operating in an **ambiguous / uncertain environment;**
  - The **resilience** of networks and of members supported by networks.

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[1] Suggested reference is Gladwell, M (2000) The Tipping Point where author describes how trends spread.

- Things which terrify / cause angst include:
    - Knowing that in the end, **individual free will determines success** of a network;
    - **Letting go** of control (the flip side of empowering others);
    - **Managing ambiguity;**
    - **Outcomes**! (Knowing you're being evaluated on them; figuring out what they are);
    - **Operationalizing the role of boundary spanner** in different cultures; enabling people to 'swim upstream' (i.e. try to connect with decision makers if you're a researcher; try to value and promote research if you're a decision maker);
    - Understanding and **managing the tension** between self-sustaining networks and leadership of same;
    - The **time crunch**. Developing networks takes a long time; and often expectations of external funders or even members of the network are unrealistic;
    - Knowing when and how to **evaluate so that it is helpful**, not detrimental, to the network.

Question 4: Outcomes and Indicators of Network Performance.

Oriented to leading networks: Tell a story using real people and situations that describes outcomes that you have discovered from networks. Looking back…. If you knew then what you know now, how might you have predicted them.

Outcomes referred to during the stories included:
- Establishment of **relationships which endure over time** (The point was made that in any one community, there are probably 50 'go to' kind of people. You need to learn who they are, and then interestingly, over time and differing topics, you tend to run into these people in different places);
- Increased **efficiency** (e.g. increased knowledge about where expert knowledge resides in a community; a nurse in an acute care hospital who knows the diabetes educator can make connections efficiently; work is expedited informally)'
- **Career enhancement** for network members (e.g. early exposure to established leaders; enhanced job opportunities);
- Enhanced **access to decision makers** (Can lead to changes in system; example given of a caregiver being present at a meeting involving senior executives where the caregiver gave example of there being no appropriate facilities for changing older children in diapers; very shortly these changing facilities were in place);
- Establishment of functional network is an early indicator of probable success;

- **Collegial support** and ability of a team to tolerate differences of opinion and perspective;
- Shared **planning;**
- **Creation of organizations** to serve mutual interests in a particular geographic area;
- **Enhanced value** of individuals to the organization because of employee's (network member's) rapid access to knowledge from network;
- **Risk taking** (Sometimes a 'risky' activity can be sanctioned by network where employers of network members would be hesitant. Examples cited included a physician researcher doing a project on story telling as a way of transferring information to patients; this project would not have been funded through traditional means; research network supported this work which is now often quoted).

Question 5: Positive Mileposts on the way to Outcomes and Indicators of Mileposts

Oriented to researching networks: Thinking back, what were the things you saw that would suggest that the network was heading in the right direction?

There were several indicators suggested (implicitly or explicitly) that may signal movement in the right direction with respect to network maturity.
- Ability of members to discuss money seriously;
- Agreement about key issues (e.g. governing structure, criteria for success;
- Resolving a conflict or adversarial situation successfully;
- Members voluntarily subjugate own interests to those of collective;
- Acknowledging that sustainability is about more than funding;
- Referral among network members;
- Exhibiting trust and respect for viewpoints/perspectives that others bring to the table;
- Network is used as a problem solving mechanism.

An element of trust was a key enabler to several of the indicators listed above.

Question 6: Research Capacity Outcomes and Mileposts

Oriented to leading networks: How would we know enhanced research capacity if we saw it? How would you know that networks were contributing to enhanced research capacity?

The responses were very broad ranging to this question. A key point made was that outcomes need to be specific to the substantive purpose of the network, whatever that is. However, there were several non-specific dimensions noted that could contribute to the achievement of the purpose specific outcomes:
- With respect to outcomes specific to research capacity, the point was made that there are really **two main types of outcomes:** those related to

knowledge creation and those related to knowledge use. On the use side, this could include concepts of diffusion, differentiation and also absorptive capacity. Diffusion refers to the situation where the intent is to have everyone have access to certain knowledge; in the case of differentiation, each person or network node has its own specialty and members know who the expert is. Absorptive capacity refers more to the situation internal to organizations that are linked to the network. External connections are not enough to ensure knowledge use internally.

▪ It is often helpful to think about the **different levels at which outcomes are considered** as well: the level of the individual, the organization, or the community (or health system). There is no simple description of outcomes of a network, even one with a clearly specified purpose.

▪ There are multiple stakeholders with an interest in the achievements of the network; so **the question about whose purpose is being served must be asked.** The substantive purpose of the network (e.g. research capacity in the present discussion) is only one dimension that defines outcomes. Other potential purposes may relate to such things as inclusion, political responses or addressing inequities (although this was described as being often an unintended outcome).

▪ Another theme arising in this discussion was that related to **the network as a growing, evolving, changing entity.** By its very nature, a network is more permeable and changeable than other organizational forms. This of course, makes the evaluation of outcomes more complex. Networks may change in focus, and be influenced by new entrants. While the change in focus may not be desired from an external assessors point of view (such as a funder), it may be very desirable from the point of view of members and may also be an early signal that the context has changed in ways that are not yet apparent to the funder.

▪ The notion of 'intersecting' networks also was discussed. **Rarely is an individual who is part of one network a member of that one network only**. Sometimes memberships in various networks work at cross-purposes.

Networks in Three Dimensions: Building Models

Participants were asked to build three-dimensional models that reflected their view of what a network was. There was a fascinating array of hard connections, flexible connections, and different types of elements. Appendix 4 includes photographs and key points relating to each of the models, but a summary of key attributes reflected in the models follows:

- All network models included some array of nodes and connections

- The nature of the connections within networks varied
  - Some were inflexible and routine;
  - Some were loosely connected;
  - Some connections atrophy during the evolution of the network;
  - Some connections result in knowledge transfer;
  - Some connections connect people geographically dispersed;
  - Some connections are important because they are 'potential'.

- Network members had varying attributes:
  - Some come in with new ideas;
  - Some reach out to find additional links for the network;
  - "Hubs" have the most knowledge and the most connections;
  - Some are gatekeepers;
  - Some use network in ways that are against the values and purpose of the network;
  - Major hubs are important, increase them and you increase the connections, weaken them and the network (or parts of the network) will die;
  - Some people are good at attracting people to networks; others are attracted because of who is in the network. Some people are good at making the connections; other attract connections so are valuable;
  - Different disciplines come together to "exploit" (in the best sense of the word) each other's skills / all become stronger because of it;
  - 'Network members' need not be human. For example, a node / network member can be a database.

- Different models emphasized different aspects of the network
  - Strengths of connections;
  - Connection of members to organization of origin;
  - Nature of formation and action ("sometimes it all comes together like fireworks").

- There may be some particular competencies for network members and leaders:
  - Some people are better networkers than others.

- If you need "glue" the connection may not work. There must be something inherently attracting about the network to participants. Third party actions (glue) which are coercive are not helpful; glue which is facilitative may be.
- There may be different metaphors to describe networks:
  - A network is like a fish net -- strong but flexible. If you stimulate (or lift, metaphorically) one part of the net, other connected parts follow.

Focusing on Networks and AHFMR

Following the structured dialogue and network modeling to bring a common information base to the group, participants moved into small groups to focus the discussion onto the specific utility of networks to AHFMR. Specifically, the question for this element of the workshop was:

Is the concept of network one that has value to AHFMR? Why or why not, and in what circumstances?

There were a variety of questions and points that relate to this discussion.
- There is a critical distinction between networks that support researchers and other networks, for example. There are a variety of network models to consider, and a variety of purposes i.e. create knowledge versus exploit knowledge (and perhaps also broker knowledge);
- It is the emergent qualities of networks that makes them unique and gives them value in solving problems;
- There are different strategic approaches AHFMR could take: catalyze networks, levering projects to create networks, creating a network of networks (a 'meta network');
- Trust is a key point of network success, implicit versus explicit;
- It is helpful to have a mental model of how a network is expected to accomplish the anticipated goals;
- It would be helpful to know the role of IT to support networks; is it useful or not?
- What is the life expectancy of a network?

A critical element of assessing whether networks are an appropriate strategy for AHFMR is to have an extremely clear and precise understanding of the specific outcome / result that is required. Thus, a particular element of the AHFMR goals was chosen for consideration by the groups. Of the continuum of 'research capacity' (from creating, choosing, transferring to utilizing research evidence), the aspect 'utilization' or 'uptake of research appropriately into practice' was chosen for the groups to focus on. The focal networks in this case, then, could perhaps be referred to as practice networks, i.e. networks for the purpose of applying new knowledge in practice (as distinct from research networks, with the purpose of generating new knowledge).

The framework for small group discussion is illustrated in Figure 1, on the next page. AHFMR has a variety of strategies through which it aims to achieve its mission of increasing the application of knowledge in operational settings, whether those be clinical, service delivery, policy settings or community groups. Strategies include personnel awards, grants, Health Technology Assessment,
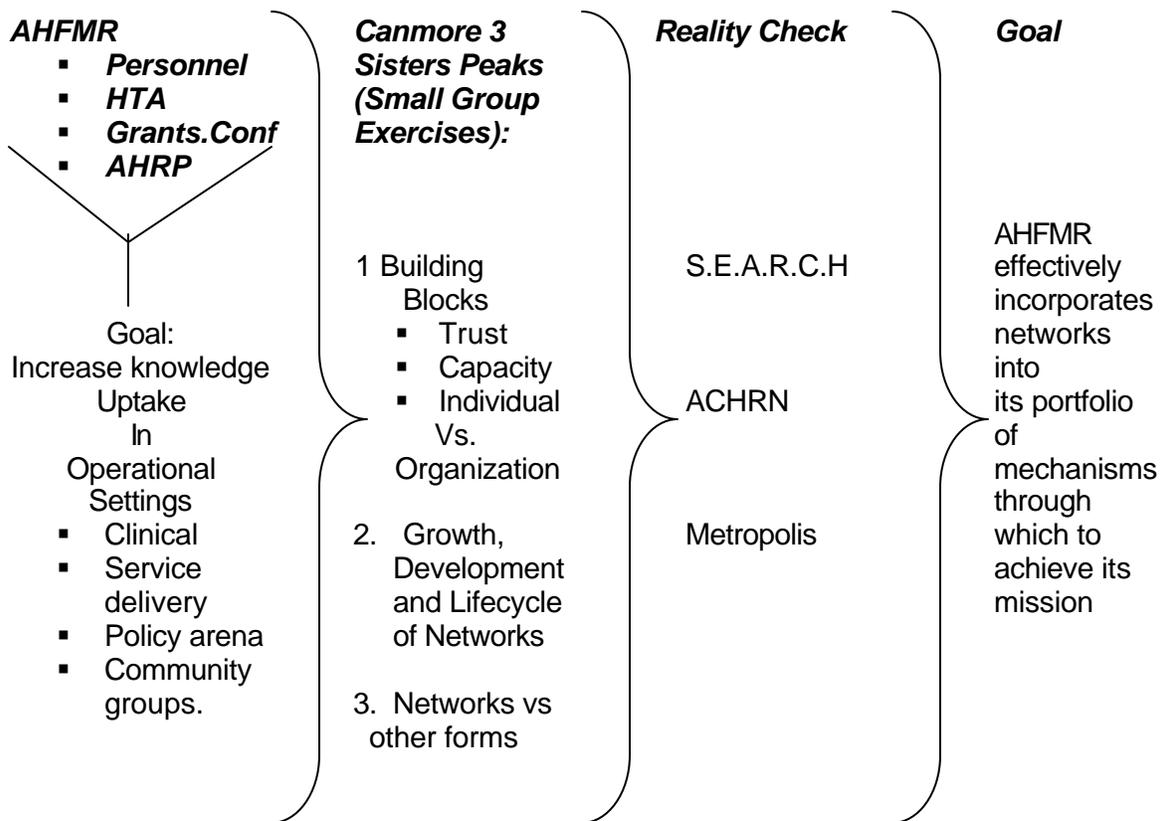
conference and travel grants, capacity-development programs in Applied Health Research.

Three different problems surrounding the issue of networks for research application were chosen as focal points for discussion. The three areas of discussion (cast as 'the Three Sisters Peaks[2]), were:

1. What are the building blocks for networks in terms of trust and capacities, and is there a difference if the network member is an individual or an organization?
2. What is the growth and development lifecycle of networks and how should AHFMR best support and evaluate each stage?
3. When are networks more appropriate than another strategy and why?

The small groups tested their thinking against three of the networks represented at the workshop (SEARCH, ACHRN and the Metropolis network) to come to a conclusion about the extent to which and how AHFMR could effectively incorporate networks into the portfolio of mechanisms through which to achieve its mission.

Figure 1: Framework for Small Group Work

AHFMR	Canmore 3 Sisters Peaks (Small Group Exercises):	Reality Check	Goal
▪ *Personnel* ▪ *HTA* ▪ *Grants.Conf* ▪ *AHRP*			
Goal: Increase knowledge Uptake In Operational Settings ▪ Clinical ▪ Service delivery ▪ Policy arena ▪ Community groups.	1 Building Blocks ▪ Trust ▪ Capacity ▪ Individual Vs. Organization 2. Growth, Development and Lifecycle of Networks 3. Networks vs other forms	S.E.A.R.C.H ACHRN Metropolis	AHFMR effectively incorporates networks into its portfolio of mechanisms through which to achieve its mission

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[2] The 'Three Sisters' is a well known landmark in the Rocky Mountains near the town of Canmore, where the workshop was held.

Peak One: Building Strong Foundations[3]

The topic that this group was asked to consider was: What are the building blocks for networks in terms of trust and capacities; and is there a difference if the network member is an individual or an organization?

Considering the issues of trust and capacity, the group identified a series of heuristics (sometimes called rules of thumb) of interaction for a funder to consider when wanting to fund or support a network in such a way as to make the power differentials work to the benefit of the network rather than its detriment:

- The level of trust that can be developed is affected by power imbalances. These occur most vividly in the case of an individual's relationship with his/her work organization in balance with his/her relationship to the network.

- The power balance between the organization and an individual staff member is such that the individual is the more vulnerable. AHFMR's potential role is therefore also one of 'Protector Organization'. This role helps negotiate the legitimacy of the vulnerable individual network member in the organizational context. The individual will always need to negotiate his/her involvement in a network within the local organization unit, but can use as part of the rationale the 'legitimacy' from the organization's overall agreement with the Protector.

