Class 1: Abstracts and Data Access

CSCI6410/EPAH6410/CSCI4148

Finlay Maguire (finlay.maguire@dal.ca)

Components of a written research proposal

- **Research Question:** *clearly defined research question related to solving an important problem*
- **Abstract:** *concise & informative expert overview*
- **Lay Summary:** *clear general public summary of problem, solution, and relevance*
- **Introduction:** *problem/knowledge gap justification/explanation of relevant methods*
- **Literature Review:** *critical appraisal of broad relevant literature that supports method and question*
- **Methodology:** *appropriate method, data gathering/access, that solves the research question and is justified by literature review*
- **Budget:** *reasonable/appropriate timeline and cost estimates*
- **Ethics:** *explores hurdles/risks/benefits and impact of question, method and KT*
- **Discussion:** *addresses limitations, implications, and future directions/extensions.*
- **Knowledge Translation:** *robust/impactful plan to mobile results across a range of settings.*

Proposal Presentation Structure (June 22nd - 26th)

15 minutes + 5 minutes Q&A

- Title Slide (1)
- Team Background and Conflicts of Interest (1)
- Background/Literature Review (3)
- Research Objectives/Question/Hypothesis (1)
- Methodology (3)
- Budgeting (1)
- Knowledge Translation Plan (1)
- Future Work (1)
- Q&A

- ***Chance for feedback -> incorporate into final submission***

Abstract

"Several studies have reported reprogramming of fibroblasts into induced cardiomyocytes; however, reprogramming into proliferative induced cardiac progenitor cells (iCPCs) remains to be accomplished. Here we report that a combination of 11 or 5 cardiac factors along with canonical Wnt and JAK/STAT signaling reprogrammed adult mouse cardiac, lung, and tail tip fibroblasts into iCPCs. The iCPCs were cardiac mesoderm-restricted progenitors that could be expanded extensively while maintaining multipo-tency to differentiate into cardiomyocytes, smooth muscle cells, and endothelial cells in vitro. Moreover, iCPCs injected into the cardiac crescent of mouse embryos differentiated into cardiomyocytes. iCPCs transplanted into the post-myocardial infarction mouse heart improved survival and differentiated into cardiomyocytes, smooth muscle cells, and endothelial cells. Lineage reprogramming of adult somatic cells into iCPCs provides a scalable cell source for drug discovery, disease modeling, and cardiac regenerative therapy." (p. 354)

The first sentence announces the **topic** under study, summarizes what's **already known** or been accomplished in **previous research**, and signals the **rationale and goals are for the new research and the problem** that the new research solves: How can researchers reprogram fibroblasts into iCPCs?

The **methods** the researchers developed to achieve their goal and a description of the **results**.

The **significance** or **implications**—for drug discovery, disease modeling, and therapy—of this reprogramming of adult somatic cells into iCPCs.

https://writing.wisc.edu/handbook/assignments/writing-an-abstract-for-your-research-paper/

Structured Abstract

Objective To establish the challenges Boston general practitioners (GPs) encounter while treating patients with myelodysplastic syndromes (MDS)

Methods A qualitative analysis of transcripts from three focus groups in Boston public hospitals (16 GPs), using a four-level data coding process, was performed. GPs with no MDS patients in the past three years served as the control group.

Results Four main challenges contributing to high stress levels among the GPs emerged in the analysis: insufficient training in the management of patients with MDS, a lack of internal hospital guidelines for patient treatment, hurdles to establishing a trustful doctor-patient relationship, and decreased access to resources and specialists in a primary care team. These factors remained significant on comparative analysis of responses from GPs in the focus groups and control group, and accord with our hypothesis that...

Conclusions This study confirms that treatment of patients with MDS is directly impacted by the hospital-system support of GPs providing care for these patients within the Boston health care system. These findings indicate that physicians' stress may be reduced and their adherence to treatment guidelines may improve by providing education in the biopsychosocial model during medical education and establishing a GP hierarchy that can address adverse circumstances in hospitals where GPs treat MDS patients. Repeating the survey after allocating more financial resources for city health care and granting easier access to rehabilitation services would be useful for assessing the impact of these measures.

