COLLABORATIVE RESEARCH

7.1 COLLABORATIVE RESEARCH

Background

For many reasons, Science is increasingly dependent on collaborations. Firstly, no single person has the skills, knowledge, and resources to address all research problems; a judicious choice of collaborators can save considerable time and money. Secondly, the funding and structure of science tend to favor programs in which recognized authorities are involved from each key area. Thirdly, breakthroughs are often more likely to come from collaborations across disciplines than by adherence to tried and true methods. Fourthly, collaboration within the private sector is highly prized. Institutions and academia are being encouraged by their own institutions' legislation, industry (which recognizes the benefits of the expertise and reputation of academics), and academia itself (which can benefit from immediate and long-term sources of private funding). Finally, collaborations are easier now than before. With obvious improvements in communication (telephone, facsimile, e-mail), shipping (one-day delivery), and travel (to national and international conferences), potential collaborators are more likely to find each other and are more able to maintain their collaboration.
Whatever the reason, collaborations are increasingly beneficial and possible. Nevertheless, problems could also arise from collaborations because it can take such different forms. It certainly implies two or more people joined together for a common purpose, but this might involve almost any arrangement, from shared time, work, resources, unique materials, data, ideas, to money. Once the work is completed, credit and responsibility might then be shared in a number of ways. Collaborations may not even begin because of reluctance to share or work together, and if started, collaborations can be marred by misunderstandings of what is to be provided by each of the participants. This may include unhappiness with a slow collaborator, disagreement about what and when to publish, or conflicts regarding authorship and credit. Although there is no panacea for such problems, it is evident that any solution needs to begin with improved communication.

What is collaborative research?

Research can involve a vast scope of collaborations within departments of institutions, between institutions and internationally. Collaborative research has increased significantly recently and has raised specific issues, such as managing research findings, managing conflicts of interests, sharing intellectual property and commercializing research outcomes. Though research practices differ between institutions, researchers should make every effort to adhere and comply with all relevant policies and guidelines when conducting their research.

Collaboration has been intrinsic to the research process for the past 50 years, but collaboration per se usually refers to researchers who work within the same discipline, either within an institution or in different institutions. Multidisciplinary research is a form

of collaborative research that involves researchers working across disciplines, either within an institution or in different institutions. A physician working with an engineer to manufacture a new imaging device, or an epidemiologist working with a political scientist on a tobacco-control initiative, is an example of a cross-disciplinary research project. When the pharmaceutical industry works with a medical center to perform a clinical trial of a new drug, it is a form of collaboration across industry and academia. Each of these interactions creates different expectations and requires a variety of modes of communication to ensure that the collaboration is successful.

7.2 FACTORS THAT CONTRIBUTE TO COLLABORATIVE RESEARCH

Funding sources

The National Medical Research Council's (NMRC) has started to focus on strengthening the capabilities and capacity for local Translational and Clinical Research (TCR). With the funding support from the National Research Foundation (NRF) and guided by the Biomedical Science Executive Committee (BMS Exco), NMRC has overhauled its grant framework for the purpose of turning Singapore into a buzzing center for TCR.
NMRC has developed a comprehensive and transparent set of grant schemes to grow and support the research environment in Singapore with the revamped grant framework; so as to engage all levels of expertise of clinical investigators and researchers by ensuring adequate opportunities for research support and career development. With this process, NMRC hopes to establish research programs which will be oriented around strategic disease areas with the purpose of integrating, to establish research programs, coordinating and leveraging the full chain of research capabilities in Singapore from basic science to clinical research. Lastly, institutions have also set up funding streams to support innovative approaches within their institutions.

Ease with new telecommunications technologies

E-mail and Web-based technologies have changed the way many people in research-oriented countries interact, and scientists are among the beneficiaries of the new communications technology. While the wider use of fax machines, in the 1980s, allowed documents and data to be sent across phone lines, shared computerized databases at that time were more difficult to manage. Today, Web-based technologies allow researchers to input and manipulate data in shared databases with ease. Web-based telecommunications systems also allow people from across the world to communicate by simulating face- to-face meetings.

7.3 POTENTIAL PROBLEMS OF COLLABORATIVE RESEARCH

Difference in styles of investigators

As in any relationship, people have different styles of relating. Some people are more formal, while others are more laid-back and relaxed. Likewise, in science some researchers have collaborations in which they develop a project over a beer and a handshake at a conference and the tenure of the tie remains informal throughout. Others require more documentation and rigorous enumerations of responsibilities. However, even if a researcher works easily with another researcher, shared grants, data, and materials require more formal written agreements involving grants-and-contracts offices at their respective universities.