- There is a creative tension between an individual and an organization. This tension will always be there and must be accepted as the 'nature of the beast'. The key is to work with it in a way that recognizes it is a factor, and that it is considered creative rather than limiting.

- Not all 'support' for networks comes from funding. AHFMR also may play a valuable role in legitimating the activities of the network in the eyes of organizations in which network participants work.

- It is essential to consider 'whose interests are being served' in the examination of any networks (e.g. network members, organizations, funder, system).

- Norms are powerful shapers of networks. One way in which a funder could be informed by this characteristic is to make it a requirement that a network's norms be made explicit and revisited regularly.

- Some functions of a network are assisted by having different organizational levels represented, because this provides diversity and ensures that front line, mid-level and executive management perspectives are all included.

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[3] Participants in Peak One Group were M.Spence, C.Katterhagen, A.Mark and K.Wright

- Other network functions require equivalent influence of members representing organizations. For example when organizations are in a network and decisions / commitments need to be made, the representatives need to be able to commit their organization's resources. In those situations AHFMR can require the organization representatives be of comparable influence in being able to commit their organization.

- A characteristic of networks is that the social capital developed in the network enables *reciprocity* in behaviour and in exchanging resources. In other words, if funding is necessary to enable an exchange, it is one signal that a network is weakening, or that it has become an organization. (organizations require rewards and authority directions to require exchanges) For example, in a network, participants respond to requests for information in a free and open manner. If someone expects payment or some other form of consideration for the information, it is a signal that there is not a network in place.

- The funder needs to identify whether the capacity required for networks functioning at different stages is in fact present, in order to ensure the funding will get the desired impact. For example, in the early stages of network development, is there anyone equivalent to a 'start up CEO' in the private sector – someone with experience at developing the network to a stable functioning system. On the other hand, a network at a stable functioning stage (or which needs to move to that stage) someone or some group that is comfortable and competent at maintaining stable operations. (Note that these functions might be provided by a core group in a network rather than a single individual.)

- At some stage the network may be struggling, or may clearly be working in ways that require 'fixing'. The funder needs to be prepared to walk away. Thus it is critical for a funder to be conscious of whether the network is developing as needed. The situation is much like a start up in the private sector – some fail and the venture capitalist 'cuts their losses'.

- The funder needs to have some limits on how long the start up phase lasts, and how long it maintains the 'Protector' role. If organizations do not evolve to a place where they provide sufficient internal commitment to the activities and health of the network (i.e. the outcomes of the network are sufficiently important to the organization), then the funder needs to question whether they will continue to force the issue. On the other hand, the organizational culture change to recognize the importance of the network's outcome might take a very long time and the funder be wanting to stay in the Protector role long enough to ensure that happens. The key is that the funder recognize how long it can reasonably be expected to take for organizations to provide sufficient support for network activities.

Peak Two: Network Growth, Development and Lifecycle[4]

Topics that this group was asked to consider included:
- *What are the stages of a network's lifecycle?*
- *What supports are needed at each stage (including IT)*
- *What is the appropriate role for AHFMR at each stage?*
- *What are appropriate evaluation techniques at each stage?*

The group initially focused on the question, "What is growth?" A number of terms were floated that might describe the changes in networks over time: growth, maturation, emergence, and evolution. It was agreed that "growth" might be somewhat value-laden and a decision was made to describe instead how a network might change over time. The group also tried to articulate those aspects of developing networks that a funder could examine when deciding whether or not to invest in a network.

The model that emerged from this discussion focuses mainly on purposeful network development, and in particular may reflect the narrow perspective of networks formed to conduct research. While this model did not reflect the understanding and experience of all group members, time did not permit exploration of other contrasting models.

This group described a network as having a lifecycle consisting of 5 stages naturally[5]:.

1. Formation
2. Identity
3. Proposal Development
4. Implementation
   a. Early (process) achievement
   b. Late (outcome) achievement
5. Wrap Up / sustainability / transfer / rollover / disengagement. Hand off

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[4] Participants in Peak Two Group were N.Contractor, B. Milward, G.Kerr, J.Popp, A.Best, J.Biles, R. Thornley

[5] As noted previously, this group focused primarily on a model that is more appropriate for a 'research generating' network, as compared to one which is designed to enhance the utilization of research knowledge in practice. A description of stages that is more widely applicable that is adapted from this one is presented in Part III of this report. Also, a key characteristic that emerged in other places in the workshop is not captured. This characteristic is that of the 'ebb and flow' or varying levels of activity in a functioning network at different points in time. The ability to 'gear up' or become inactive when specific situations warrant is one important characteristics of a network. This feature is lost in this rather linear depiction.

AHFMR might be approached for support by a network in any of these stages, or AHFMR might be seeking to reinforce or build on an existing network that is at a particular stage of development. The manner in which AHFMR acts depends on how many of the stages have been completed by a group that is approaching AHFMR for support.

The group worked with this characterization for the rest of the session, although there were some who did not feel that this particular model adequately described the specific type of network of interest i.e. one focused on applying research in practice settings.

There are a variety of 'neat mechanisms' that might be used by the evolving network and/or by AHFMR to facilitate the achievement of the necessary components in each stage. These are identified later in this section.

The following sections describe in more detail sub stages or components associated with each stage.

1. **Formation**

    (AHFMR could provide funding and facilitation in this stage).

    A network will go through a variety of sub-stages in its journey through the formation stage, implicitly or explicitly. The contribution from AHFMR can make more of the process explicit. This initial stage may be quite exploratory, and involve creating opportunities for people to come together and explore ideas and options in a non- or semi-structured way. The form in which the following sub-stages or components are explored or expressed may vary, but these are key:

    a. Statement of Purpose / idea (initially this may be quite fuzzy and include a number of competing and complementary purposes). Over time the clarity of the actual purpose of the network emerges.

    b. Identification of thought leaders

    c. Formation / Recruitment / Coalescing

    d. Feasibility analysis / formal go/no go decision

    e. Refinement of purpose / mission / vision /values leading to a purpose statement.

2. *Identity Formation*

    (AHFMR could provide funding, technical resources, road map in this stage. It is critical that realistic timelines are provided and the funder is patient in this stage as it can be quite lengthy.)

    In this stage, the work begun in the Formation stage is continued and refined. The group explores and decides on more detailed processes by which it will

operate, and these decisions create the culture and operating norms of the network that underpin its identity. The variety of areas in which the network explores this socialization / norming / identity stage are:

> a. How will we work? How much structure is optimal?
> b. How will we communicate?
> c. How will we make decisions
> d. How will we share resources? Power?
> e. How can we develop trust? How resolve disputes?
> f. What are our core values / norms / rules of behaviour?
> g. What are our membership rights and responsibilities?

The output of this stage may take a number of forms. Since going forward usually involves accessing some type of funding, these may be a preliminary action plan and/or a Letter of Intent. A 'logic model' or 'theory of action' may be prepared if the group wishes to explicate its assumptions of how the outcome will be achieved, although in an emergent situation it may not be possible to express a linear cause-effect relationship and a narrative theory of action is used.

In the end, the group does a self-assessment of whether it is feasible to proceed, and makes a go/no go decision. The stage involves gradually increasing levels of consensus / clarity and cohesion.

3. Proposal Development

(AHFMR can provide limited funding for proposal development, travel and facilitation, as well as the evaluation / accountability framework that the group can use to structure its thinking)

It is assumed for the context of this workshop that a network stage of development includes one of developing a full proposal for funding to support full implementation. This might be left to some members of the proposed network who have the most expertise in proposal development.

4. Implementation

(AHFMR can provide Network secretariat support).

The resources to support ongoing implementation of the network come from a variety of sources – organizations contribute the time of their staff members, and might contribute some additional resources (data banks etc). However, a secretariat function is critical to the productivity of a network and takes more than might be expected. One or more organizations might provide this function as well, sometimes in rotation, but it is more likely a greater investment than any one organization is prepared to provide.

5. Wrap Up / Sustain / Turn over

An Evaluation Framework for Networks

The group developed the basic structure of an evaluation framework. There are five dimensions of interest in the framework, and they all apply to some degree to each stage of evolution. **The five dimensions are: efficiency, effectiveness, accountability, responsiveness and equity**. The weighting of each of these might be different at different stages. For example, efficiency and equity are deemed to be relatively more important in the early stages, whereas effectiveness is important in later stages.

When evaluating effectiveness, or achievement of outcomes, it is important to be open to unintended outcomes. In fact, it is plausible that the actual purpose of the network may change as it develops and changes over time, and as the needs of the context change.

Each stage will evolve according to the unique characteristics of the situation and context. There are a number of process tools or **'neat mechanisms'** that can be used at various stages:

- IKnow (a software program that maps and allows analysis of networks);
- Environmental scan;
- Launch team;
- Concept / teambuilding work;
- Feasibility assessment;
- Repeated measure network mapping;
- Identity formation tool kit / web based resource centre;
- Expert consultation to support key deliverables such as the logic model / theory of action.

Peak Three: Networks vs other enabling strategies [6]

This group was asked to consider whether, given a complex situation, and desiring innovation and equalization of research use / impact across the province:

- *Are networks better than 'x' (your choice) at facilitating progress? Why?*
- *At what level should network focus be – individual, network or meta level?*
- *What is the mental picture (logic model, theory of action)?*

Again, the group was asked to consider these issues from the particular objective of this workshop, i.e. the group was asked to consider these topics from the perspective of AHFMR funding a formal network, with the desired outcome of increasing the uptake and application of evidence in applied settings.

Potential Strategies Available

There are basically two mechanisms available through which networks develop: they develop as a byproduct of another process; or they are explicitly supported. These two are discussed briefly below.

A. **Network as byproduct**. In some cases an activity or initiative has created a network as a byproduct of the primary activity. Some activities that can create networks as a byproduct are:

1. Social marketing;

2. Promoting individual training or education;

3. Creating internal champions;

4. Creating external consultants;

5. Linkage and exchange project requirements. (For example in SEARCH[7] there is a requirement that one of the projects be on a topic that is of interest to multiple regions and organizations, and the project team is comprised of cross-organization membership);

6. Targeted incentives;

7. Curriculum change (For example in SEARCH, the curriculum is delivered by having participants work in groups wherever possible, and there is a talking circle at the beginning and end of each residential module. This curriculum design is chosen for adult learning

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[6] Participants in Peak Three Group were S.Hayward, D.Behrens, K.Pain, N. Edwards, D.Royce, T.Reay

[7] SEARCH (Swift Efficient Application of Research in Community Health) is a capacity building program of AHFMR designed to enhance capacity of those working in the health delivery system to contribute to research and use research findings in their decision processes. For further information, see www.ahfmr.ab.ca and search for SEARCH.

requirements and also to increase the relationship building between individual participants that can support a network being created).

B. **Network as primary strategy or mechanism**. There are three strategic directions that a funder can take if it decides that a network is the best approach for achieving a particular outcome:

1. Promoting the creation of new networks
2. Support existing networks
3. Linking existing networks

A funder would decide that a network was the best approach because they facilitate behavior change and diffusion of knowledge (and they are efficient once they exist)

There are a variety of situations under which a funder would consider that a network might be a useful investment:

1. Scarcity of resources and/or expertise;
2. Distribution of resources or expertise;
3. Complex problem;
4. No existing natural networks – i.e. there is a network gap, e.g. horizontal;
5. There is sufficient time to mature a network to address problems.

Structures

Early work by Coleman[8] and subsequently by his student Ron Burt[9] addressed the issue of varying types of network structures and varying suitability for different purposes. There can be different kinds of structures of networks for different purposes.

For example, cohesion networks are characterized by direct ties among members and are good for transferring information among members (as, for example in the case of a particular graduating class from university). Equivalence networks on the other hand are comprised of members with similar characteristics, social norms, etc. who have equivalent connections to similar others but not necessarily to each other (i.e. all members of the alumni of the same faculty would be members of equivalence networks; they would all have connections to the university, the faculty and what it stands for; they would not

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[8] Coleman, Katz and Metzel (1957) The diffusion of an innovation among physicians. Sociometry 20, 253-270.
[9] Burt, Ronald (1978) Cohesion vs structural equivalence as a basis for network subgroups. Sociological Methods and Research, 7, 189-212. and Burt, Ronald (1987) Social contagion and innovation: Cohesion versus structural equivalence. American Journal of Sociology, 92, 1287-1335.
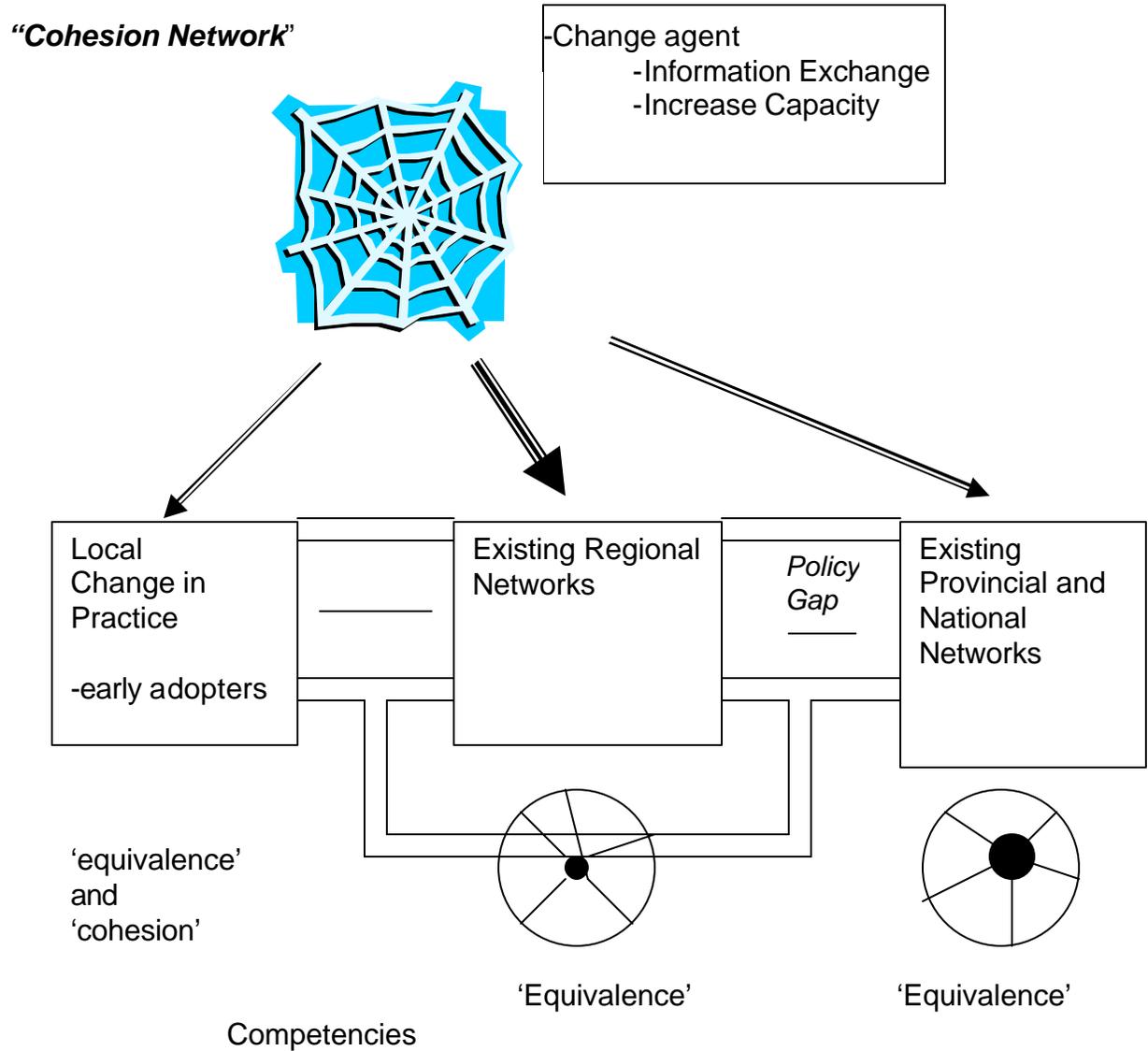
necessarily all know one another). This type of network is better for supporting behavior change because they tend not to develop the rigid social control of behavior that inhibits behavior change and that can happen more easily in a cohesion network.

