Oxford's Dictionary's definition of a network is a group of individuals or organisations organising themselves on a voluntary basis for a common purpose in a way that participants’ remain autonomous. Like other forms of cooperation, networking is a means to achieving a goal, not a goal in itself. The number of participants in a network tends to be large.

A social network can be described as an informal, voluntary based, dynamic and borderless open system which is flexible, fluid, adaptable and susceptible to innovations, new ideas and needs without its internal balance being threatened. Network goals must serve an existing need, and be important enough for members to allocate resources and delegate authority to the network.

Networks generally build on voluntary cooperation based on common interests, absent of formal contracts. Networks are generally decentralised, so that the network’s activities respond to the members’ needs. E.g. an information network must produce, collect and disseminate the kind of information that is the most critical to the users/members, and to ensure that it is in a format and language that is appropriate. Trust is key in networking. Trust is more easily achieved in a network with a small and homogenous number of members (e.g. a small group of researchers in a specific field but in different geographic locations). In such a network little formal co-ordination is required.

However, when the network goal is complex and members involve a larger, more heterogeneous group, a more formal structure with greater central management is generally required.

A theory that deals with the optimal size of a network is the so-called rule of 150, which states that the size of a genuine social network is limited to about 150 members (sometimes called the Dunbar Number, named after the anthropologist Robin Dunbar). The rule arises from cross-cultural studies in sociology and anthropology of the maximum size of a village. It may be that the number is some kind of limit of average human ability to recognize members and track emotional facts about all members of a group. However, it may be due to economics and the need to track "free riders", as larger groups tend to be easier for cheats and liars to prosper in.

Box 1. Network characteristics (Garton et al 1997):

1. **Range**: Social networks can vary in their range: i.e., in their size and heterogeneity. Larger social networks have more heterogeneity in the social characteristics of network members and more complexity in the structure of these networks [Wellman & Potter, 1997]. Small, homogeneous networks are characteristic of traditional work groups and village communities; they are good for conserving existing resources. Yet large, heterogeneous networks (such as those often found online) are good for obtaining new resources.

2. **Centrality**: It may be important to examine who is central or isolated in networks, i.e. who are the key information brokers/coordinators in the network. These are not necessarily synonymous with those that have been given formal responsibility for coordination. Social network analysis has developed measures of centrality which can be used to identify network members who have the most connections to others (high degree) or those whose departure would cause the network to fall apart (cut-points).

3. **Network density** is one of the most widely used measures of social network structure: i.e., the number of actually-occurring relations or ties as a proportion of the number of theoretically-possible relations or ties. Densely-knit networks (i.e., groups) have considerable direct communication among all members: this is the classic case of a small village or workgroup. By contrast, few members of sparsely-knit networks communicate directly and frequently with each other. As in the Internet, sparsely-knit networks provide people with considerable room to act autonomously and to switch between relationships. However, the resulting lack of mutual communication means that a person must work harder to maintain each relation separately; the group that would keep things going is not present.
The shape of a social network helps determine its usefulness to members. Smaller, tighter networks can be less useful to their members than networks with lots of loose connections (weak ties) to individuals outside the main network. More "open" networks, with many weak ties and social connections, are more likely to introduce new ideas and opportunities to their members than closed networks with many redundant ties. In other words, a greater degree of diversity fosters dynamism and innovation. A group of individuals with connections to other social worlds is likely to have access to a wider range of information. It is better for individual success to have connections to a variety of networks rather than many connections within a single network. Similarly, individuals can exercise influence or act as brokers within their social networks by bridging two networks that are not directly linked.

