

Thematic coding framework

Substantive Categories

These represent the set of analytical coding categories capturing the substantive material of the interviews: the interviewees' opinions, experiences and issues relevant to an OSI at the Neuro. This large category includes a subset we derived, called 'key categories' (see below for details)

Attribution:

- Reasons to need attribution for your work & interaction with funding committees
- What types of attribution are expected and actually occur for sharing resources now
- Traditional authorship standards persist for sharing research results and resources

Changing paradigms in academic research and science in general:

- Neuro policy is lagging behind modern reality of openness
- Opinions about the Neuro's transitional period if they decide to move towards open science

Collaborations:

- Require possibility of patenting discovery
- Require secrecy about data generated
- Collaborations with industry needed to fund research translation

Commercialization of research output:

- Researchers' experiences with commercialization
- Researchers' lack of interest in commercializing their research themselves

- Increased pressure felt by researchers to commercialize their research
- Commercial entities would take advantage of openness and commercialize research outputs without permission or collaboration, to the detriment of researchers

Disincentives to sharing or open science:

- Commercial entities would take advantage of openness
- Concerns around privacy and confidentiality of participants
- Currently insufficient infrastructure for sharing
- Lack of interoperability between potential sharers
- Issues around REB approvals
 - Ethics approval processes as a barrier
 - Lack of understanding of REB approval processes
 - Positive aspects of REB involvement in move towards OS

- Neuro's Open Science Initiative, conflict with McGill University patent policy
- Losing competitive advantage by sharing too much
 - Non-issue
- Losing out on financial rewards for discovery
- Losing private investment in research
 - Non-issue
- Pre-publication sharing/sharing of unvalidated findings may have adverse social impact through poor quality data and resulting research
- Researcher time and money invested in resource creation
- Time and cost burden of distributing shared resources
- Risk of shared data being used out of context/misused and wasting other researchers' time

Effects of an OSI on public funding received by the Neuro:

- Public funding will increase
- Public funding will decrease

Expressed positive perspective on open science

Governance mechanisms currently in place or seen as necessary in the context of Neuro's Open Science Initiative:

- Decisions around data sharing
- Decisions around IP
- Decisions around use and sharing of valuable resources
- Decisions around use and sharing of depletable resources

Intellectual property (IP):

- Use of others' patented research tools
- Use of others' patented research tools is not required for research
- Researcher uses IP to protect their research
 - Copyright
 - Licenses
 - Patents

Motivations for sharing or open science:

- Academic and ethical sharing ethos
- Neuro's Open Science Initiative would attract new students and trainees
- Efficient collective problem solving
- Increase research impact and dissemination
- Increased quality of care and research
- Increased stature of Neuro
- More and different collaborations
- OS leads to more publications
- "Mother's voice"/childhood lessons

- Return output of publicly funded research and public resources to the public

Motivations to collaborate with the Neuro:

- Unique expertise or knowledge
- Comprehensiveness of integrated datasets

Patient-public interest in open science:

- Interactions between Neuro's Open Science Initiative and consent
 - Decreased ease of consent
 - Increased ease of consent
- Public interest in OS is high
- Public interest in OS is low
- Public trust of the Neuro will increase
- Public trust of the Neuro will decrease
- Researcher opinion on IP:
- IP provides advantageous royalty fees
- Holding IP protections is a valuable addition to a CV
- Distaste for ownership as a public researcher
- Excellence in research is more important than patents
- Excessive red tape involved in seeking IP
- IP is essential to encourage private investment in research
- IP protections have negligible value
- Uncertainty about the value of IP protections

Solutions:

- Communication and engagement
- Access to shared resources should be controlled
- Education of stakeholders (patients and public or researchers)
 - Researchers
- Need for flexibility or ability to opt-out of Neuro's Open Science Initiative
 - Academic freedom or PI personal freedom to choose
 - Mandatory open access policy is a bad idea
 - Need for different models of engagement
- Importance of clear goals for Neuro's Open Science Initiative
- Infrastructure support for sharing
 - Biobanks and data repositories
 - Bioinformaticians and support staff
 - Creation of a patient web-interface
 - § Negative opinion
- Need for a metric or incentive or credit for openness
- Partnership with REB in Neuro's Open Science Initiative development and implementation
- Publication in open access journals
- Reasonable costs charged for open provision of resources

Timeline for sharing:

- Pre-publication sharing of research-associated resources
- Post-publication sharing of research-associated resources

Auxiliary Categories

Auxiliary categories represent the analytical coding categories that we used to cross-reference interviewees' opinions, experiences and issues. They include for example, information about the area of research, the reagent, the data-type or the stakeholders the interviewee was speaking about. For example, using these categories in our analysis allowed us to compare how interviewees' opinions about IP protections differed across types of data or with respect to different stakeholders.

Experiences with sharing:

- Data sharing
- Not yet sharing but willing
- Protocols
- Reagents
 - Only post-publication
- Software, algorithms

Intellectual property:

- Researcher doesn't use IP
- Researcher uses IP to protect their research (licenses, patents, copyright)

Past (every mention of anything in the past)

Stakeholders:

- Foundations and private donors
- Journals
- McGill University
- Neuro
 - Clinical Research Unit
 - Neurobiobank
- Private investors
 - Biotechnology
 - Pharmaceutical
 - Start-ups
- Public collaborators
- Public funding agencies
 - CIHR
 - FRQS
 - NIH
- Public or patients
- Public repositories
 - Addgene

- o Biobanks
- o EEG
- o Fly Bank
- o Jackson Labs
- o Parkinson's Biobank
- o PPMI
- o Quebec Parkinson's Registry
- REB
- Structural Genomics Consortium (SGC)
 - o Aled Edwards
 - o SGC model
 - § Uncertainty about merit
 - § Unsure about usefulness
- Spin-off companies
- Young researchers

Types of resources:

- Data
 - o Brain imaging data
 - o Experimental data
 - o Negative data
 - o Genetic data
 - o Patient clinical data
 - o Proteomics datasets
- Knowledge
 - o Expertise
 - o Methodologies, protocols, task batteries
 - o Tacit
- Reagents
 - o Animal models
 - o Antibodies
 - o Assays
 - o Compounds
 - o iPS cell and other cell-lines
 - o plasmids
- Software and technology
 - o Algorithms
 - o Products and platforms
- Tissue samples

Key Categories

Key categories represent the subset of interviewees' opinions, concerns and motivations that we determined are the most relevant to the development of an OS policy at the Neuro. Often, this material represents the most significant sources of disagreement or tension about the proposed shift to OS, and material that was the most emphasized by interviewees.

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Governance mechanisms currently in place or seen as necessary in the context of Neuro's Open Science Initiative:

- Decisions around data sharing
- Decisions around IP

Researcher opinion on IP:

- IP provides advantageous royalty fees
- Holding IP protections is a valuable addition to a CV
- Distaste for ownership as a public researcher
- Excellence in research more important than patents
- Excessive red tape involved in seeking IP, or IP itself is excessive red tape
- IP is essential to encourage private investment in research
- IP protections have negligible value
- Uncertainty about the value of patents

Motivations for sharing or open science:

- Academic and ethical sharing ethos
- Efficient collective problem solving

- Increase research impact and dissemination
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- Increased stature of Neuro
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Positive perspective on open science