Figure 2: Cohesion versus Equivalence Networks

Cohesion -direct ties among members	**Equivalence** -linkages to similar others
good for diffusion of information	good for behaviour change

One way to describe the various elements of networks for the current purpose is to use the analogy of Spokes, Spiderwebs and Stormsewers (see Figure 3 on next page).
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Figure 3: Spokes, Spiderwebs and Stormsewers

"Cohesion Network"

-Change agent
    -Information Exchange
    -Increase Capacity

| Local Change in Practice

-early adopters | Existing Regional Networks | *Policy Gap* | Existing Provincial and National Networks |

'equivalence'
and
'cohesion'

Competencies

'Equivalence'

'Equivalence'

In thinking of these two types of networks, there may be appropriate places within the system to incorporate or recognize the value of both types. Cohesion networks may work effectively for transferring information, but when one focuses more closely on the operational levels of organizations, equivalence networks are perhaps a more appropriate lens, as behavior change relies to a great extent on factors (e.g. professional norms) other than pure information.

Part III Implications for AHFMR

This work was undertaken because a research foundation (AHFMR) had an explicit interest in assuring good return on its investments in networks of varying types. This section considers the input that was given by experts in leading and researching networks and applies it to the AHFMR situation. Where it is helpful, key literature is referenced[10]. There are five questions for which we attempt to provide, if not answers, then at least some insight. These questions are:

1. What are networks, what defines them; what distinguishes them from other organizational forms?
2. For what purposes are networks particularly well suited?
3. Can networks be purposefully stimulated?
4. What can networks accomplish (outcomes, impacts, etc) and under what circumstances?
5. How do you measure activity and impact of networks?

This section also describes the process that AHFMR might use in responding to two different scenarios for potential funding of networks.

1. Networks: What are they?

What are networks? What defines them? What distinguishes them from other organizational forms?

There is no straightforward answer to this question. At root, a network can be considered to be the form created when two or more elements (people, groups, organizations, databases) are connected. There are two components – nodes and connections. One pays attention to the characteristics of the nodes, and the characteristics of the connections.

In other words, most organizations can be thought of as a networks where the nodes (individual people) are connected in relationships imposed by the organization's governance and management through decisions on organization form and function and maintained through a complex range of rewards and punishments (actual or potential). Other networks (the kind of interest in this report) are created by nodes (people or organizations) who connect in relationships for a variety of reasons, based on mutual interest of some kind, and in which trust and mutual respect grow over time.

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[10] See Appendix 5 for list of potentially helpful references and a list of perspectives from the literature that can potentially add to the understanding of networks.

Some authors identify networks as those forms that exist between the 'firm' (a formal organization with fixed boundaries and identity), and the 'market' (where there are no connections other than for exchange of goods and services)[11].

In part, networks are visible when one chooses to look at the world in terms of relationships rather than fixed items. For example, in Newtonian physics, one sees the world in terms of those things we can discern with our senses and thus as a collection of objects. This has led to a view of atoms as billiard balls for example. However in quantum physics one is interested in flow and energy patterns[12].

So, for the purposes of this report, we are considering network forms in which membership is voluntary and the nature of connections and the selection of the nodes in a network happens through some sort of process internal to the network rather than by fiat.

Networks include Nodes and Connections

Nodes can be individuals, groups, organizations. They need not be human – a database or other shared resource can be a node in a network. Some authors call these 'agents'[13].

Connections among nodes have different characteristics. They can be described as loose or tight, weak or strong. There are no good or bad connections, but different types of connections are able to facilitate different types of interactions and influences. Granovetter's[14] classic work showed, for example, that weaker ties are actually more effective for certain purposes (e.g. employment seeking), where it is important to connect with those outside of your immediate circle.

Another dimension that has been used to characterize the nature of connections is that which attends to the nature of the relationships between members of a network. Early work by Coleman[15] and later work by Burt[16] examines

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[11] Ireland, Thomas R (1990) The formation of organizations, networks and markets. *Journal of Behavioural Economics*. Vol 19(1):103-125.
[12] In Blackfoot Physics (2002), Phanes Press Inc., pages 6 – 8 David Peat describes this concept "In modern physics, the essential stuff of the universe cannot be reduced to billiard-ball atoms, but exists as relationships and fluctuations at the boundary of what we call matter and energy…[and that]…nature is not a collection of objects in interaction but is a flux of processes. This worldview is also expressed by ecologists who stress that we must attend to the basic interconnectedness of nature and to the sensitivity and complexity of natural systems.
[13] Monge, P.R., and Contractor, N.S., Theories of Communication Networks, (2003) New York: Oxford University Press.
[14] Granovetter, Mark (1973) The strength of weak ties. *American Journal of Sociology* 78(6):1360-1380.
[15] Coleman, James; Katz, Elihu; Menzel, Herbert (1957) The diffusion of an innovation among physicians. Sociometry, Vol. 20, No. 4, 253-270.
[16] Burt, Ronald (1987) Social contagion and innovation: Cohesion versus structural equivalence. American Journal of Sociology, 92, 1287-1335.

characteristics which Burt calls cohesion or structural equivalence. Cohesion relationships are characterized by physical proximity between socially similar individuals whereas structurally equivalent relationships describe people who occupy the same position in the social structure (e.g. physicians) and so are proximate in so far as they have similar patterns of relationships with occupants of other positions. So the structural equivalence concept has particular relevance when considering situations that involve representatives of specific professional groups that have identifiable social identities, for example.

Some networks have hubs, which are areas characterized by a higher density of interactions. In some cases, these hubs represent some sort of leadership or coordinating centre, and sometimes hubs include paid staff.

Characteristics of Networks

There are some key characteristics that define networks, but not many that are unique – i.e. occur only in networks. Sometimes it is a matter of degree – the degree of formality and of mandated behavior becomes stronger and stronger and then an organization form looks more like a formal organization.

Some characteristics which may be 'necessary, but not sufficient' to determine that a network exists include:
- There are nodes and connectors in every network. The nodes may be human or non-human (e.g. databases; knowledge repositories)
- Involvement in networks usually involves a high degree of self-directedness. Membership is almost always voluntary. People 'vote with their feet'.
- Networks can operate in the 'white space' or opportunity space which often provides an opportunity for action that is not feasible within one's home organization. There are no formalized procedures or reporting relationship which mandate or structure the interactions.
- Networks can exist quite effectively without tangible formal organizational characteristics. This is not to say that they all do. There is a quality of emergence that more often describes network evolution than other organizational forms.
- Networks are particularly well suited to be responsive to the environment i.e. they can be quickly activated at certain times but can also lie relatively dormant for long periods of time without ill effect.
- Networks are similar to other organization forms in that they have life stages; these stages may be more important to acknowledge in networks, as due to their very nature they are more likely to wax and wane in their activity levels.

Note that none of these are absolute – it is possible for a network to be a 'monoculture' and have little diversity, or to require tangible organization characteristics for some aspects of its operations.

There is arguably one characteristic of networks that actually differentiate them from other organizational forms. The fact that networks are not the primary organizational connection for members is unique (with the exception of staff who may be hired by the network to support it).

Implications for AHFMR

The primary implication for AHFMR is that supporting networks can be considered a potentially valuable strategy for achieving the organization's mandate. Networks support research in practice, both in 'generating new knowledge' and in 'using knowledge in practice'. Networks are a mechanism for innovation and flexibility, and creating 'space' for professionals to take action that may benefit their organizations, and may also provide opportunity for accomplishment and recognition outside the constraints of their home organization. Because of the multiple connections, it enables more opportunities for information flow into an organization; and provides another avenue for concerted endeavors beyond the usual organizational context.

Involvement in networks provides another way for personal accomplishment among members. It provides a vehicle for achievement. Relationships are built on trust and are voluntary, therefore there is no sense that one is engaging out of obligation or organizational pressure. This in essence means that networks can be an effective vehicle for 'unleashing' energy and expertise on a particular focus, such as enhancing the uptake of research knowledge in organizations.

The ability to exert control over how you spend your work day is known to be a powerful motivator. Although that may be an attribute of many positions, it is almost a given in network membership; by its nature the involvement is voluntary. Therefore, by supporting and enabling network membership and activity, AHFMR may be making a modest contribution to morale of health system workers in the province.

Because networks are particularly well suited to be more or less active depending on the context at a point in time, they are an efficient mechanism through which to support action.

There must be a 'dance' of stimulating networks – just enough to attract it to address a purpose, but not so much that the stimulation creates a required behavior – this turns the emergent network into an organization that exists for the purposes of those stimulating its existence and form – it becomes a means to produce a product by some pre-determined means. Thus, the nature of the connections stops being based on trust and reciprocity and starts becoming based in reward / punishment. It is important for AHFMR to recognize the valuable experience that they are gaining in nurturing and guiding networks, and

to capture that expertise in such a way as to contribute to continued capacity in the province.

A particular life stage requires specific skills in the individual or group that is providing the leadership. There fore, it is important for AHFMR to attend to the leadership or level of inherent energy in a community for any particular network, and to consider that in its strategy for supporting any particular network.

2. Situations for which networks are suited.

Networks are particularly appropriate in some kinds of situations. These include:

- Context where varying levels of activity are needed. The most obvious one is a situation where varying levels of activity are required at different points in time. In contrast, networks are probably not the best way to organize individuals for a production or manufacturing process[17]. However, networks are particularly well suited to be responsive to the environment. Networks can 'sleep' and 'wake up'. If the environment is not supportive, they can lie relatively dormant for long periods of time; they can also mobilize quickly.

- When innovation is needed. Outcomes of a network cannot be completely predicted.

- Knowledge is not codified and is needed in a timely (just in time) fashion.

- Data or information is not sufficient – knowledge or wisdom are required. That is, the fit with context is particularly relevant for the desired purpose.

- There is a scarcity of resources and/or expertise and they are widely distributed.

- Situation where diverse entities need to connect or work together. Networks are a better form for integrating diverse entities, because they do not force the individual or organization to conform to a fixed identity. This makes it easier to have high creativity or innovation, because the trust relationships of the network plus diversity are the ingredients of innovation.

- The problem to be addressed is particularly complex.

- There is sufficient time to mature a network to address the problem.

Implications for AHFMR

Given the above, it should be possible for AHFMR to make an assessment of the context for new networks that are asking for support; and also to assess the appropriateness of other initiatives that it is currently supporting under a network umbrella.

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[17] Note this does not preclude the use of networks in production or manufacturing. There are examples in the private sector of vertical integration of a production venture using a network of organizations, each of which is a specialist in a particular part of the production

3. Can networks be purposefully stimulated?

Networks can, and have been, purposefully stimulated. Careful thought should be given to whether (and when) they 'should' be stimulated. Networks can be stimulated either by nurturing nascent or emerging activity that is already present, or by stimulating them de novo. The question about when it is appropriate to stimulate one when there is no nascent activity (i.e. de novo) is not an easy one to answer. It seems common sense that providing fuel to a fire that is already started has a higher chance of success than one where there is no flame. The other part of the question is, once stimulated, can a network be maintained so it continues to have the valuable characteristics of emergent networks yet continue to achieve the purposes desired.

There are a number of things to consider:
- Networks are at differing stages of development. Like a seedling, a network needs nurturing but also needs freedom to explore and grow.
- Sometimes it may be wise to stimulate a network indirectly – by implementing an activity that has a high degree of likelihood of a network emerging as a byproduct.
- The art of supplying the 'right' amount of support is not straightforward. Support (most often interpreted as money) needs to be applied judiciously; enough to nurture growth and momentum but not enough to remove the need for reaching out and expanding connections.
- Although money is often the identified means of support or stimulation, there are other important resources. For example, network start-up skills are as important as the skills of a startup CEO in a new company. The skills for the facilitation processes involved in the early stages of a network's development are also a critical resource in stimulation. Further, AHFMR can play a valuable role as 'legitimizer' or 'protector'. By gaining acceptance for the importance of the network at the executive level of organizations, AHFMR provides a means for individuals in that organization to justify the time they spend on network affairs.

Implications for AHFMR:

It is important to ask the question – For what purpose does AHFMR wish to stimulate networks, and are the conditions such that a network could be expected to be an appropriate mechanism? Then it is possible to consider whether the right kind of network can be stimulated to grow and flourish, realizing the valuable characteristics of networks and also achieving the purposes hoped for.

It is not realistic to expect every network that is supported will flourish. It may be appropriate for AHFMR to use a population approach when assessing success in

their efforts to stimulate networks. If one accepts that there are some clear advantages that networks can provide in a health research use system, then success at a system level means considering all of the networks stimulated as a group, rather than considering them one at a time.