Box 2. Three main network structures

<table>
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<tr>
<td><strong>1. Enclave networks (EN)</strong> have a flat structure with no central authority. They are based on shared commitment, and commonly consist of a close-knit group with a high level of social cohesion. Enclave networks are often most successful in enabling information and ideas to be shared among professionals with a common interest. However, such networks can be unstable where there is insufficient institutionalisation, such as shared resources.</td>
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<tr>
<td><strong>2. Hierarchical networks (HN)</strong> have an organisational core and authority to regulate the work of members. Such networks are most successful in co-ordinating and controlling a pre-defined task that involves complex division of labour. The weakness of hierarchical networks is that they may fail through over-regulation and bureaucracy that stifle innovation and de-motivate members.</td>
</tr>
<tr>
<td><strong>3. Individualistic networks (IN)</strong> are those where an individual or organisation develops a loose association of affiliates. They are often based on the procurement of a network of service providers through the negotiation of contracts. Such networks tend to be innovative and flexible, with the capacity to respond to change because membership is fluid. However, individualistic networks can fail due to high transaction costs and the competition and conflict between agencies that can restrict the capacity and motivation for joining.</td>
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Advantages and Disadvantages of Networks

The two basic resources derived from a network are social capital (relationships) and intellectual capital (knowledge). The social capital can improve diffusion of information and facilitate creativity and learning (Fenton et al 2001). Benefits of networks include avoiding duplication of investment activities; gaining scale economies; allowing new initiatives and research to take place; sharing knowledge and resources to improve effectiveness; accelerating momentum and attracting funding by building a common “brand” that gains legitimacy.

By combining the efforts of otherwise potentially competing organisations alliances contribute to more efficient and focused use of scarce resources in international development work. Unfortunately this is now counteracted by the rapidly increasing number of networks and alliances, once again reducing the co-ordination and focus of efforts. Network building is a long-term process that may have unintended negative effects such as overdependence of central expertise. Other problems may include loss of autonomy, information asymmetry and “collective blindness”. Networks also have cost implications. The creation and maintenance of social capital often requires significant investment of time and other resources.

Management - Degree of Control and Authority

Because of their generally non-hierarchical nature, the scope of authority in networks is restricted, and there do not exist procedures for command and control common to NGOs, grassroots organizations, governments and many other forms of organisation (Nunez et al 2003).

Studies of networks in international development have been identified. They identify that networks in this field tend to have a more formal structure, with a co-ordination centre or secretariat, and a management or representative committee as a minimum. However, too tight a structure may stifle creativity, diversify and dynamism. Too light a structure requires very high level of trust, which is generally only present in smaller networks.
Box 3. Ten key lessons for network management (Goodwin et al 2003)

Ten key lessons for network management (the type of network where each practice is most important in brackets).

1. Achieve a position of centrality (HN and IN).
2. Have a clear mission statement and rules of engagement (HN).
3. Be inclusive – ensure all agencies and individuals gain ownership (EN and HN).
4. Avoid too large networks, as they incur high administrative costs and lead to inertia. The larger the network, the more difficult to centralise management arrangements. This applies to all types of networks, and must be balanced against the need to make the network inclusive. If there are many members in the network then it may be necessary to limit the number of people involved from each member organisation.

5. Developing network cohesion. Strategies for network cohesion are important to avoid network fragmentation.
   a. Pooled budgets, joint finance agreements, and common targets can help create cohesion in HN and EN.
   b. IT can be a key enabler in promoting network cohesion across all network types. Availability, capacity and reliability of IT is clearly one of the key challenges when building a network for exchange of information, ideas and experiences among key policymakers and research institutions in developing countries.

6. Ownership may be facilitated by formal contracts and agreements. However, over-regulation of hierarchical networks should be avoided.

7. Actively engage respected professional leaders who will promote the network to peers. The more senior and charismatic the ‘sponsor’ the more powerful will the promotion be in attracting other key parties to the network. (All networks)

8. Avoid network capture by e.g. a dominant professional elite or organisational culture. (All networks)
   A powerful and highly relevant example is a network that is designed to support health systems policy and planning, and which therefore must involve both research institutions and local policy makers. In order to get research into policy and practice (GRIPP) and in order not to alienate the most important network members, the policy makers, from the network, it is key that communication and written information is not too complex, “academic”, and abstract but uses a language that is understood by all and deals with issues on a concrete level.