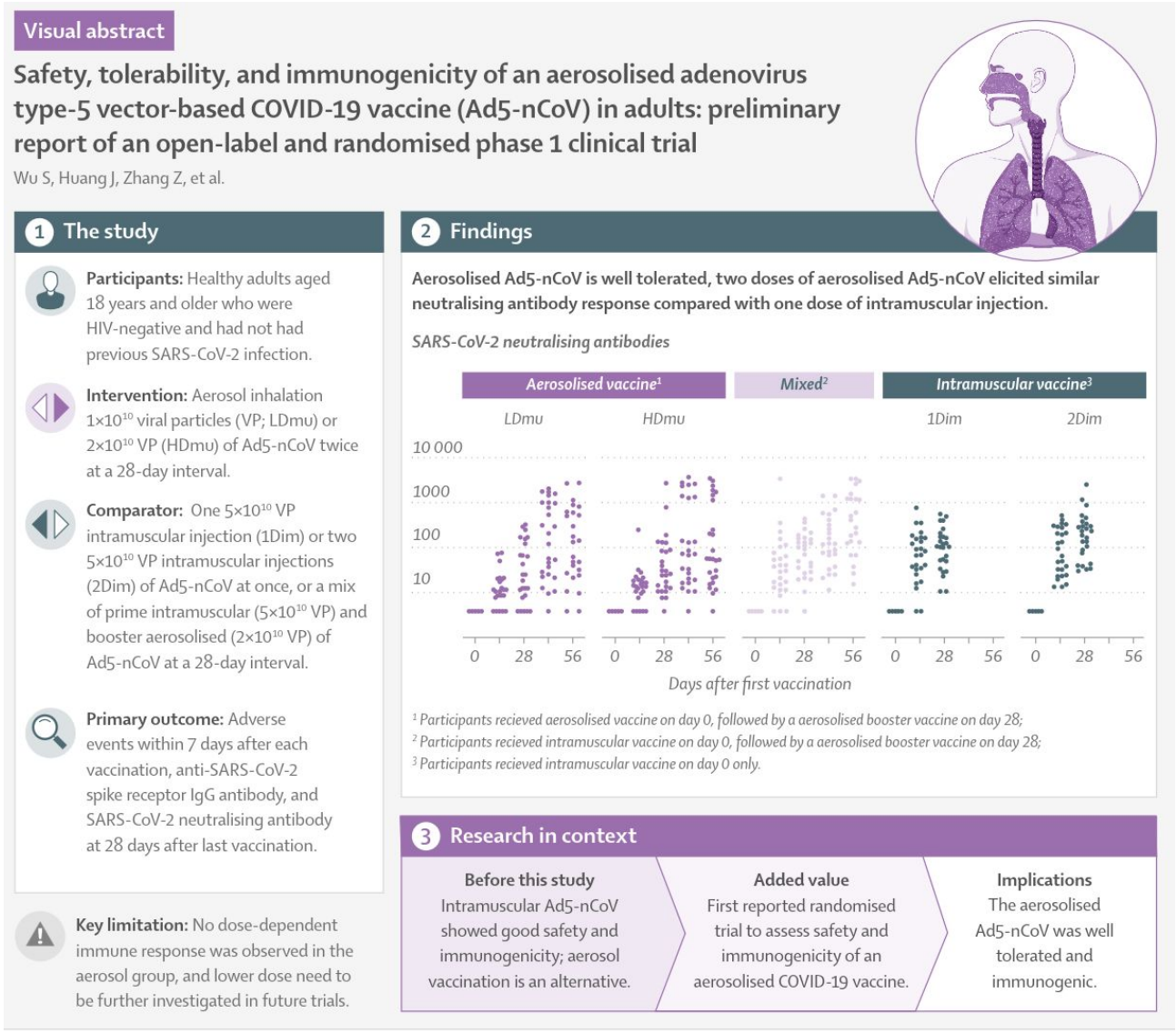
Objective: State the purpose of your research.
-Use a verb that describes the action of your study.
-Use object terms and phrases that connect to the central elements and goal of your study.

Methods: Explain how the research was conducted.
-Describe the study design, methods, and analysis.
-Include key details: sample group and size, variables, procedures, and controls.

Results: Summarize the data.
-Include results that answer the research question and that were derived from the stated methods.
-Examine data by qualitative or quantitative means.
-State whether research question or hypothesis was proven or disproven.

Conclusions: Describe the key findings.
-Summarize your Interpretation of the results.
-Explain the importance of this research to the area of research or medicine.
-Explain the wider implications for medical science, patient health, public health policy.
-Discuss major limitations of the study and further research or actions that should be carried out.

Graphical Abstracts: some basically normal + graph



Visual abstract

Safety, tolerability, and immunogenicity of an aerosolised adenovirus type-5 vector-based COVID-19 vaccine (Ad5-nCoV) in adults: preliminary report of an open-label and randomised phase 1 clinical trial

Wu S, Huang J, Zhang Z, et al.

1 The study

Participants: Healthy adults aged 18 years and older who were HIV-negative and had not had previous SARS-CoV-2 infection.

Intervention: Aerosol inhalation 1×10^{10} viral particles (VP; LDmu) or 2×10^{10} VP (HDmu) of Ad5-nCoV twice at a 28-day interval.

Comparator: One 5×10^{10} VP intramuscular injection (1Dim) or two 5×10^{10} VP intramuscular injections (2Dim) of Ad5-nCoV at once, or a mix of prime intramuscular (5×10^{10} VP) and booster aerosolised (2×10^{10} VP) of Ad5-nCoV at a 28-day interval.

Primary outcome: Adverse events within 7 days after each vaccination, anti-SARS-CoV-2 spike receptor IgG antibody, and SARS-CoV-2 neutralising antibody at 28 days after last vaccination.

Key limitation: No dose-dependent immune response was observed in the aerosol group, and lower dose need to be further investigated in future trials.

2 Findings

Aerosolised Ad5-nCoV is well tolerated, two doses of aerosolised Ad5-nCoV elicited similar neutralising antibody response compared with one dose of intramuscular injection.

SARS-CoV-2 neutralising antibodies

[1] Participants recieved aerosolised vaccine on day 0, followed by a aerosolised booster vaccine on day 28;
[2] Participants recieved intramuscular vaccine on day 0, followed by a aerosolised booster vaccine on day 28;
[3] Participants recieved intramuscular vaccine on day 0 only.

