Audit and Feedback 101

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The Ottawa Hospital | **L'Hôpital d'Ottawa**

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Many Kinds of Feedback

Types of Feedback:
- Systematic/ad hoc
- Patient/Supervisor/Colleague/Organizations
- Verbal/Written
- Specific/General

Audit and Feedback: *"a summary of clinical performance over a specific period of time (audit), and the provision of that summary (feedback) to individual practitioners, teams, or healthcare organizations"*

Recent literature has focused on **Outcome Specific** feedback

Brehaut & Eva (2012). Implementation Science

Why focus on Audit and Feedback Interventions?

- Data increasingly available and easy to obtain
- Feasible, 'light-touch' intervention in many complex environments
- Knowledge-user demand
- Can be easily paired with other intervention components
- Providers are high achievers, and motivated to improve

…AND IT WORKS!!!

Audit and Feedback works

Large Cochrane review

- 140 trials of A&F

- 4% mean absolute improvement, IQR +0.5% to 16%.

Test ordering A&F - mean 22% reduction

Ivers et al. (2012) . Cochrane Database of Systematic Reviews;

Kobewka (2015). Clin Chem Lab Medicine.

The Bad News

- Hasn't been improving over time: Feedback designed NOW not likely to be any more effective than feedback from 20-25 years ago.

- Huge variation in effectiveness: Negative effects, to huge (50%+) improvements, and we don't know why

Ivers et al (2014). Implementation Science.

Hospital #123: Summary of Care for Acute Myocardial Infarction (AMI) During the 1999/2000 Fiscal Year
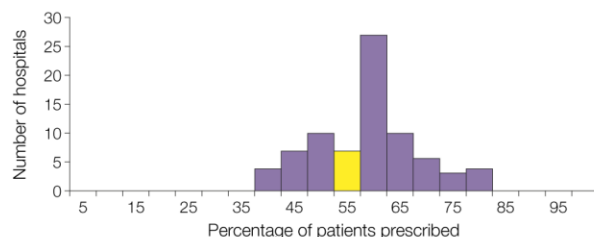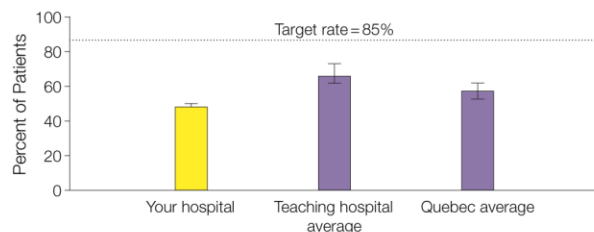Hospital type: teaching hospital
Number of patients of all ages admitted: 366
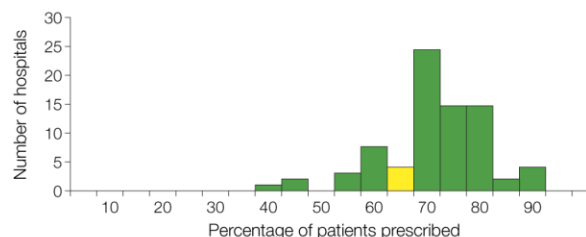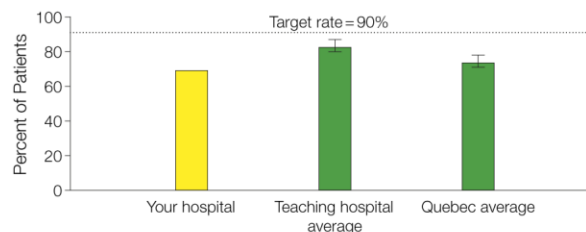Number of patients ≥65 years old admitted: 150
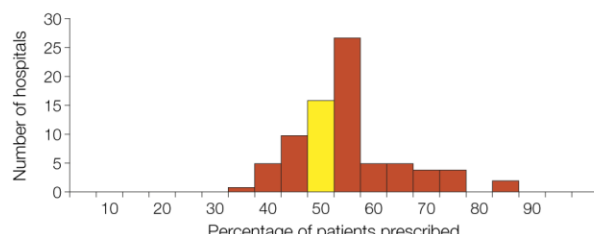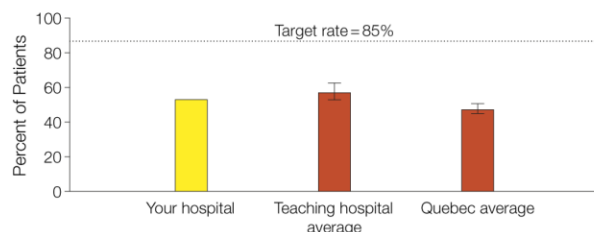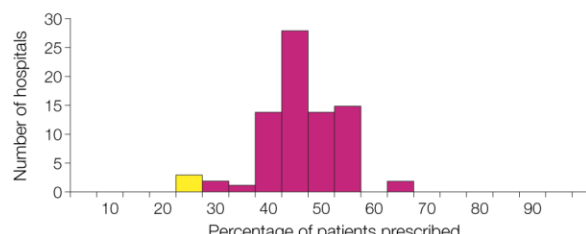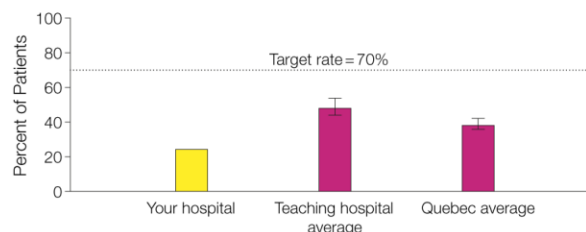
- Reported in JAMA
- Can Hospital admin data improve quality of cardiac care?
- Hospital report cards to 77 hospitals in Quebec
- 12 outcomes, 2 histograms per
- Sent to directors of services
- Feedback sent once based on data from previous year