9. Respond to the needs of the network members in such a way that the network remains relevant and worthwhile. A network will survive as long as members perceive that involvement is valuable. (All networks)

10. Professionals in the network must provide the mandate to allow managers to manage and govern their activities (IN and HN).

Trust is the basis for any network. Participants need to know each other and truly believe that no other parties have hidden agendas.

Trust is sustained by: regular contact & dialogue; mechanisms ensuring transparency and accountability; by the very act of collaborating together.

Efficiency and Effectiveness of Networks

Banda (2004) concludes that there is a lack of general consensus in the methodology of evaluating networks, though there are a few identified common issues such as measurement of communication channels and participation, knowledge management, support/benefits obtained and, other functions.

Nunez et al (2003) state that “networks generally struggle for more or less intangible, even ideological, goals that have to do with the consciousness, behaviour and empowerment of people and of societies. This does not mean, however, that the management bodies of a network – general assembly, board of directors, secretariat – as well as each member, cannot set concrete and measurable operational objectives”. They studied international social change networks. They state that a network’s efficiency and effectiveness depend on structure, organisational management, institutional capacity and communication. The four major performance criteria identified are: democracy, diversity, dynamism and excellence. The two first criteria create the great challenge of net-
works: success of a network depends on the equity in relations and exercise of power. This becomes very challenging in networks with a highly diverse membership group, which is the second performance criterion.

Figure 1 summarises some network criteria that could be used as a basis for developing monitoring indicators for success (Simaeys B 2004).

**Figure 1**

**Networks: Quality Criteria**

**Networking of Networks in International Health — A few Examples**

As significantly more funds are channelled to networks and alliances – alliances receive 80% of Bill and Melinda Gates Foundation’s global health investments - this has probably contributed to the growing number of networks.

However the current web of international health networks is complex enough to make anyone confused. Only searching the WHO home page several hundreds of networks were identified. A big challenge in achieving a more effective global health and health system development is to co-ordinate the multitude of networks that already exist, where North and South institutions, policy makers, donors, etc. are represented to a varying degree. This could diminish overlapping activities that lead to a waste of scarce resources, and improve sharing of the experiences and evidence including research results that if better used could improve health.

In theory this task could be achieved by creating a network of networks that aggregates useful information from other relevant networks and makes. This could make relevant information, lessons learned, research etc. more transparent and accessible to local policy makers.

At the International Colloquium “Networking the Networks”, which was held in Antwerp in November 2004, Akanmori and Aderaye defined the features required to build a successful network within the health systems area in low income settings.

- Should have no language or political barriers
- Must address the health needs of the south
- Should address capacity building for weaker institutions
- Goals should be defined and endorsed by all
- Free flow of info preferably through a dedicated website
- Should address malaria, AIDS, TB, and all other major threats of the poor
- Should be able to attract adequate funding
- Should be sustainable

Very few networks which are coordinated in low and middle income countries perform well, even within countries. Reasons for this include the digital gap (internet expensive and slow); visits, face to face contacts are unaffordable; - there are too few research centres and institutions with quality work in the South. Thus the strengthening of organizations and institutions is a priority in order to promote sustainable organizational and institutional capacity-building in resource poor settings (Potter and Brough 2004). The countries needs and circumstances should shape the nature of support given.

For this paper some networks in International Health were purposively selected (Table 1). The criteria included dealing with global health, health policy and systems issues and an attempt was also made to include some networks dealing with control of communicable diseases. The sample is not meant to be a representative sample but rather illustrative. The reader is kindly requested to visit the websites of the 15 networks listed in the table. Two networks were selected with convenience method by the author to exemplify success factors and some highlights are presented.
International Clinical Epidemiology Network (INCLen), where success factors have included:

- A shared vision;
- Commitment to providing time and resources to pursue the network’s mission/vision,
- A common language and common interests. This came in the form of the common discipline interests (clinical, Epi, biostat, social sciences) and disease-specific and thematic areas (like child health, reproductive health, TB, other infectious diseases, knowledge translation, injuries, family abuse, mental health, CVD), and country/region-specific priorities;
- Prime mover/s to keep the ball rolling;
- Working channels of communication, esp. electronic means of communication and teleconferences; annual or biannual meetings at regional or global levels;
- Success drives further success – visible outputs from the group/network motivates the group to work even harder or further;
- In resource poor settings, even a minimal investment in people, structures and/ or support staff goes a long way;
- Investment must be within the context of a long-term plan for institutionalization of the member of the network (clinical Epidemiology Unit) within the local setting (in INCLen’s case, the local universities);
- Finally, networks can be sustained if the local units are able to replicate themselves by local training and mentoring. Hence capacity building is INTEGRAL to successful networking.

(personal communication – Mary Ann Lansang former INCLen president)

The International Baby Food Action Network (IBFAN) is the first single focus’ coalition of peoples organisations working to protect breastfeeding. It grew from a few and disparate groups of idealistic individuals to some 200 groups in 25 years and its impact is fascinating. IBFAN now has 200 affiliations in 90 countries. It has a flat, flexible and non-hierarchical system. One of its strengths is how it monitors the ability and willingness of governments to monitor companies compliance with the International Code of marketing of Breast Milks substitutions adopted at the WHA 1981. Included in its achievements is a robust monitoring instrument which is easy to use and generates valid information. The example of IBFAN is presented in a special issue of development dialogue (Allain 2002) where the reader has a chance to better understand how a small number of people around the world devoted their skills, creativity and efforts to for a long time with limited resources protect breastfeeding. A question here is obviously how much being “a single issue” and thus easy to understand as well as something involving children and mothers have contributed to the success.

Annelies Allain, one of IBFANs founders, writes that “Networking has a political value in that it can unite people, harness their ideas and energies and mobilise them for activities such as monitoring. It also provides and information channel that can assist local groups. People feel supported in what they do and less lonely.”
Table 1. Examples of Networks in International Health