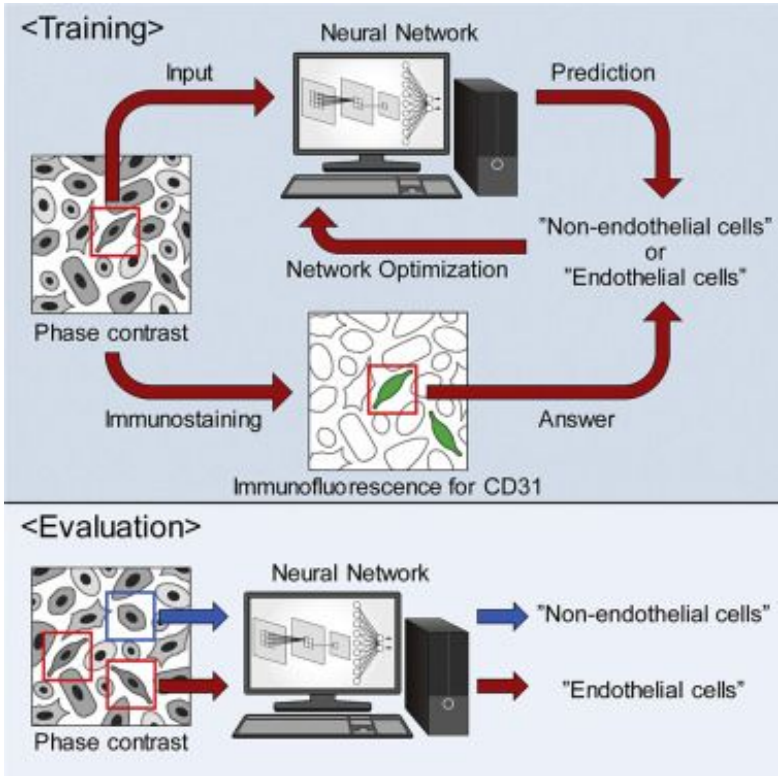
3 Research in context

Before this study
Intramuscular Ad5-nCoV showed good safety and immunogenicity; aerosol vaccination is an alternative.

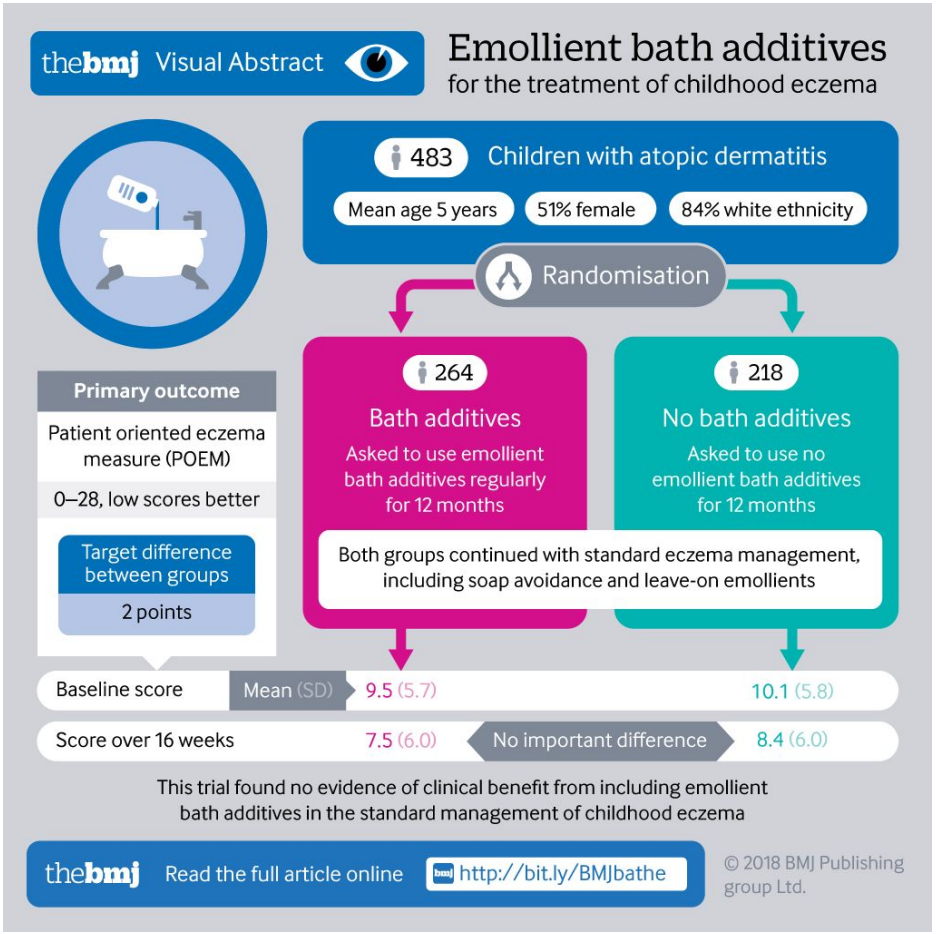
Added value
First reported randomised trial to assess safety and immunogenicity of an aerosolised COVID-19 vaccine.

Implications
The aerosolised Ad5-nCoV was well tolerated and immunogenic.