Beck et al., 2005 JAMA

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We know A&F works, but not *how* it works

- What are the mechanisms by which feedback works?

- Many different disciplines understand feedback in different ways

We interviewed 28 theory experts from:

- Psychology (social, health, cognitive, organizational)

- Human factors

- Medical education

- Economics

- Management

Perspectives on feedback

Feedback as…

- A cognitive challenge
- A method for directing attention
- A motivator/de-motivator
- A reflection of self-identity
- A learning/education tool
- A tool for changing behaviour
- An organizational improvement device
- A socio-cultural construct

15 Initial Suggestions for Improving FB

- Some ideas seemed uncontroversial
- But when you look in health care, they aren't being consistently (or ever) applied
- These 'Low-hanging fruit' issues could be used to improve health feedback interventions NOW

Generated the 15 based on:

- Expert interviews
- Data from existing reviews
- Study group discussion and experience

Practice Feedback Interventions: 15 Suggestions for Optimizing Effectiveness

Jamie C. Brehaut, PhD; Heather L. Colquhoun, PhD; Kevin W. Eva, PhD; Kelly Carroll, MA; Anne Sales, PhD; Susan Michie, PhD; Noah Ivers, MD, PhD; and Jeremy M. Grimshaw, MD, PhD

Electronic practice data are increasingly being used to provide feedback to encourage practice improvement. However, evidence suggests that despite decades of experience, the effects of such interventions vary greatly and are not improving over time. Guidance on providing more effective feedback does exist, but it is distributed across a wide range of disciplines and theoretical perspectives.

Through expert interviews; systematic reviews; and experience with providing, evaluating, and receiving practice feedback, 15 suggestions that are believed to be associated with effective feedback interventions have been identified. These suggestions are intended to provide practical guidance to quality improvement professionals, information technology developers, educators, administrators, and practitioners who receive such interventions. Designing interventions with these suggestions in mind should improve their effect, and studying the mechanisms underlying these suggestions will advance a stagnant literature.

Brehaut et al. *Ann Intern Med* 2016; 164:435-441.

Nature of the action sought

Feedback Interventions should…	Example Intervention Changes	Evidence
1. Recommend actions consistent with established goals & priorities	Coordinating with ongoing initiatives; collect pilot data on need, salience, justifiability of the behaviour	Interviews
2. Recommend actions that have room to improve	Target FB to under-performers	Cochrane
3. Recommend specific actions	Implementation intentions, If/Then plans	Interviews

Nature of the data available for feedback

Feedback Interventions should…	Example Intervention Changes	Evidence
4. Be provided multiple times	Replace one off feedback with regular feedback	Review: 24% once, 24% unclear
5. Be provided as soon as possible, dependent on number of patient cases	Increase frequency/decrease interval of feedback for outcomes with many patient cases	Review: Only 6% provided data within days
6. Provide individual rather than general data	Provide practitioner-specific rather than hospital-specific data	Review: 58% individual provider, 25% individual patient cases
7. Choose comparators that reinforce desired behaviour change	Choose 1 comparator rather than several	Cochrane: 49% others' performance only, 26% unclearly reported

Display of the feedback

Feedback Interventions should…	Example Intervention Changes	Evidence
8. Closely link the visual display and summary message	Put summary messages in close proximity to the graphical or numerical data supporting it	Interviews: human factors literature
9. Provide feedback in more than 1 way	Present key messages textually and numerically	Cochrane
10. Minimize extraneous cognitive load for feedback recipients	Eliminate unnecessary 3-D graphical elements, increase white space, clarify instructions, target fewer outcomes	Interviews; human factors literature