<table>
<thead>
<tr>
<th>NAME</th>
<th>AIM</th>
<th>WEBSITE</th>
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<tbody>
<tr>
<td>Alliance for Health Policy and Systems Research AHPSR</td>
<td>To promote generation, dissemination, use of knowledge for enhancing health system performance.</td>
<td><a href="http://www.alliance-hpsr.org">http://www.alliance-hpsr.org</a></td>
</tr>
<tr>
<td>Alliance for the Prudent Use of Antibiotics APUA</td>
<td>To improve antimicrobial policy and clinical practice worldwide so as to preserve the power of these lifesaving agents.</td>
<td><a href="http://www.APUA.org">http://www.APUA.org</a></td>
</tr>
<tr>
<td>Gender and Health Equity Network GHEN</td>
<td>To develop and implementing policies to improve gender and health equity, particularly in resource constrained environments.</td>
<td><a href="http://www.ids.ac.uk/ghen">http://www.ids.ac.uk/ghen</a></td>
</tr>
<tr>
<td>Health Action International HAI Global Network</td>
<td>To increase access and improve the rational use of essential medicines.</td>
<td><a href="http://www.haiweb.org">http://www.haiweb.org</a></td>
</tr>
<tr>
<td>International Baby Food Action Network IBFAN</td>
<td>To improve the health and well being of babies and young children, their mothers and their families through the protection, promotion and support of breastfeeding and optimal infant feeding practices.</td>
<td><a href="http://www.ibfan.org">http://www.ibfan.org</a></td>
</tr>
<tr>
<td>International Network of Demographic Evaluation of Populations and Their Health in developing countries INDEPHT</td>
<td>To harness the potential of the world's community-based longitudinal demographic surveillance initiatives in resource constrained countries to provide a better understanding of health and social issues, to alleviate the severe health and social challenges.</td>
<td><a href="http://www.indepth-network.org">http://www.indepth-network.org</a></td>
</tr>
<tr>
<td>International Network for Rational Use of Drugs INRUD</td>
<td>To design, test, and disseminate effective strategies to improve the way drugs are prescribed, dispensed, and used, with a particular emphasis on resource poor countries.</td>
<td><a href="http://www.inrud.org">http://www.inrud.org</a></td>
</tr>
<tr>
<td>International Clinical Epidemiology Network INCLEN</td>
<td>To improving the health of the people by promoting clinical practice based on the best evidence of effectiveness and the efficient use of resources.</td>
<td><a href="http://www.inclen.org">http://www.inclen.org</a></td>
</tr>
<tr>
<td>Health Evidence Network HEN</td>
<td>To provide reports answering policy-makers’ questions concerning health policy decisions; and facilitate policy-makers' access to databases containing evidence to health policy decisions.</td>
<td><a href="http://www.euro.who.int/HEN">http://www.euro.who.int/HEN</a></td>
</tr>
<tr>
<td>Global Network of People Living with HIV/AIDS GNP+</td>
<td>To work to improve the quality of life of people living with HIV/AIDS.</td>
<td><a href="http://www.gnpplus.net">http://www.gnpplus.net</a></td>
</tr>
<tr>
<td>Multilateral Initiative of Malaria MIM</td>
<td>To maximize the impact of scientific re-search on malaria in Africa through promoting capacity building and facilitating global collaboration and coordination.</td>
<td><a href="http://www.mimcom.net">http://www.mimcom.net</a></td>
</tr>
<tr>
<td>Network for Equity in Health in Southern Africa EQUINET</td>
<td>To build knowledge and perspectives, shape effective strategies, strengthen voice nationally, regionally and globally and with strategic alliances to influence policy, politics and practice towards health equity and social justice.</td>
<td><a href="http://www.equinetafrica.org">http://www.equinetafrica.org</a></td>
</tr>
<tr>
<td>Scientists for Health and Research for Development SHARED Network</td>
<td>To share essential information on health research and development for developing countries.</td>
<td><a href="http://www.sharingpoint.net">http://www.sharingpoint.net</a></td>
</tr>
<tr>
<td>Stop TB partnership</td>
<td>To eliminate TB as a public health problem and, to obtain a world free of TB.</td>
<td><a href="http://www.stoptb.org">http://www.stoptb.org</a></td>
</tr>
</tbody>
</table>
React – what now?

The attributes of ‘the learning organization’ include inspirational leadership, skilful change management, penetrating vision/mission statements, participative management styles, transparency, open communication, flattening of organizational architecture, downsizing, delegation of decision-making authority and empowerment of stakeholders (Merrick and Blunt 1999). But learning is incomplete without action, which provides material for reflection and review, for conceptualizing reality and for experimenting with changed behaviours. This means that partners in React must be involved in all aspects of network building activities - planning, design, implementation, review and follow-up.

How should a network be structured, size, governance, degree of homogeneity? How formal should the structure be and how can the network be managed? Which of already existing networks should React interact with according to the “networking of networks” idea presented earlier?

Figure 2. Some of the organisations and networks, in addition to Ministries of Health, from which concerned individuals participate in the React meeting September 2005.

A lot of concerned individuals from many organisations (Fig 2) have travelled from all corners of the world to meet in Uppsala at this meeting to contribute to the containment of antibiotic resistance as antibiotics represent the most effective health technologies in the world. React should assist in creating values, galvanising interests and capability by linking individuals and groups with opportunities and resources for learning. Future success factors may include establishment of a small secretariat to facilitate the above but also an information dissemination strategy from targeted information to general information. Simple e-mails is an example of “strengths of weak ties” where people sometimes with little in common have potential to exchange communication. React could also provide the medium and impetus for small groups of people to come together. Social network theory states that successful networks are those that find a balance between weak ties and stronger ties including more focused subgroups (Russel et al 2005). Some also consider it important to allow passive participation “lurking” such as reading email postings to a group without replying. There may be a great value in a network even without active participation. Most experience from Networks is in favour of a small secretariat. There is however a fine balance between a strong centre that enables, facilitates and supports and one that stifles the energy of networking by too much control.
References