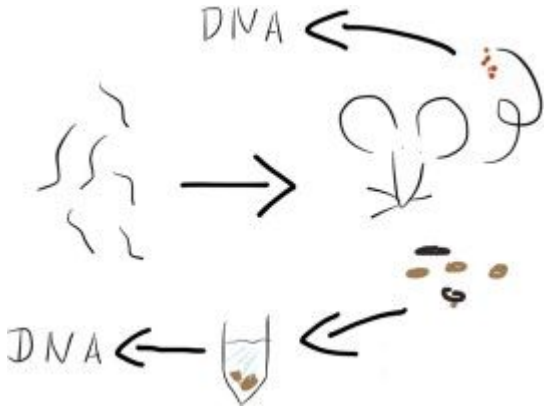
Graphical Abstracts: some are appealing & effective



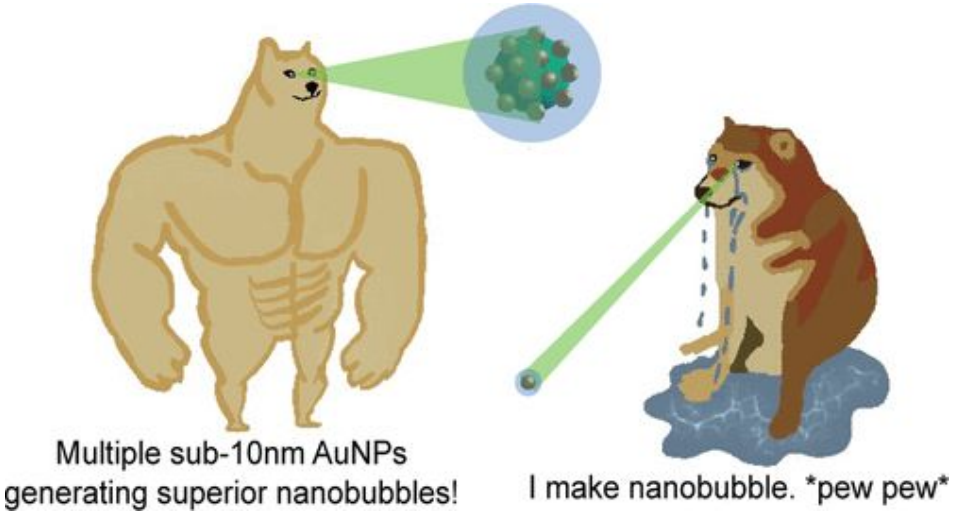
https://www.sciencedirect.com/science/article/pii/S2213671118301759



Graphical Abstracts: some are just bizarre

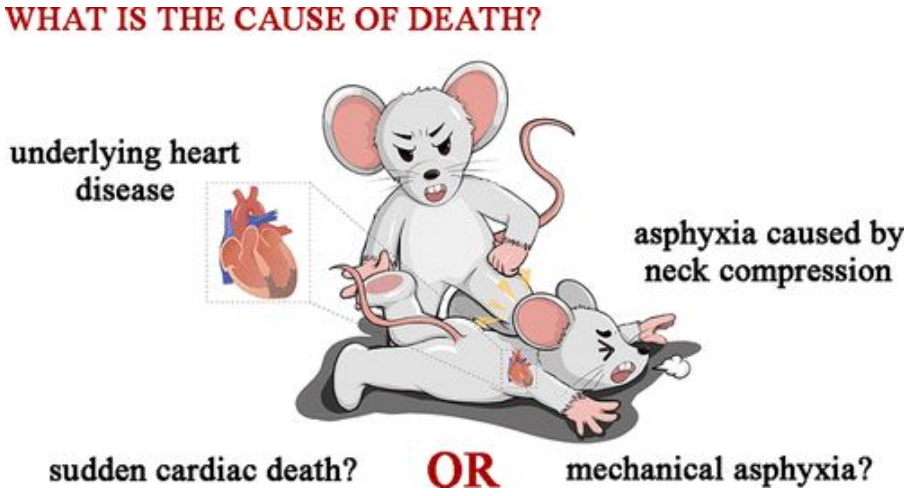


Abkallo, Hussein M., et al. "DNA from pre-erythrocytic stage malaria parasites is detectable by PCR in the faeces and blood of hosts." International journal for parasitology 44.7 (2014): 467-473.