Difference in styles of research across and within disciplines

One collaborator believes that peer-reviewed papers should be short and should use a limited amount of data. Another collaborator believes that more data should be collected and the "story" of the research should be developed before anything gets published. This kind of disagreement can occur with collaborators in the same field or in different fields. Disciplines also suggest, in different ways, who should be an author on a paper. In certain fields, people who have not contributed substantially to the intellectual process of the research are not included, while, in other fields, people get authorship if they participated in doing the research at any level. Different research disciplines also have varied approaches in work habits. Biomedical laboratories, for example can operate for 24 hours a day because of the nature of performing experiments, but other disciplines may have more routine, 8- to 10-hour days.
Furthermore, different types of work may follow different timetables. Statisticians working on analyzing data may move faster than the social-science researchers surveying hundreds of people in a population for data. Researchers collaborating internationally may also speak different languages. In addition, technical jargon exists within subspecialties within a discipline and across various disciplines. It can be challenging for researchers to create a language understood by all across all disciplines. The crucial point is, to presume nothing and to place everything on the table for discussion as early in the relationship as possible.

Differences between academic and industrial research with respect to sharing of data and results

The free exchange of information at scientific meetings and in publications is the ethic and lifeblood of academia However, in commercial enterprises research data could have financial repercussions, so data is carefully vetted before it is published, if it is ever published. When academics and business researchers work together on projects, each party has to come to an agreement about how data and materials will be shared. Institutions do not allow hindrance of publication in research collaborations with industry. Other universities are willing to forego the freedom in exchange for funding, access to industrial ideas, and opportunities to train students in commercial types of research endeavors.

Do you know?

In the US, the issue of industry sponsoring drug trials at academic research centers and not allowing the recipients to publish papers on the results of the trials has become front-page news. The New York Times reported in late 2004 that medical-school researchers funded by the pharmaceutical industry had sought access to unpublished data in an antidepressant trial to determine whether the drugs increased the risk of suicidal behavior in children. Drug companies denied the researchers access to the data and would not allow them to communicate with other researchers who had participated in the same study at another institution. Drug companies performed the clinical trials at multiple locations and kept the data centralized, with each institution not blinded from the results from elsewhere. An editorial in the Times commented that it may now be time for all institutions to negotiate contracts with drug companies that would "ensure researchers' access to data and prompt publication of results.

Ethical considerations may affect research across institutions and nations

Institutions everywhere may have different standards for the nature of disclosure of potential financial conflicts of interest. While one institution/academic medical center would not allow a researcher who developed a drug to be involved in the clinical trials of that drug, another might permit it as long as safeguards were in place that would prevent the researcher from knowing the progress of ongoing trials.

7.4 HOW TO ENHANCE COLLABORATION

Responsibilities of Institutions

a) Establish agreements for each collaboration

- An agreement should be reached with the partners on the management of the research in a joint research project of organizations involved. The agreement should adhere and follow the general principles of the RCR manual, including integrity, honesty and a commitment to excellence.

- The agreement should be in writing and it must cover intellectual property, confidentiality and copyright issues; sharing commercial returns (if applicable); responsibility for ethics and regulatory authorities (if applicable) submissions and approvals, and the reporting to appropriate funding agencies. The protocols to be adhered to by the study team when disseminating the research outcomes and the management of primary research materials and research data should be addressed.

- The agreement may take various forms, including a legal contract signed by the Chief Executive Office of the institution, or a research management plan read and

- signed by all study team members or appropriate representatives from the study team.

- Each organization / institution must ensure that its researchers are made aware of, and fathom, the policies and agreements governing the joint research collaborations.

b) Management of conflicts of interest

A policy for managing conflicts of interest that may potentially arise in collaborative research must be readily available in the institutions (see section 3).

c) Management of access to research materials

i) Communication first second and throughout.

No one in collaboration should assume anything. Establishing, maintaining, and even continuing communication is important for the project to continue. If two researchers exchange data, personnel, or materials without a formal collaboration in place, perhaps they need to address whether one should be established. Once collaboration is formally created then discussion about data, ideas, and personnel issues should occur. Researchers need to communicate effectively, whether the other person is across the hall or on the other side of the globe.