4. What can networks accomplish? Under what circumstances?

In theory, networks can contribute to the accomplishment of a very wide range of outcomes and goals. There is no list of outcomes for which one must use a network. There are examples in the private sector of vertical integration of a production venture using a network of organizations, each of which is a specialist in a particular part of the production. Certainly networks to catalyze research are known. Practice networks that include a commitment to best practices and research-in-practice are also known, but they are not the same as research networks.

Some types of networks are better for dissemination of information and others are better for stimulating behavior change. It is not so much a question of asking what can networks accomplish, as much as asking 'If I am stimulating a network for a particular purpose, what types of connections are more likely to lead to my particular kind of outcome?'

As with other organization forms, there are impacts of networks that are almost byproducts – the network is not created to accomplish certain outcomes, but yet the network contributes to their generation. These include:
- Equity.   A network may contribute to equity by, for example, exerting pressure to ensure that all members have equal access to core resources (e.g. fax machines, computers, access to internet). Because there is no formal authority structure in a network, the contributions of an individual node are valued for how well they contribute to the network's primary purpose.
- Efficient knowledge translation. Networks connect individuals in varying local situations with remote knowledge sources. A network gives direct or mediated connection to deep pools of wisdom and applied knowledge.
- Experimentation – a network allows testing of new ideas in a fairly low risk environment because the organization does not need to sanction the activity.

Networks can link together people from widely diverse fields of knowledge and worldviews, so they are likely to be particularly effective at addressing enormously complex policy problems. These require the combined and concerted effort of people from a large number of research and policy areas. For example, a major health renewal project encompasses governance / organization design elements together with health services / clinical elements and population health promotion elements. The range of research fields to inform the enormous range of decisions for such a project would definitely take a network to have the

various players act in concert. It requires programs of research and practice that bring together researchers, practitioners and communities in ways that they do not usually interact.

As noted in section 1, networks are particularly well suited to 'working in the white space' and therefore for producing innovative outcomes as well as disseminating information about innovation. Some of the emerging information on improving an organization's skill at innovation[18] identifies the logic of transferring approaches and technologies from one industry to one application to another. Because a network has a greater capacity for accommodating a wide range of diversity across its nodes, together with the trusting relationships, it has the necessary key ingredients for innovation.

Implications for AHFMR:

Networks are a means to an end, not an end in themselves. There are particular contexts where networks present a good alternative for trying to enhance knowledge utilization or research uptake. It is better to first understand the specific purpose for which a network is desired, and then ask what types of forms are necessary, so that the appropriate type of network is stimulated. At that point, the outcomes of interest are those which are intended to be addressed through the network mechanism.

5. How do you measure activity and impact of networks?

There are no specific outcomes that are unique to networks and the outcomes of interest to be measured are the substantive ones associated with the desired purpose, whether it is tackled through a network form or some other mechanism. In the case of AHFMR, if a network was supported for the purposes of supporting research, the outcomes of interest would be the usual research achievement outcomes. If the network was designed to enable research utilization in service delivery settings, then that is the ultimate outcome of interest.

What is perhaps notable about measuring outcomes or impact of a network form is that there must be a recognition of the fluidity and informality of many networks, particularly in their early days of evolution. It is only appropriate to examine indicators of 'network maturity' when the network is expected to be in a mature life stage. Although the concept of life stage of an entity is clearly not limited to networks, it is critical to recognize when measuring networks. Networks evolve along some particular dimensions. Evaluating networks appropriately requires some knowledge of the path of evolution and the particular life stage of the network being evaluated.

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[18] Hargadon, A., How Breakthroughs Happen: The surprising truth about how companies innovate (2003) Harvard Business School Press.

Having said that, evaluating the life stage of the network and / or the nature and extent of connectivity of a network may be considered as a leading indicator of its ability to deliver the desired outcome in future in a more polished, competent way. Although social mapping received relatively little air time at the Canmore workshop, the nature and extent of connectivity within networks is often measured using a variety of social mapping or sociometric techniques, and approaches to mapping are highly developed. There was limited discussion about the association between network activity and impact.

This means that knowledge of the intended outcomes will be important so the leading indicators of the desired outcome can be tested for, early in the network's life, so the decision about whether to continue funding can be made. Funding could be provided on a staged basis, with each decision being contingent on satisfactory progress through the previous stage.

During the workshop, one model of the lifecycle of a network was proposed, which included the following stages:
- Formation;
- Identity;
- Proposal Development;
- Implementation;
- Wrap up.

While this formulation seems more appropriate to some contexts than others, it gives the sense of movement and maturation. Not all the steps would apply in every network. For example, a network could develop and thrive without ever developing a formal proposal, per se. A more general formulation of the stages of network maturing might be:
- Formative;
- Identity;
- Solidification of purpose and governance arrangements;
- Fully functioning (but not necessarily fully active at all times);
- Mature;
- Declining or disintegrating or emerging (into something else).

At the mature stage of the network one could realistically assess the accomplishments of the network with respect to the substantive outcomes originally hoped for (or at least hoped for at a point in time, as it is recognized that purpose may evolve as networks evolve). As implied, however, network growth trajectories are not necessarily constant, or linear; nor are activity levels constant after a network is fully functioning or mature. One of the appealing characteristics of a network is the ability to ramp up quickly in activity levels or to essentially lie dormant at a point in time if there is no 'purpose relevant' need for it to be active.

Following are potential indicators that relate to recognizing whether a network is evolving in maturity:

- Ability of members to discuss money seriously;
- Agreement about key issues salient to network future (governing structure; criteria for success);
- Resolving a conflict successfully;
- Members voluntarily subjugate their own interests to those of the collective in the short run, because they have developed trust that their own interests will be met in the long term;
- Acknowledgement that sustainability is about more than funding;
- Referral among members;
- Exhibiting respect for various perspectives;
- Using the network as a problem solving mechanism;
- Varying levels of activity over time may be an appropriate indicator of a successful network, depending on its purpose.

There are different levels to consider when measuring activity and impact: individual, home organization, network and community.

Implications for AHFMR

It will be important to develop a matrix of appropriate indicators of progress for various lifecycle stages. Outcomes indicators are only appropriate once a network has achieved a certain degree of maturity.

Scenarios for Application

As a means of demonstrating how the information from the workshop might be translated into practical application by AHFMR, two scenarios have been developed. One describes how AHFMR might respond to a request to fund a network, and the other how AHFMR might choose to strategically stimulate a network.

These are not meant to be the penultimate approach, nor even a recommendation at this point, but rather are provided for discussion purposes. They are described fully in Appendix 6.

Appendices

1. Network Descriptions

2. Workshop Process

3. Workshop Participants

4. Three Dimensional Models

5. Literature Resources

6. Decision Process Re: Requests for Network Support

Appendices

Appendix 1: Networks of Interest

Network Description: CAMera

Name of Network:

Complementary & Alternative Medicine Education and Research Network of Alberta (CAMera Network)

Mandate/Reason for existence:
To sustain an education and research network to:
- Advance evidence based integrative health care practice
- Facilitate multidisciplinary research
- Promote the education of Complementary and alternative medicine

Brief History and Background:
The network was launched after a CAM research symposium held at University of Calgary on June 8, 2002. Participants at the symposium identified a lack of resources such as time, money and manpower, and a lack of research skills as the primary barriers to conducting CAM research. The main strategy proposed to overcome the identified barriers was the development of a CAM research network.

Structure/Governance:
- Four member Steering Committee
- Seven member Advisory Committee representing wide range of conventional and CAM backgrounds

Funding and support:
- Director and part-time coordinator
- Partnership with the Alberta Consultative Health Research Network and the Integrative Health Institute
- Joint funding for 2-years from Gary Owen Memorial Fund and The Calgary Foundation

Members:
Are:
- Conventional and CAM practitioners and researchers with an active interest in CAM research, from within the community and universities
- In Alberta

There are currently 300 members on the mailing list. Approximately 35% of the members are actively involved in CAM research; the majority of members are from major centres (Calgary and Edmonton).

Interactions/ Activities:
- 3-hour CAM research methods workshops

- Five-session CAM research methods course
- Annual CAM Research Symposium
- Research consultations
- Newsletters and newsflashes
- Website
- Interest Groups
- Official CAM affiliate of the Canadian Health Network

Stability of network:
Funding for a third year of operation may be sought from the Alberta Heritage Foundation for Medical Research's Special Initiatives Fund. Following the third year, the aim is for a self-sustaining network by linking with national networks, levying modest membership fees, and charging increased fees for workshops, courses and consultations.

Evaluation:
An internal evaluability assessment is currently being planned, followed by an internal primarily formative evaluation by the Network Coordinator (MSc Candidate thesis). Following 2 years of its operation an external summative evaluation will be conducted.

Network Description: RTNA

Name of Network:

RTNA (Health Research Transfer Network of Alberta)

Mandate/Reason for existence:
Strengthen the application of research to health policies and practices through a multi-sectoral, province-wide network that:

- enhances skills and knowledge of professionals within the health system to do "best practice" research transfer;
- fosters partnerships, collaborations and mentorships which contribute to knowledge about research transfer;
- supports opportunities for the exchange of knowledge and expertise at the provincial, inter-provincial and national levels; and
- undertakes activities to broaden the community of interest in Alberta

Brief History and Background:

Under the Directorship of Dr. Judy Birdsell, the Dissemination Unit of AHFMR sponsored a number of people from Alberta attended a workshop in Toronto on research transfer with a follow-up workshop in Montreal some months later. Following the workshops, Dr. Judy Birdsell (formerly with the AHFMR) invited the Alberta attendees to meet and discuss the possibility of building and sustaining a network of people with interest and involvement in research transfer. Judy also established a broadcast email of information on research transfer activities in Alberta and across Canada.

In June 2001, individuals from several regional health authorities in Alberta, Alberta Health and Wellness, U of C, ACHRN, Health Canada, Centre for Health Evidence, Institute for Health Economics, and AHFMR met to continue these discussions. Since June 2001, this group of keenly-interested individuals has worked to identify the Network's aim, create a steering committee structure, and establish a variety of working groups with the purpose of addressing membership questions, communication needs, plan our launches, and develop or identify learning opportunities.

RTNA launched itself in May 2002.

Structure/Governance:
Central - Steering Committee of persons who are actively involved in facilitating the transfer of research into practice. Members can participate on subcommittees and in activities.

Through the Director of AHRP, The Steering Committee advises AHFMR on education and mentoring activities and initiatives that will enhance capacity for research.

Funding and support:
AHFMR provides funding to RTNA on an annual basis and provides staff resources to coordinate and organize and direct the Network.

Steering Committee members have the support of their organizations to participate on the committee and provide additional funding support and staff as needed.

Members:
Can join for free. Are as active or inactive as they chose to be in the network. Currently we have 150 people who are on our email newsletter list.

Interactions/ Activities:
Steering committee meetings every two months, ad hoc education/networking activities. RTNA co-hosted, with CHSRF and the Centre for Knowledge Transfer, a workshop on knowledge brokering on May 8, 2002 and jointly with the CRTN, hosted a conference on research Transfer in Health in October 24 and 25, 2002. A variety of education sessions and presentation have also been done by and for the RTNA, most recently was a province-wide videoconference discussion about building communities of practice that 50 people in 6 sites across Alberta attended.

Stability of network: unknown

Evaluation: No existing evaluation results about the network.

Individual at the workshop affiliated with this network:
Sarah Hayward, Director, Applied Health Research Programs, AHFMR
Cheryl Katterhagen, Community Liaison, Applied Health Research Programs, AHFMR

Network Description: SACYHN

Name of Network: Southern Alberta Child & Youth Health Network (SACYHN)

Mandate/Reason for existence:
SACYHN's mission is to use its collective strength and expertise to build and sustain linkages that optimize the health and well being of all children, youth and families.

The initial impetus for SACYHN was related to the discussion about building a new Alberta Children's Hospital in Calgary. Early planning sessions reinforced a commitment to creating a comprehensive network that would include many child-serving sectors and a broad definition of health.

The development of the *Network* is also in keeping with the Alberta Government's Children and Youth Initiative. Its primary goal is that Alberta's children will be well cared for, safe, successful at learning, and healthy. A comprehensive system of integrated health services for children that stretches across health regions and other child serving systems will help meet that goal.

Brief History and Background:
The Southern Alberta Child & Youth Health Network (SACYHN) formed in September 2001 and is a collaborative venture among parents, regional authorities, ministries and provincial agencies, universities and the not-for-profit sector. Mrs. Colleen Klein (the Premier's wife) agreed to be the honorary chair of the *Network*. SACYHN is building linkages across regions and sectors to support the provision of high quality, coordinated services to children and youth as close to home as possible.

Structure/Governance:

Funding and support:
SACYHN has three secretariat positions, all currently supported by funds raised through the Alberta Children's Hospital Foundation, that provide support to the Steering Committee, Working Groups and Regional Groups. The SACYHN Director has primary responsibility for the development, promotion, implementation and administration of SACYHN. The Director provides support for the Steering Committee, is actively involved in all Working Groups, and supports the Regional Groups as requested. The Child Telehealth and Outreach Coordinator develops and organizes telehealth and outreach activities throughout Southern Alberta. The Administrative Secretary provides support for the Director, Steering Committee and Working Groups.

In addition, a shared funding arrangement among *Network* partners in Calgary has resulted in the development of a Calgary Region *Network* Coordinator position that has responsibility for coordination of intersectoral initiatives and implementation of SACYHN activities within the Calgary area.

Members:
Calgary Board of Education
Calgary Health Region
Calgary Rocky View Child & Family Services
City of Calgary
United Way of Calgary and Area

Interactions/ Activities:

o Outreach Clinics 2003

  Medicine Hat
  Cardiology
  Cystic Fibrosis
  Endocrine
  Genetics
  Neurology
  Pulmonary
  Seating
  Lethbridge
  Cardiology
  Genetics
  Neurology
  Endocrine
  Red Deer
  Juvenile Amputee
  Genetics

o Telehealth
o Family & Community Resource Centre

Stability of network:

Evaluation:

Individual at the workshop affiliated with this network: Janice Popp

Janice Popp, Director
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Network Description: SEARCH

Name of Network:

SEARCH Network

Mandate/Reason for existence:

The SEARCH Program provides health professionals and administrators in Alberta with skills in applying health research and evidence based decision making (EBDM).

The SEARCH Network sustains and strengthens the capacity for EBDM and applied health research that is created by the Program.