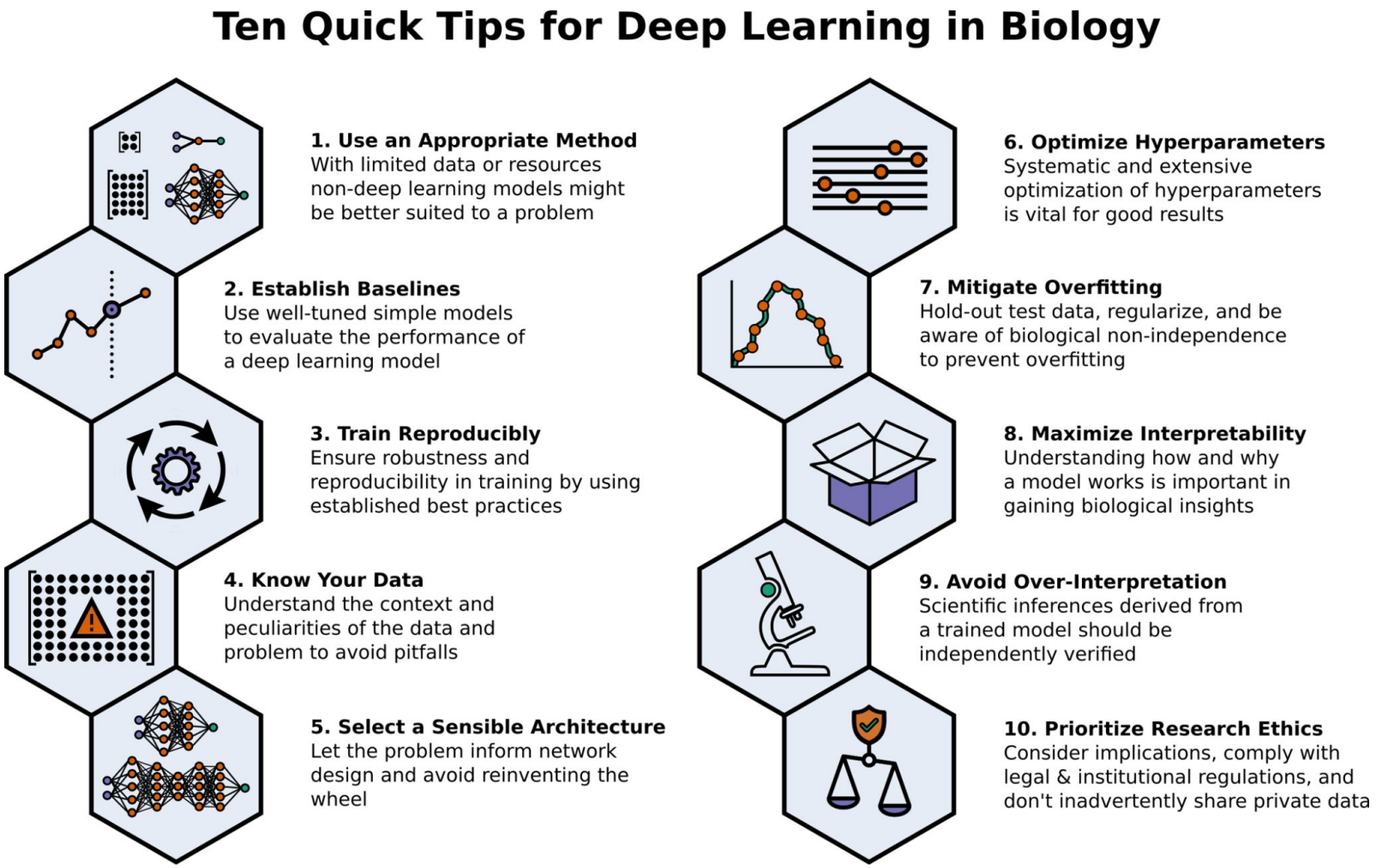
Parsamian, Perouza, et al. "Enhanced nanobubble formation: gold nanoparticle conjugation to Qβ virus-like particles." ACS nano 17.8 (2023): 7797-7805.

Kuang, Zhijie, Bingnan Li, and Qiuling Song. "Cu/Pd cooperatively catalyzed tandem intramolecular anti-Markovnikov hydroarylation of unsaturated amides: facile construction of 3, 4-dihydroquinolinones via borylation/intramolecular C (sp 3)–C (sp 2) cross coupling." *Chemical Communications* 54.1 (2018): 34-37.



Zhang, Kai, et al. "Distinguishing asphyxia from sudden cardiac death as the cause of death from the lung tissues of rats and humans using Fourier transform infrared spectroscopy." *ACS omega* 7.50 (2022): 46859-46869.

Graphical Abstracts for Reviews



Lay Summary

How to write a Lay Summary for your website

Parents of autistic children in Europe have positive attitudes towards research involving babies who might be autistic.

We asked 1040 parents who have a child on the autism spectrum about their attitudes to research. Specifically we asked them about research with babies who don't yet have a diagnosis of autism, but who are more likely to be autistic because they have an older, autistic brother or sister.

Parents with an autistic child are central to these studies, because they decide whether to get involved. It's important to find out their opinions on this work, so we can make it easy to take part, ethical, and useful.

In our sample, from 11 European countries, attitudes were positive overall, and parents valued the scientific goals of research. We also learned about what parents want when it comes to the types of research they would be happy to take part in.

The findings of this work can influence how researchers design their studies, and also provide an example of how to involve the community in research.

Start by stating your main finding clearly. This is the key thing most people want to know about your study

Describe the method that underpinned that key finding, ideally in a single sentence

Now you can add a bit more methodological detail, to help readers understand more about what you did.

This is where I would describe why you were interested in this question. It comes in the middle – much later than a normal abstract

Repeat your main finding and add a bit more info. It is OK to leave out some of the detail, especially if you're worried about mis-representing what you found.