Delivering the feedback intervention

Feedback Interventions should…	Example Intervention Changes	Evidence
11. Address barriers to feedback use	Assess barriers before feedback provision, incorporate fb into care pathway rather than providing it outside of care	Cochrane: E.g. action plans, coping strategies
12. Provide short, actionable messages followed by optional detail	Put key messages/variables on front page; additional detail in subsequent materials	Interviews
13. Address credibility of the information	Feedback from trusted local champion, colleague, rather than research team; increase transparency of data sources; disclose conflicts of interest	Interviews
14. Prevent defensive reactions to feedback	Incentives for improved performance; positive messaging along with negative; 'feedforward' discussions	Interviews: e.g., prevent discounting of feedback
15. Construct feedback through social interaction	Encourage self-assessment around target behaviours prior to receiving fb; engage in dialogue with peers as fb is provided	Interviews: Medical education literature

But the 15 are just the tip of the iceberg

- Interviewed experts on feedback from Psychology (social, health, cognitive, organizational), Education, Human Factors, Medical Education, Economics, Management

- Identified **300+ hypotheses** about how health care feedback might be improved/optimized

Prioritize the Hypotheses

Audit and Feedback Hypotheses Prioritization Exercise

Participant ID: T2 | Instructions | Demographics | Prioritization Exercise | Summary |

Theme	#	Feedback will be more effective…	
Cognitive Influences	1	…if emphasis is on what needs to be achieved (loss framing) as opposed to what was achieved (gain framing) (i.e., 20 % of your patients did not receive the proper prescription vs. 80% did receive the proper prescription).	☐
	2	…when graphical representations of sub-par performance are displayed below, and good performance displayed above, a visual frame of reference	☑
	3	…if noun descriptors rather than verbs are used in messaging (e.g., don't be an over prescriber vs please prescribe less).	☑
	4	…if information about subpar performance is provided in the context of more assuring messages (feedback sandwich).	☑
About Aspects of Behaviour	5	Feedback about behaviour will be more effective for behaviors that are easy compared to those that are harder to do.	☑
	6	Feedback interventions involving stopping behaviours will be more effective if they involve persuasive components.	☑
	7	Feedback interventions involving starting new behaviours will be more effective if they involve reminders/prompts.	☐
	8	…if it is about a behaviour that does not rely on others.	☐
	9	…when it addresses a behaviour that is relevant to the current patient.	☐
	10	…if incidence of type 1 errors (false positive or missing a test that should have been ordered) is low but incidence of type 2 errors (false negative or ordering a test that was not needed) is high.	☐

| Next 10 |

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Some Hypotheses worth further testing

Table 2. Summary of 'Top Hypotheses' (i.e., those voted as one of the top '50' by > 50% of the sample).

Hypotheses (theme)	Number of participants who chose this hypotheses (%)
Feedback interventions will be more effective…	
1. if the feedback is provided by a trusted source (Trustworthiness/Credibility)	45 (74%)
2. if recipients are involved in the design/development of the feedback intervention (Decision Processes or Conceptual Model)	37 (61%)
3. when recommendations related to the feedback are based on good quality evidence (Trustworthiness/Credibility)	37 (61%)
4. if the behaviour is under the control of the recipient (Self -Efficacy/Control)	35 (57%)
5. if it addresses barriers and facilitators (drivers) to behaviour change (Remove Barriers)	33 (54%)
6. if it suggests clear action plans (Enable Action Plans/Coping Strategies)	32 (52%)
7. when target/goal/optimal rates are clear and explicit (Goal Setting)	31 (51%)

Colquhoun H. et al. Informing the research agenda for optimizing A&F: Results of a prioritization exercise (Manuscript in preparation).

Partnering with organizations that provide feedback

1. **Eastern Ontario Regional Laboratory Association (EORLA)**

- Conducts all in-hospital laboratory testing for 16 hospitals in Eastern Ontario

- Providing feedback about appropriate/inappropriate test ordering in ICUs

2. **Canadian Partnership Against Cancer (CPAC)**

- Developing data infrastructure and A&F plans for Cancer surgery and pathology across 6 provinces

The Audit side:
What should you provide Feedback on?

- Most work has focused on the Feedback side, much less on the Audit side.

- Test ordering in the ICU: which tests are worth intervening on?

- Just finishing a scoping review of studies of test ordering interventions; how did they decide on the target test?