Brief History and Background:
Informal networks are created over the two year participation in the SEARCH Program by participants and SEARCH core faculty who use the Network to facilitate their work. Each time a SEARCH Program is run, linkages between participants are created that facilitate the inter-regional and province wide exchange of information and expertise.

Without any formal support, funding or human resources, these intra-cohort networks sustain themselves in a manner than meets the needs of the participants from the cohort.

With the addition of formalized funding and human resource support, intra-cohort ties can be maintained and strengthened and cross-cohort ties between SEARCH I, II, III and IV participants can be created to extend the usefulness of the Network.

Structure:
The SEARCH Program direction is guided by the SEARCH Steering Committee. A working group representing participants, faculty and staff met to develop a plan formalizing support for the Network. The proposed structure is a sub-committee of participant representatives that advise the Steering Committee.

Governance / Leadership:
Yet to be formalized.

Funding and support:
AHFMR provides funding support for both access to technology (the virtual learning community, ie. SEARCH desktop) and staff support to organize and coordinate educational/networking events.

Membership:
Membership consists of past and present SEARCH participants and core SEARCH faculty. There are 75 past and 25 present participants; there are 14 core faculty members.

Interactions/ Activities: residential modules, conferences, research projects, inter-module skill exercises.

Stability of network: 100% for the duration of the SEARCH program and about 50% of past cohort participants remain active in the SEARCH Program and SEARCH Network activities.

Evaluation:
No formal evaluation, but there is some evidence that cross-cohort and intra-cohort ties are sustained and used to support the application of evidence in members' work practice.

Individual at the workshop affiliated with this network:

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Network Description: ACHRN

Name of Network:

Alberta Consultative Health Research Network (ACHRN)

Mandate/Reason for existence:
ACHRN's primary goal is to increase the capacity of Alberta health professionals and organizations to carry out and to use research and evaluation studies.

It also aims to
- increase capacity within Alberta academic institutions to work collaboratively with community agencies and professionals;
- contribute to construction and maintenance of research networks within Alberta that cross boundaries of Universities, health regions and disciplinary groups; and to
- contribute to successful completion of research and evaluation projects through the provision of consultation, mentoring and networking services.

Brief History and Background:
The need to provide expertise to health researchers based in the community, rather than in academia, and to create a supportive research environment of linkages and partnerships was identified as a result of the completion of the first SEARCH program.

ACHRN was established in 1998 as a partnership between the Universities of Alberta and Calgary with funding from the Alberta Heritage Foundation for Medical Research. The original grant was for five years with a mandatory external review after three years. This review led to some changes in structure and functioning of the organization. ACHRN currently has funding until March 31, 2004.

Governance & Structure:
- o Staff consists of a Director, manager and coordinator(s). There are currently two Regional Development Advisors and a statistical consultant located within affiliated universities. Two additional Regional Development Advisors are being recruited to start in September 2003. All positions are part time.
- o Board of Directors with representation from University of Calgary, University of Alberta, University of Lethbridge, AHFMR, Council of CEOs and client groups. Planning Committee
- o Consultants are engaged on a fee for service basis to provide consultations and workshops as needed by ACHRN clients.

Funding and support:
Special initiative grant from AHFMR for $225,000 / year plus direct support to Research Development Advisors and the statistical consultant (One day / week each). ACHRN is

supported by a part-time Director, Dr. Kerrie Pain; a program manager, Nadine Gall; Network coordinator, Rosemary Paddock; and a network assistant.

The ACHRN central office is housed at the University of Calgary, and there are two regional development advisors, Brad Hagen at the University of Lethbridge and Bonnie Dobbs at the University of Alberta who work within health regions, with both individuals and organizations to promote research and evaluation activities.

Membership:
There are several levels of 'membership' within ACHRN:

- Service is open to all Alberta health professionals, with a particular focus on those who reside outside of Edmonton and Calgary.

- ACHRN produces a newsletter and a periodic e-mail bulletin. These are sent to a comprehensive list of clients, consultants and other interested parties.

- Consultants are recruited to match the needs of individual clients and projects. Some consultants do frequent consultations, others have expertise that is less frequently required.

- ACHRN also works with other networks to provide support and education that supports the mission of the other groups.

Interactions/ Activities:
Consultations, Workshops and Information Sessions
ACHRN provides services to health service professionals in Alberta. Some examples of professionals we work with include nurses, rehabilitation therapists, physicians, health service managers, social workers, health economists, etc.

Interested clients contact the ACHRN coordinator to discuss their needs. The coordinator locates a consultant with appropriate expertise and links the consultant with the client, outlining the services to be provided. Both the client and the consultant are asked to provide feedback to the coordinator after the project is completed. If additional services are required, further contact can be initiated through the coordinator. Consultants provide expertise in areas such as:
  o Proposal writing/grant applications
  o Research design (qualitative or quantitative)
  o Data collection (questionnaire design, interview guides, etc.)
  o Data management and analysis
  o Data presentation and interpretation
  o Applied research (evaluation research, needs assessments, etc.)
  o Health policy (planning, management and organization)
  o Research dissemination (communicating research findings)
  o Research transfer (applying research findings to practice)

In addition to the consulting role, the Research Development Advisors work pro-actively with regions and other local groups to promote and develop research capacity within that local area.

Stability of network: ACHRN has been in existence since 1998. Current funding will expire in 2004, with an application for renewal planned for fall, 2003.

Evaluation:
External evaluation of ACHRN was done in spring 2001 with a final report delivered April 19, 2001. A formative evaluation of the Research Development Advisor initiative and a qualitative assessment of outcomes are planned for July through September, 2003.

Individual at the workshop affiliated with this network:
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Appendix 3: Workshop Process and Evaluation Feedback

Briefly the process used in organizing this workshop was:

1. Scan / sample literature to identify differing disciplinary perspectives regarding networks and to identify potential participants in workshop.

2. Approach potential participants regarding their interest in participating.

3. Participants in the workshop included researchers who study one or more aspects of networks; leaders of networks; consultants who work with networks, representatives of the sponsoring organization (AHFMR).

4. Background package for the workshop included 8 articles of interest reflecting different perspectives, with summaries of the networks whose leaders were invited.

5. Workshop in Canmore which involved the following sections/ activities:
   a. The schedule included an evening dinner on day 1, full day working sessions on day 2 (with a lengthy break in the afternoon, but working into the evening), and a finish at lunch on the third day.
   b. Evening dinner on Day 1 to meet and learn a little bit about one another
   c. Part I: designed as a dialogue where participants shared their perspectives of specific questions. Researchers and network leaders were asked questions as separate groups. (The group providing input at any one time constituted an 'inner circle' (around the table) and the other group observed. The purpose was to generate varied perspectives on key questions.
   d. Part II: Building three-dimensional representations of models and summarizing key features.
   e. Part III: Consolidation and focusing. The intent of this section was to consolidate along key dimensions which had emerged as important and focus on implications for AHFMR.

Comments offered on the process included:

- Participants liked the 'talking stick' concept (where each participant in the inner (talking) circle had an opportunity to give their input.

- Move earlier to consolidation phase (energy was low for final dialogue session)

- Provide time/space for participants to 'learn what one another knows' (in interactive way). The first evening session was viewed positively, but wasn't enough. It may have helped if participants

could have moved tables in some way so they got to know more people.

- Tell participants ahead of time clearly what the process plan is, so they can consider this in their decision to participate.

- Speakers in the 'listening' group would have appreciated the opportunity to comment on what they had heard from the 'inner circle' when their turn came (They were asked to respond to a new question).

- Consider having the break in the evening of Day 2, rather than in the afternoon.

- On balance, there was inadequate time for 'getting to know' each other, and learning what they knew. The group, in essence, created this space for themselves during the first 'consolidation working groups' on the evening of Day 2.

- There were mixed feelings about the usefulness of the 'inner circle' and 'outer circle' concept, where half of the group provided input at any one time.

Appendix 4: Three Dimensional Models

Participants were asked to build a 3 dimensional model of a network, using any materials they wished. A variety of materials were provided, including lego, white styrofoam balls (ranging from 1" diameter to 2.5" diameter), extruded foam 'building blocks' of different colors, 8 inch diameter beach balls, small plastic soldiers and parachutists (3" height), nylon string, cotton twine, wool yarn, drinking straws of different colors, balsa wood sticks (1/8" to ¼" diameter and length ranging from 2" to 20"), different colors of pipe cleaners, copper wire, glue, masking tape, modeling clay of different colors, gift wrap ribbon of different colors and types, wired garland with foil stars, scissors,

Participants could work alone or together, as they desired. Approximately 30 minutes were allocated for the task. Participants then described key characteristics of their model to the group.

Following are the 11 models developed by participants. Each has given a title by the report authors. Each model has a picture and key points drawn from the participant's description of their model and what they were trying to illustrate with their approach.

Public Policy Change through a Network
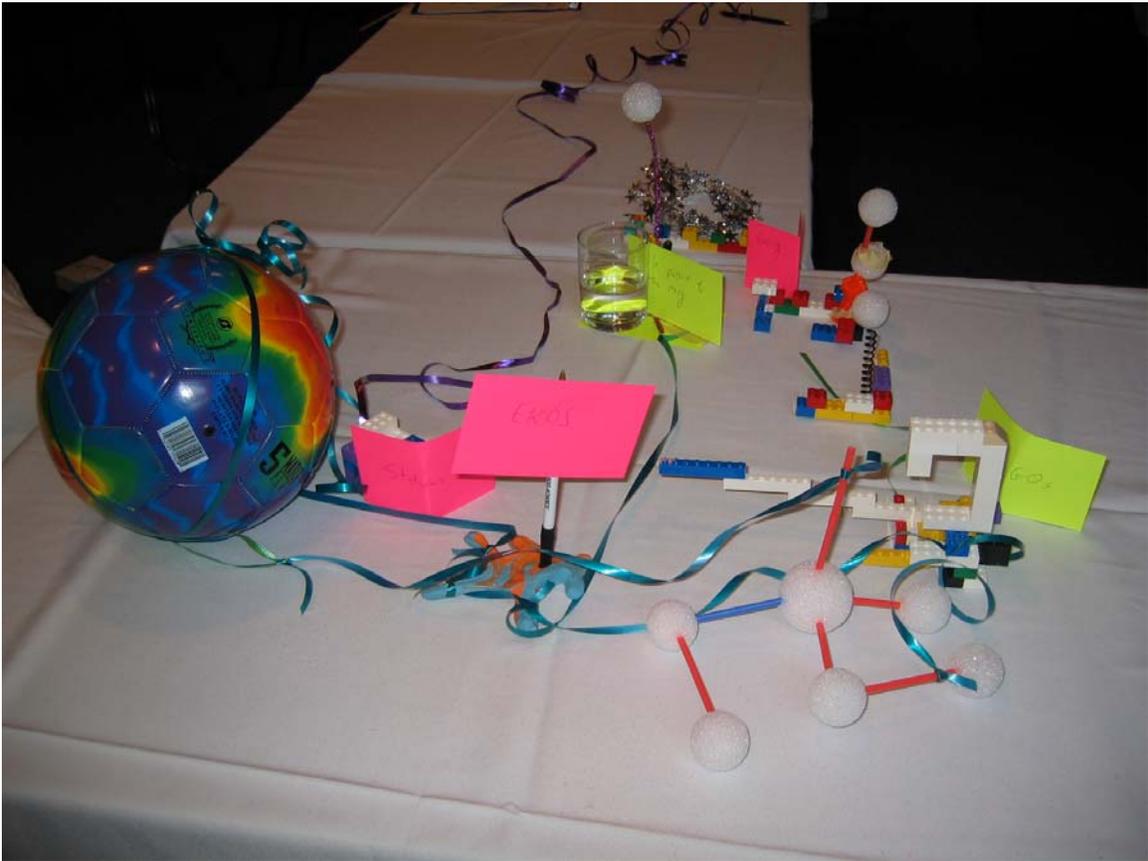
- This group based their network model on a real life scenario where they were envisioning how to influence Statistics Canada to change their policy about collecting data on sexual preference in population surveys.
- Diverse people and groups can be connected through networks (Statistics Canada, gays and lesbian NGOs, judicial system, Human Rights Commission, Governor General, academics)
- There is also diversity in the nature of connections – some are quite rigid, others very flexible.
- Sometimes don't want to be, or perceived to be, connected to some parts of the network ("media not connected to the judicial system because we thought that might be a bit problematic"
- Power of nodes in a network can be expressed in different ways (e.g. 'the big ball', the sparkly garland on the lego house)
- Social activism can be an objective of a network

Focusing on 'Thickness' of Relationships
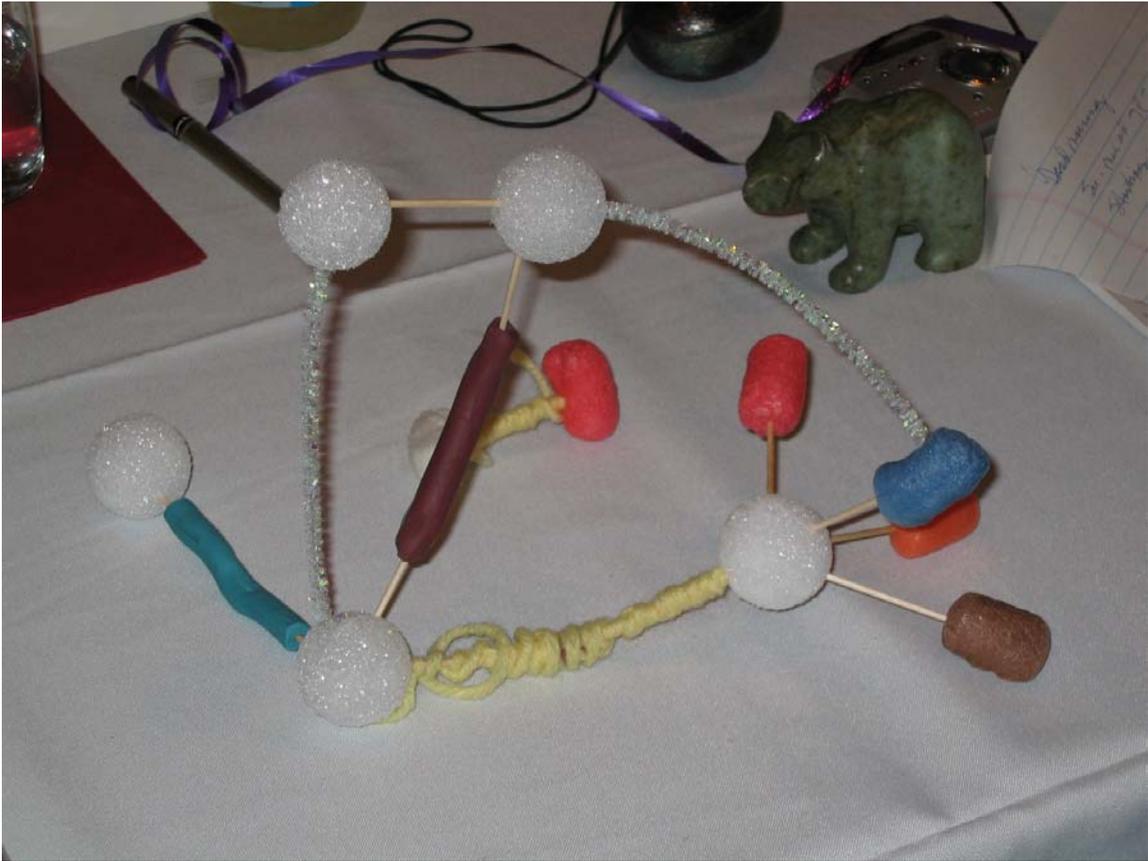
- Focus on the relationships – different types of relationships in a network
- Not everyone chooses to be part of a big network – prefer to stay in dyad
- Some relationships have history – that makes the relationship deeper, stronger, richer, different than others in the network
- Some connections can be more visible than others
- Connections can be flexible or inflexible
- Connections / relationships change over time
- Networks are never just in one structure, but are a multitude of potential structures.