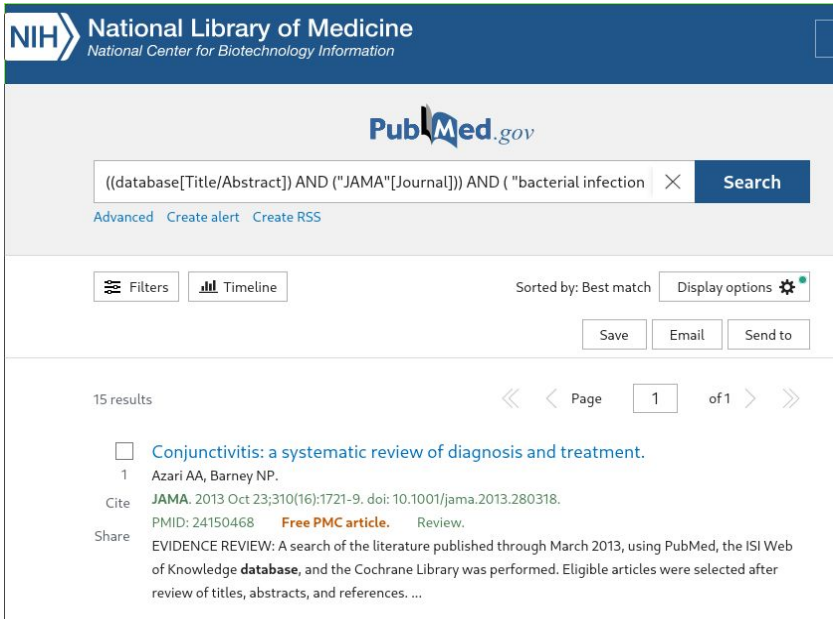
Finish by stating why your research is important and how it will contribute to changing things in the future.

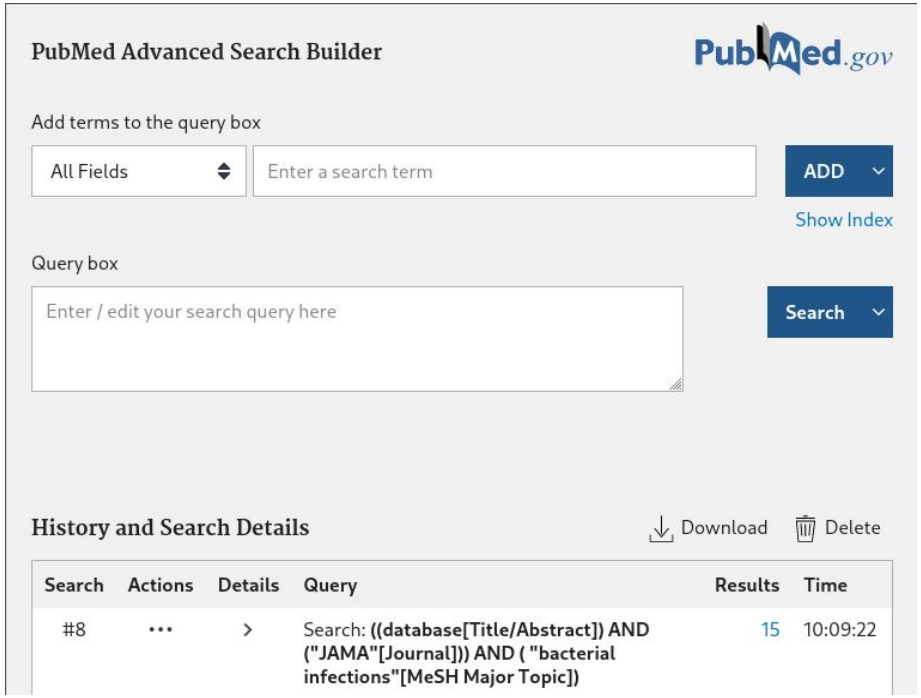
Created by Sue Fletcher-Watson, @SueReviews, www.dart.ed.ac.uk
Based on this original article: https://journals.sagepub.com/doi/full/10.1177/1362361317728436
Inspired by Nature: https://www.nature.com/documents/nature-summary-paragraph.pdf