Communication is particularly important in collaborations between academia and industry. Special requirements may be imposed on the publication of material or on the invention and patents. Whether a graduate student participates in such an academic-industrial project must be resolved early on if the research may not be published in a timely fashion. Also, patent lawyers, technology-transfer administrators, and marketing personnel from industry need to establish a common ground for communication.

ii) Discussing in advance who will do what in a project while understanding that the research may evolve

Parties in collaboration should define goals in such a way that they could not have been established without the collaboration. Setting goals leads to expectations and outcomes. Who will take charge of the collaboration also needs to be defined. As multiple laboratories or groups of researchers may be involved, coordinating the effort among the participants requires management (and communication). When a research project changes direction, how that will impact participants needs to be addressed as well. Authors may be added or removed. Finally, it is pertinent for researchers to determine when a collaboration is over.

d) Discussing authorship in advance

Different disciplines have varying standards for determining authorship. The criteria for authorship among collaborators have to be established beforehand so everyone involved will know what to expect. But with authorship comes responsibility, so collaborators need to determine how they will deal with the differing expertise levels of each author, who will actually write the manuscript and be responsible for the input from collaborators. If the research changes direction, someone expecting authorship might be disappointed, so the evolution of a project has to be considered and made known. Finally, the list of collaborators to be acknowledged should be addressed.

e) Discussing data and material management in advance

This is an example of what can happen among researchers who share resources and data. Laboratory A, for example, has purified a protein and prepared antibodies to the protein. Laboratory B will screen an expression library to find the clone. Laboratory B will get the monoclonal antibody and the clone will be shared. But will Laboratory B also get the cell line that makes the monoclonal antibody? How such a question is resolved affects the ability of the laboratories to replicate work and to perform independent work at the end of a collaboration. The issue of who owns data is governed by the type and source of funds used to support research. Investigators and institutions also have rules for the custody and retention of data, to which all parties must adhere.

Also, the transfer of materials among collaborators is subject to so-called "material transfer agreements," or MTAs, developed by administration offices. They include:

- Limits on the use of the material, usually for non-commercial research purposes
- Prohibitions on the redistribution of the material
- Conditions of use, including prohibitions of use in animals or humans
- A hold-harmless cause, meaning that the donor has no liability resulting from the use of the material
- The issue of the return of unused material

f) Discussing intellectual property issues in advance

All investigators want to be able to protect results that might have potential commercial application. Disclosing results early could prevent collaborators from being able to obtain patent protection. All parties should know of institutional and granting-agency policy regarding intellectual property and patent procedures.

g) Managing accountability

Each institution has to abide by certain regulations, policies, and laws. Researchers working with animals, humans, or hazardous substances have to conform to the appropriate regulations, policies, and laws. Basic research scientists might have access to patient data from the clinical arm of a study and must be aware that they need to maintain the confidentiality of patients. Also, clinicians should inform bench researchers of the potential hazards of certain human tissues. Researchers also need to inform one another of any potential conflict of interest that they might have in the project.

Responsibilities of Researchers

a) Comply with multi-institutional agreements

Researchers involved in a joint research endeavor must be aware of, and adhere and comply with all policies and written agreements affecting the project, particularly to those relating to the dissemination of research findings and the management of research data and primary materials.

b) Declaration of conflicts of interest

Researchers must disclose as soon as possible any actual, apparent or perceived conflict of interest to any aspect of the projects when establishing research collaboration.

Do you know?

A new protocol amendment is required to be submitted to NHG DSRB by the PI on behalf of a study team member if a new study team member who has conflict of interest is added to the team.

7.5 REFERENCES & ACKNOWLEDGMENT: COLLABORATIVE RESEARCH

1) Collaborative Institutional Training Initiative – CITI Course in Collaborative Research Activities (https://www.citiprogram.org/rcrpage.asp?language=english&affiliation=100)
2) Harvard University Research Integrity Office of the Vice Provost for Research Webpage (https://vpr.harvard.edu/)
1) National Institute of Health - NIH Guide (https://www.nih.gov/research-training/safety-regulation-guidance)

2) Office of Research Integrity – Introduction to the Responsible Conduct of Research: Conducting Research: Collaborative Research (https://ori.hhs.gov/ori-introduction-responsible-conduct-research)
3) Office of Research Integrity – Introduction to the Responsible Conduct of Research: Conducting Research: Roles and responsibilities (https://ori.hhs.gov/ori-introduction-responsible-conduct-research)
4) Office of Research Integrity – Introduction to the Responsible Conduct of Research: Conducting Research: Management (https://ori.hhs.gov/ori-introduction-responsible-conduct-research)
5) Office of Research Integrity – Introduction to the Responsible Conduct of Research: Conducting Research: Different research settings (https://ori.hhs.gov/ori-introduction-responsible-conduct-research)
6) Office of Research Integrity – Policies - Statutes and Regulations (https://ori.hhs.gov/ori-introduction-responsible-conduct-research)
6) The Columbia University Responsible Conduct of Research : Collaborative Science (http://ccnmtl.columbia.edu/projects/rcr/rcr_science/foundation/index.html)
7) The University of Oxford, University of Administration and Services (UAS), Collaborative Research (http://www.admin.ox.ac.uk/researchsupport/integrity/collaborative/)