Mature Network of Teams
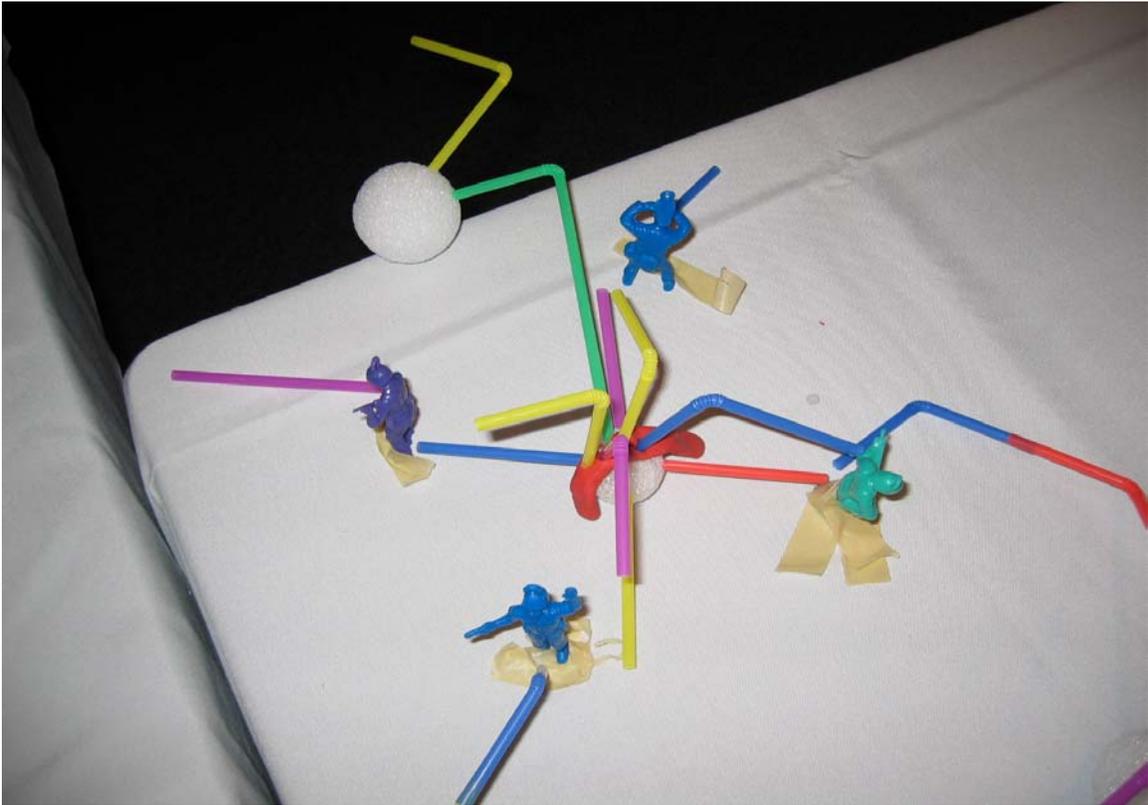
- Networks can have mature components
- Nodes can be teams
- While you can't 'control', there are ways to influence behavior in a network in a particular direction.
- In a mature network the participants focus on the job, not each other
- Although network members may fight with one another they can act in concert for a shared objective.
- Knowledge can be considered a 'flow' (and can also be a 'stock')
- Being in a network creates the opportunity for transformation – of the information, and of the researcher / node
- Networks can have a scale free nature
- Impacts can be well beyond what can be anticipated when the network is first created
- From a resource implications perspective, the administrative centre of these networks is very small and under-resourced, and the partner organizations are often the ones with the most money
- Networks don't own the people who are nodes, in the sense of having contractual relationships. They all collaborate, and often, reciprocity is part of the ties that bind them. The tight, the formal ties are elsewhere; you sort of leverage their activities and their institutional resources from other organizations
- An organization can choose to have staff members involved in a network in order to have the causal effect of a network's impact.

The Parachute Model
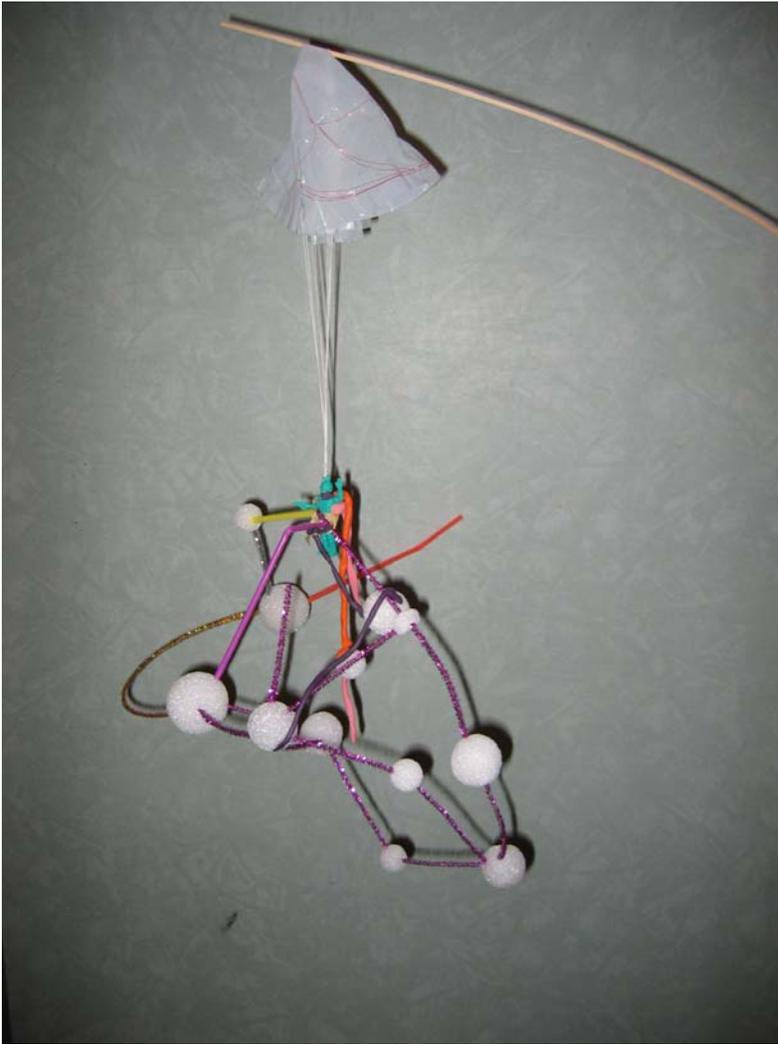
- Someone with special connection and special kind of training, working in an unfriendly environment may want to be a member of a network as it provides a 'parachute' – a source of safety – this can be true for the SEARCHers and the SEARCH network
- Some types of connections are more vibrant than others
- Some types of connections may break at any time, and the network provides some supportive connections

Occasional Fireworks
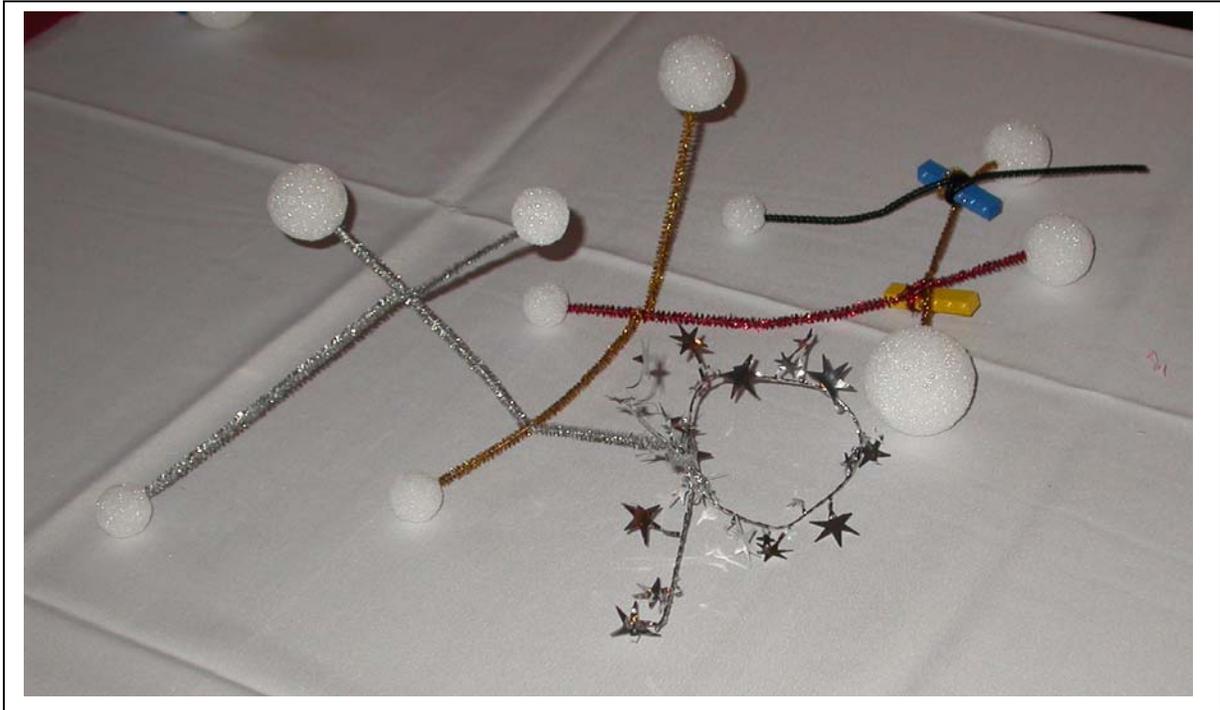
Focusing on connections between individuals and the network:
- Some connections 'tie people up in knots'
- Networks include different kinds of connections.
- Some people can be connected for multiple reasons – work, personal.
- Sometimes connections are very tight and so people consistently do things in the same way. Even though they might realize they need a new person (e.g. to 'fill a vacant spot in knowledge'), they have difficulty filling it because they are not prepared to change the way they do things and potential recruits don't want to do things in the same way as the group.
- Another type of connection is analogous to a 'loose wire', where connection sometimes happens and sometimes it doesn't, so there are likely a lot more new ideas (than the tightly coupled component of the network), but less predictability about whether something will happen.
- Sometimes the connection is like fireworks and it's impossible to predict whether the connection will happen, or bear fruit.

Competing Demands
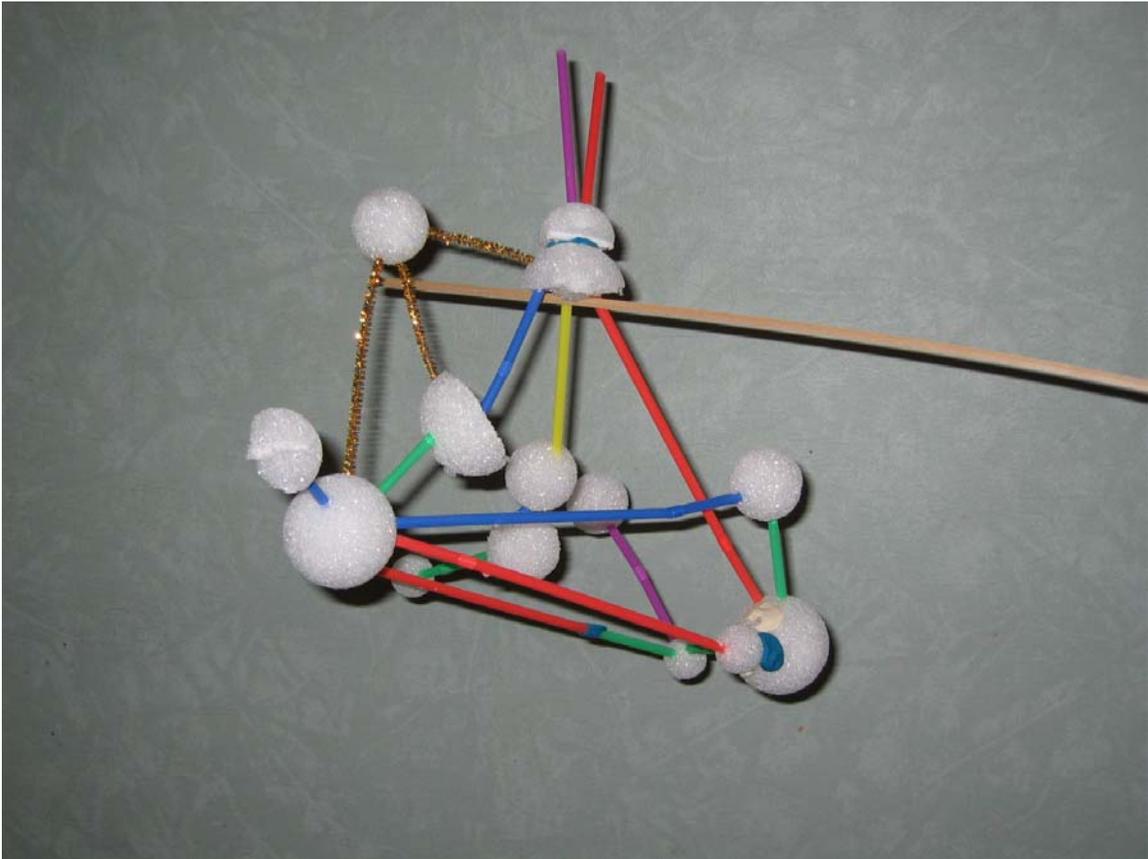
- Networks can be thought of as living organisms
- Some parts of the network can be atrophying – networks evolve.
- People in networks sometimes can have only partial commitment to the network because they have other duties and responsibilities that take priority.
- Networks realize when they need additional nodes and will attempt to recruit people.
- Human activity (including networks) has a centrifugal nature. Buds are created from the large network, and may split off.
- A network can be considered to have a 'periphery' and therefore an area that is considered the core or central component. People 'on the periphery' are those who will decide either to come in or go out in the evolving structure of the network.