Check your readability here:
https://www.webfx.com/tools/read-able/check.php

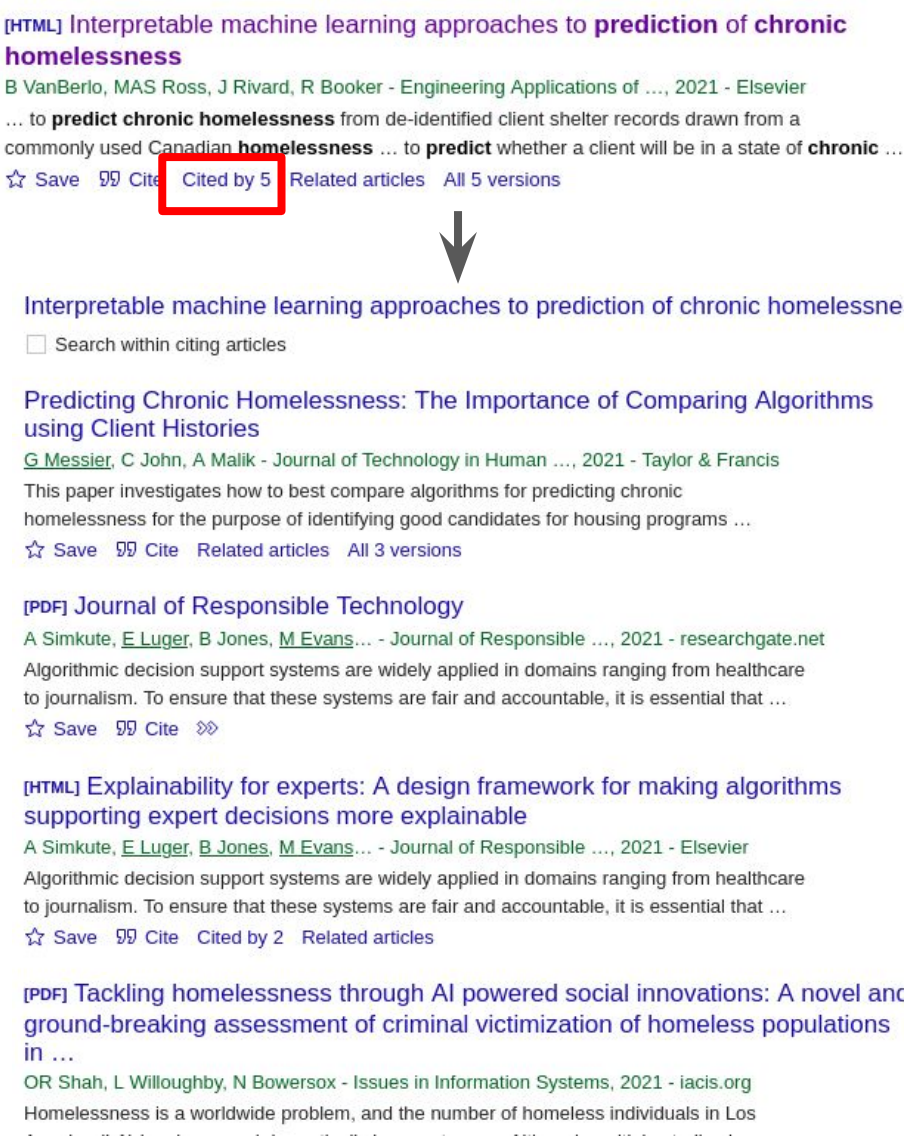
Performing a literature review

- Identify key search terms (recursive process)
- Like any search “” and boolean operators are your friend
- MeSH (Medical Subject Headings)
- Pubmed: systematic specific search
- Google Scholar: better search but can be less systematic

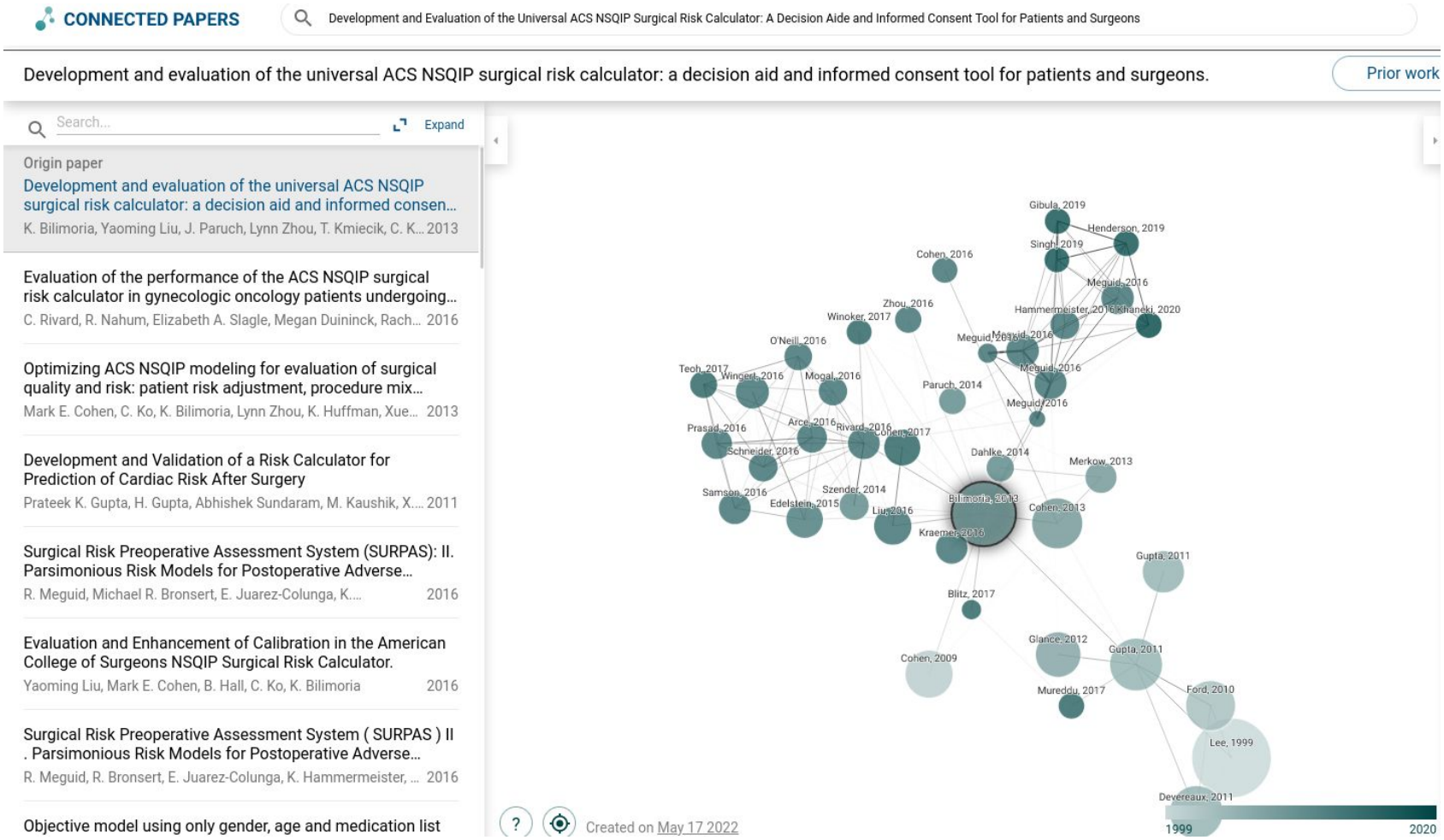




Explore the citation network: Manually



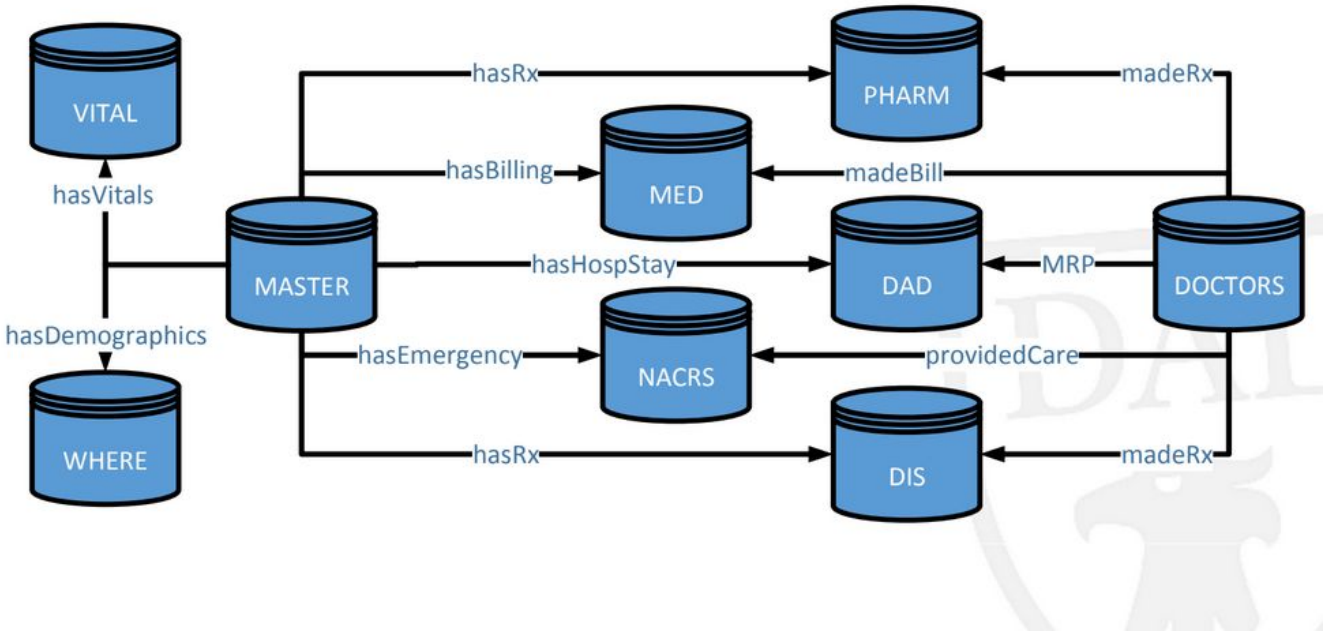
Explore the citation network: Connected Papers



Alternatives exist e.g., researchrabbit.ai, litmaps, vosmapper

Getting Access to Data: HDNS Example

- Health Data Nova Scotia: administrative and clinical health data for province
- Line-level access to de-identified data
- Data linkage services for external data (including probabilistically)
- Analyses: either done by HDNS or by yourself on their hadoop cluster (CITADEL)



HDNS Holdings

- Insured Patient Registry (MASTER): demographics of everyone on MSI (1996-)
- Licensed Provider Registry (DOCTORS): demographics of all health service providers (1995-)
- Eligibility Group (EGROUP): MSI beneficiary information in long-term care (1995-)
- Vital Statistics (VITAL): statcan's population/death information (1990-2019)
- MSI Physician's Billings (MED): all billing information i.e., every encounter between an individual and a provider (1997-)
- Drug Information System (DIS): every community prescription filled (2016-)
- Senior's Pharmacare (PHARM): senior prescriptions (1989-)

- CIHI Discharge Abstract Database (DAD): local part of national database recording everyone leaving hospital (1989/1995-)
- CIHI National Ambulatory Care Reporting System (NACRS): local part of national database recording all ambulatory care

A typical data access process

1. Contact database organisation to make sure you understand their holdings
2. Data access feasibility and cost estimate application (including research proposal)
3. Data access request application (including proposal, research ethics submission, CV) for committee review and feedback
4. Research Ethics Board approval process
5. Sign contracts (e.g., data access and confidentiality agreements) and complete related training.
6. If linking data: send your external dataset to database organisation
7. Perform your analysis (often with restrictions on where/how)
8. Submit any analysis results for review before releasing.