## Keeping Connections Strong –Glue may dissolve some!
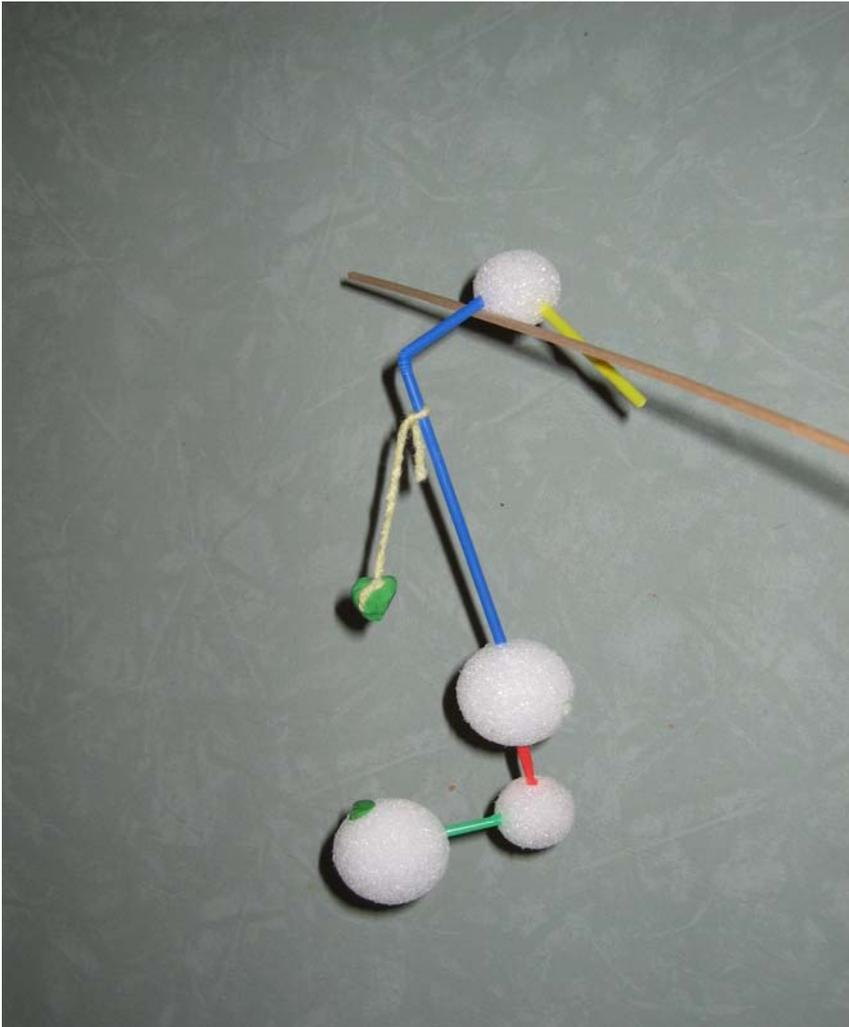
- Trying to think too much about what form a network will take is not productive
- Relationships cannot be forced. Sometimes attempts to force them cause difficulties
- Some kinds of connections are not robust and will last for only an instant.
- It is possible to have nodes that are only connected to the network.
- Where there is not a connection, there is potential for additional connections.
- Sometimes the connection to a node is only through another node (e.g. an executive assistant).

Focus on Hubs
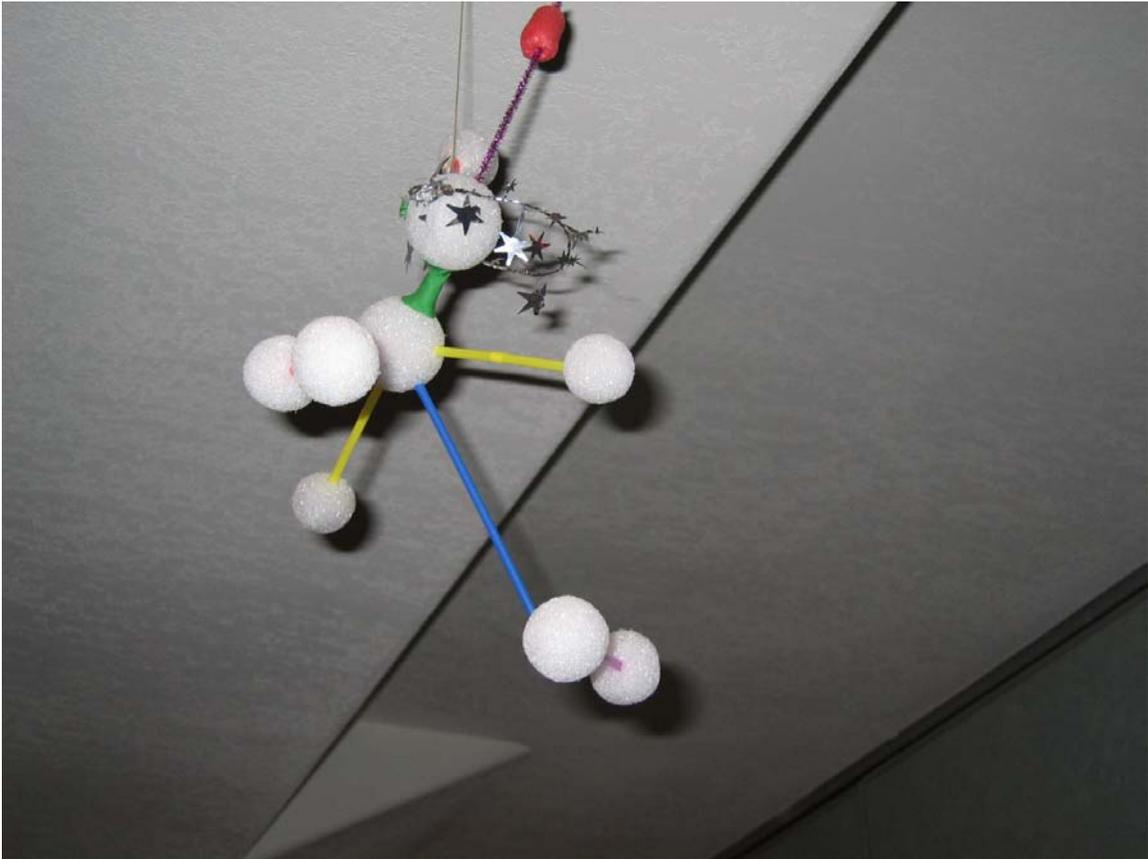
- Networks can have varying degrees of energy. Some can be thought of as having so much energy they 'lift off'.
- Modeling or analyzing real life networks is enormously complex. Combining systems theory and network theory may help.
- You cannot understand the important node in a network by looking at the formal structure of an organization. One potential way to get a good sense of how the network operates is to use the understanding of how scale-free networks operate. This means you look for 'hubs' - people who are well networked, 'who know everything that's going on everywhere'. Hubs have more connections than other types of nodes. If you analyze their connections, you have a good approximation of what the network's looking like.
- People's characteristics influence the way they operate in networks. For example, people become hubs through different strategies and it is important when trying to analyze a network through the hubs that you scan for different types of hubs. Some may be more obvious than others.
- Some hubs are 'superstars' and attract people.
- Some hubs are 'just really good networkers' and have a natural gift for networking, that helps them create a lot of connections.
- There can be variety in the type of connections to a particular hub.

# Avoid glue, and you may not know where people go
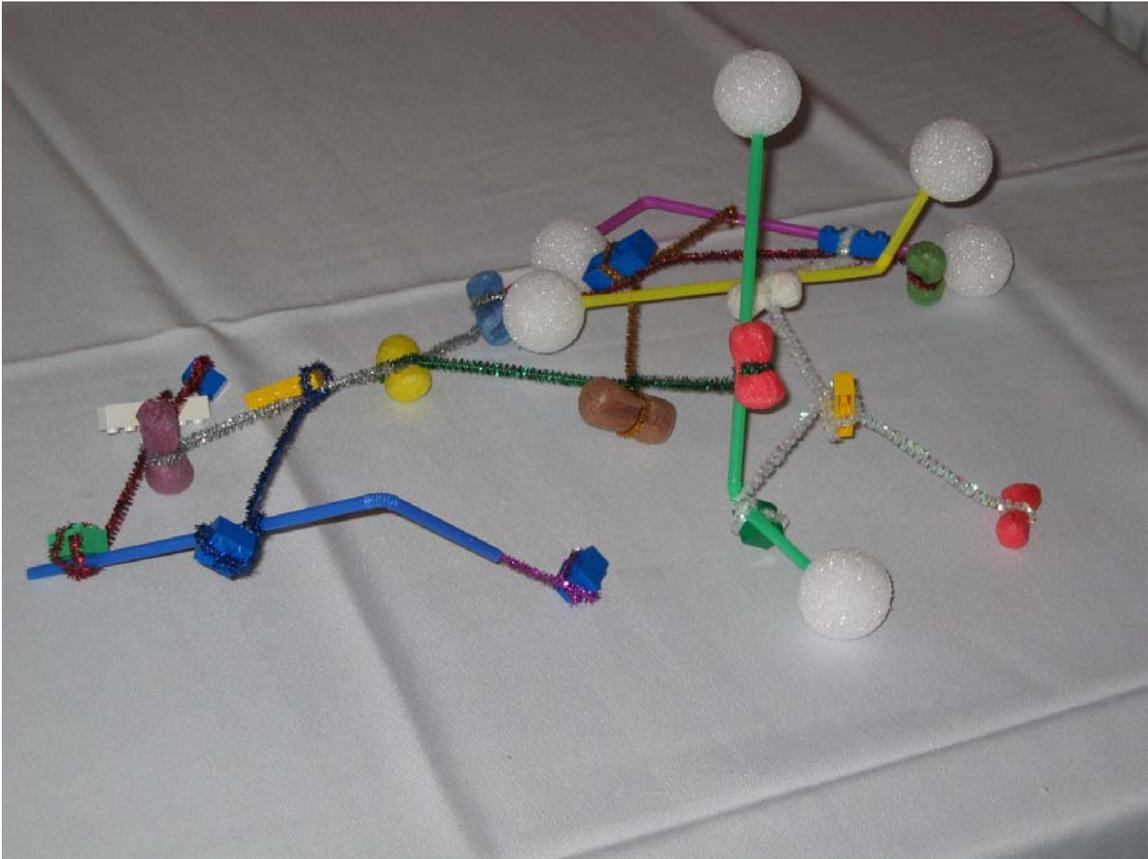
- You understand networks using 'post-hoc rationality' rather than predictive rationality.
- People join a network because it appeals to them
- Forcing relationships doesn't work. If you need to force a relationship it will not be effective.
- Links in a network are more like 'wrapping around',
- In a network people can appear to go nowhere. You will only know whether someone is participating until you need to know.
- Looking at a network from different perspectives will give different interpretations.

Networks as Fishnets

Focusing on different attributes of nodes rather than on the relations and on the issue of hierarchy in networks:

- People (nodes) in a network can have very different characteristics – they can be from different disciplines, can be basic researchers, clinical researchers and so on.
- A fishnet metaphor is useful to describe hierarchy in networks
- Like a fishnet, it looks quite fragile but is quite robust because if different parts break away, it's still works and is flexible.
- There can be a 'latent network' that doesn't become apparent until one person needs to take on the leadership.
- As illustrated in the picture below, when one person in this 'latent network' needs to take on leadership, they step into that role and the hierarchy is created around them for that particular task. The hierarchy then dissolves when the task is no longer needed. The string used for the model illustrates that connections can be both flexible and strong.
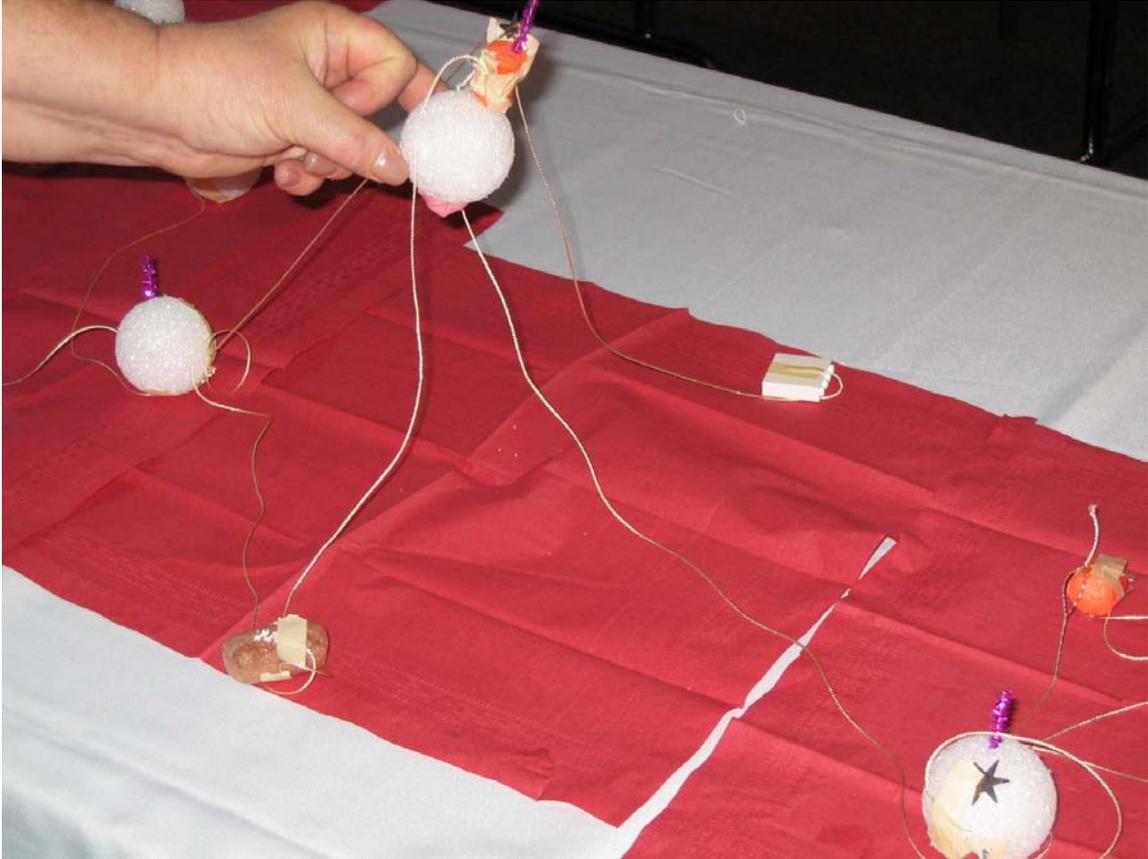
- Nodes can be non-human agents, such as a database
- The model also illustrates different types of key roles that people may take in making a network function successfully ("stars")
- The four people (in the example of the flexible hierarchy) are all well connected to each other. This illustrates a type of network called an 'exploitation network' (in the best sense of the term). In other words, people coming from different disciplines need to use each other's skills and therefore need to have close contact.
- Another type of key role (star) is a person who is connected to a lot of people. But a key part of the role is to look at the characteristics of people or groups of people that are connected to this person. In this case, the people are also connected to each other and this person's strength grows because he's a connection to people who also collaborate a lot and exploit each other's skills.
- Another type of key role (star) is one that connects two different groups of people (sometimes called a 'boundary spanner'). This person's key role is to translate across different communities of practice, or different geographical locations.
- Another type of key role (star) is connected to different groups of people who are not connected to each other. This person can be thought of as a gate keeper, because she or he will get information that's not going to be communicated among the other groups of people. This is an important structural role. This person is a good pulse taker, and usually is the first to know what gossip is circulating. They are also very successful at disseminating information. The type of network that is illustrated with this 'star' is called an exploration network (as opposed to an exploitation network). In an exploration network, more information flows but members don't use each other's skills.

Geographic separation, IT and a network 'thug'
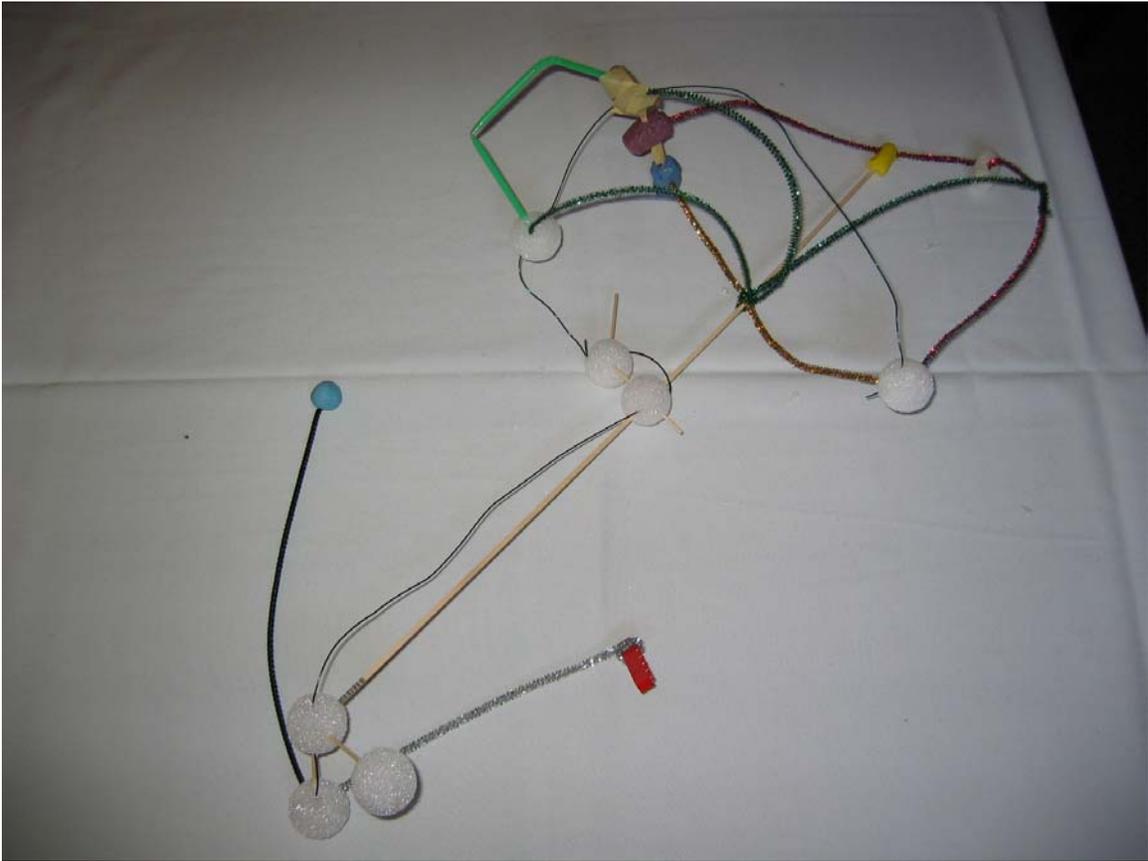
- A network can contain sub-networks that are at different stages of development. E.g. this model has some that are fairly informal and may emerge as a network, other sub-networks are slightly more rigid, less flexible. Still other sub-networks are very rigid with a very formalized structure.
- Networks can connect geographically dispersed people.
- A network can have members who come from the same organization.
- A network can have a 'dark' sub-network. This is not necessarily a danger to the larger network, but there may be a part that is using the network in ways that don't reflect the values and purposes of the network, that actually exist for other types of purposes.
- The perspective with which you look at a network is important. For example, from one perspective a member (node) can look all alone – like an orphan. But from another perspective, the person might tap into a whole other giant network.
- IT infrastructure can follow and to a certain extent, mirror some of the human relationships in a network.
- The physical and policy relationships of the IT infrastructure mirror the social/political relationships and largely follow the formal network structure, though it can be useful to the informal aspects as well.
- Different people will interpret what is happening with a network differently.
- Networks can link people who are geographically separate, and can link urban and rural sub-networks. Different parts of the network can have different types of

connections and the network still can be productive. For example, urban centres may have more formalized structures with more formal, fixed linkages. Rural areas may have a little more flexibility and a little more joy around their connections. They may enjoy their relationships in the network more than the members in the urban centres.

- Sometimes a network may create or tolerate a 'thug' role in order to make the network productive.

Appendix 5: Literature Resources

a. Perspectives which inform a discussion about networks

b. References identified prior to workshop which helped define 'conceptual space'

c. Additional references identified during workshop process

Appendix 5a. Perspectives Which Inform Discussion of Networks

There are a wide variety of perspectives through which one can look at the issue of networks and research capacity. Many of these fields could provide a 'theory of action' that can be used to explain or predict some or all of the process by which networks can improve research capacity (the capacity to create, choose, transfer and use research in practice)–either to grow and develop more capacity or capacity for more complex applications, or to weaken and ultimately die.

Network science, combining sociology and physics perspectives
Complexity theory
Static and Dynamic Modeling
Sociometrics
Organization Theory
Organization Behavior
Growth and Development – natural world, human (embryology)
Organization Life cycles
Social Capital
Communities of Practice
Learning
Social learning
Communication
Change Theory
Change Management
Biology and networks in the natural world
Ecology
Groups and Group Process
Fluid Mechanics – pipelines
Collaboration
Teams,. Alliances – formation, behaviour
Coalitions
Research Utilization
Research Transfer
Knowledge Management
Evaluation theory and process
Leadership
Orphan Knowledge
Action Learning
Action Research
Project Management
Policy Analysis
Knowledge networks
Sector Service Design (particularly Health and Human Service Sector design)
Sector service operation

Appendix 5b – References Identified Prior to Workshop

Books:

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O'Donnell, Aodheen; Gilmore, Audrey; Cummins, Darryl; Carson, David (2001) The network construct in entrepreneurship research: a review and critique. *Management Decision* Vol39(9):749-760.

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Stone, Diane and Lindquist, Evert (2000) Non-government policy transfer: The strategies of independent Policy Institutes*. Governance* 13, 1: 45-62.

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Contractor, Noshir; Carley, Kathleen; Levitt, Raymond; Monde, Peter; et al Co-evolution of Knowledge Networks and 21st Century Organizational Forms: Computational modeling and empirical testing Working Paper: TEC2000-01. University of Illinois at Urbana-Champaign. (Executive summary). Downloaded from internet, May 2003.

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Guy, Ken and Nauwelaers, Claire (2003) Benchmarking STI Policies in Europe: In Search of Good Practice. Downloaded from web www.jrc.es/pages/iptsreport/vol71/english/TEC2E716.htm February 17, 2003.

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Kenmore, Robert (2001) Human networks, social capital and Innovation. Downloaded from internet: http://www.cbi.cgey.com/research/current-work/connected-innovation/attachments/NetworksSocialCapitalandInnovation.pdf June 2003.

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Appendix 5c – Additional References of Interest

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Rhodes R 1997 Understanding governanace. Policy networks, governanace Reflexivity and accountability Open University Press Buckingham

Stoker G 2002 Life is a lottery :New Labour's strategy for reform of devolved governance Public Administration 80(3) 417-34

Networks of Centres of Excellence –http://nce.nserc.ca/index.htm - includes the Results-Based Management and Accountability Framework (RMAF)

'*Copenhagen*' (screenplay) – Frayn

Monge, Peter R., and Contractor, Noshir. Theories of Communication Networks. (2003) New York: Oxford University Press)

Appendix 6: A potential decision process for responding to requests for network support

This appendix was prepared to present one alternative scenario which AHFMR may adopt to assess requests for support of networks. It is not meant to be the penultimate approach, or perhaps even a recommendation at this point, but rather is provided for discussion purposes.

A. Response to request to fund a network.

Example: A researcher approaches AHFMR asking for funding to support the development of a network for improving the extent and quality of research related to a particular health issue or type of health service delivery.

AHFMR would probably have a 2 or 3 tier approach to reviewing such a request.
- The first level is a broad conceptual review to determine whether to spend even the resources associated with granting a meeting to discuss the researcher's concept. Decision to arrange a meeting to hear more about the concept (or to invite a high level concept paper for internal review). This tests the proposal against strategic criteria.

  ➢ Is there a scarcity of resources / expertise in this area?
  ➢ Are the resources / expertise in this area distributed widely and are not able to achieve the critical mass necessary to move the knowledge or practice forward substantially?
  ➢ Is the expected outcome of the network a highly valued strategic objective in Alberta at this time or in the short – medium future?
  ➢ Is the issue for which this network is desired a complex problem? Will the potential outcomes of the network contribute to the resolution of a complex problem?
  ➢ Are there any existing networks in this area or that might be stimulated to expand to this area that should be part of the discussion if we go forward
  ➢ Is the applicant building on an existing network and thus has experience and infrastructure to apply to the expansion to an additional purpose. IF it is a proposal for a completely new network, Is there sufficient time to allow the proposed network to mature to address the problems in a timely fashion.

- If the request passes the first conceptual review, the applicant would be invited to provide additional information on how they propose to proceed, what resources they have available to them, or are existing if AHFMR can broker them, what resources need to be acquired or developed. Funding is one of those resources, but not the only one. If the initial review has identified other potential networks that might be appropriately involved, the applicant would be prompted to identify a participatory strategy for exploring their involvement.

  - ➢ Part of the assessment would be to identify the life stage of the network. If it is a start up network, does the applicant have available the skills of a network start up leader? If not, AHFMR might consider developing the network internally with its own network start up staff, or providing those skills as part of the support provided.

- Subsequent assessment would go deeper into the stimulation or implementation approach and where the necessary skills and funding can come from.
- If the application is deemed worthy of support, AHFMR would install a means of closely monitoring the progress of the network and its achievement of outcomes from the outset. .Support would be granted in stages, as the network demonstrates its ability to grow and develop and achieve the mileposts, as predicted by leading indicators. This staging would be done in a progressive manner and support granted in stages as a new venture demonstrates success at each stage of development.

B. Strategic Stimulation of a Network

Following is a hypothetical example which illustrates how AHFMR may choose to stimulate a network., where for strategic purposes, some activity is warranted in an area, but there have been no proactive advances from stakeholders in the province.

For example, AHFMR as part of its strategic environmental scanning process, identifies that we will need a highly developed level of knowledge development across the spectrum from basic to highly applied operational and policy research in a specific area – e.g. Alberta's water resource is a key determinant of health of Alberta society. This scenario is based on the assumption that water has been identified for attention. This is an extremely complex problem with human health, environmental, legal/ethical and economic aspects of the issue. AHFMR recognizes that it will be extremely valuable for Alberta to have the benefit of a well functioning network of researchers, practitioners and communities that are

engaged in knowledge development and knowledge translation of various aspects of this issue.

AHFMR could potentially approach the Ingenuity Fund (or other institutional stakeholders) to assess interest in collaborating on the stimulation of a number of networks that might ultimately coalesce into a meta-network related to water[1].

AHFMR may than assess what networks already exist that might be stimulated to expand their attention to some element of the overall problem. These would need to be assessed in terms of their stage of evolution. The type of intervention will depend on the stage – this is illustrated with the stage above the line and the type of intervention below the line in italics:

Stage of network evolution	Opportunity for 'bubbling'	Nascent	Accelerating / Developing	Established / Mature
Type of intervention appropriate	Strategic 'stirring'	Facilitation, nurturing, seed funding	Targeted funding	Ongoing funding

The approach to stimulating new networks ('strategic stirring') would likely involve arranging a number of events that brings together widely diverse groups on areas of common interest and see what relationships can be sparked in this way.

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[1] Because of the topic of interest i.e. water, it probably makes sense for AHFMR to seek partnership with others to promote networks in this area. A joint venture is not a prerequisite for network support, but rather is a characteristic related to the specific topic under consideration in this example.