- Working towards a prioritization framework for test ordering interventions

Factors considered when deciding to intervene on a particular test/series of tests (n=80)

- Clinical Utility of the test   64
- Cost of the test   62
- Prevalence of the test   52
- Implications of a false positive   42
- Prevalence of Disease   32
- Laboratory workload   15
- Evidence of inappropriate use   12
- Feasibility of change   9

➢ 20 factors…

Eyal Podolsky, MSc student

SUMMARY: WHERE DO WE NEED TO GO?

- **Explore the Audit side**: help people decide where the resource expense will be worthwhile

- **Describe A&F theoretically**: e.g. Ben Brown's Clinical Performance Feedback Intervention Theory (CP-FIT)

- **Test many hypotheses at scale**: Noah's talk!

Brown, B. et al. CP-FIT: A new theory… Implementation Science, 2019.

Thank You!

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Audit & Feedback science was (is?) stagnant

- Cumulative analysis – effect size of audit and feedback interventions over time did not change over time

- Little evidence of replication - only 6 studies reported testing an intervention from a previous study

Ivers et al (2014) *Journal of General Internal Medicine*

BACKGROUND: This paper extends the findings of the Cochrane systematic review of audit and feedback on professional practice to explore the estimate of effect over time and examine whether new trials have added to knowledge regarding how optimize the effectiveness of audit and feedback.
METHODS: We searched the Cochrane Central Register of Controlled Trials, MEDLINE, and EMBASE for randomized trials of audit and feedback compared to usual care, with objectively measured outcomes assessing compliance with intended professional practice. Two reviewers independently screened articles and abstracted variables related to the intervention, the context, and trial methodology. The median absolute risk difference in compliance with intended professional practice was determined for each study, and adjusted for baseline performance. The effect size across studies was

DISCUSSION: There is substantial evidence that audit and feedback can effectively improve quality of care, but little evidence of progress in the field. There are opportunity costs for patients, providers, and health care systems when investigators test quality improvement interventions that do not build upon, or contribute toward, extant knowledge.

KEY WORDS: audit and feedback; scientific progress; quality improvement; systematic review; cumulative analysis.
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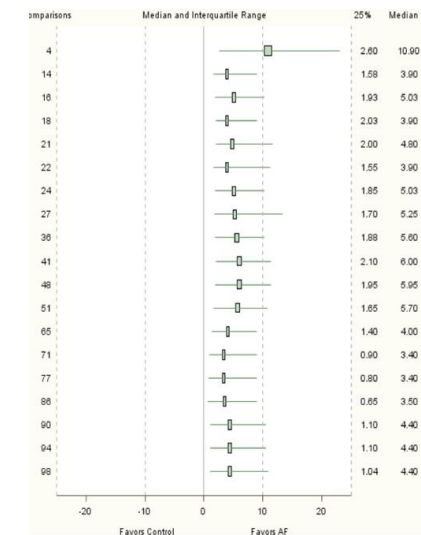
'No more business as usual'

IS IMPLEMENTATION SCIENCE
Implementation Science

DEBATE   **Open Access**

No more 'business as usual' with audit and feedback interventions: towards an agenda for a reinvigorated intervention

Noah M Ivers[1*], Anne Sales[2], Heather Colquhoun[3], Susan Michie[4], Robbie Foy[5], Jill J Francis[6] and Jeremy M Grimshaw[7]

Abstract

Background: Audit and feedback interventions in healthcare have been found to be effective, but there has been little progress with respect to understanding their mechanisms of action or identifying their key 'active ingredients.'

Discussion: Given the increasing use of audit and feedback to improve quality of care, it is imperative to focus further research on understanding how and when it works best. In this paper, we argue that continuing the 'business as usual' approach to evaluating two-arm trials of audit and feedback interventions against usual care for common problems and settings is unlikely to contribute new generalizable findings. Future audit and feedback trials should incorporate evidence- and theory-based best practices, and address known gaps in the literature.

Summary: We offer an agenda for high-priority research topics for implementation researchers that focuses on reviewing best practices for designing audit and feedback interventions to optimize effectiveness.

Keywords: Audit and feedback, Synthesis, Best practice, Implementation, Optimization

Background

Audit and feedback (A&F) involves providing a recipient with a summary of their performance over a specified period of time and is a common strategy to promote the implementation of evidence-based practices. A&F is used widely in healthcare by a range of stakeholders, including research funders and health system payers, delivery organizations, professional groups and researchers, to monitor and change health professionals' behaviour, both to increase accountability and to improve quality of care. A&F is an improvement over self-assessment [1] or self-monitoring [2] as it can provide objective data regarding discrepancies between current practice and target performance, as well as comparisons of performance to other health professionals. The recognition of suboptimal performance can act as a cue for action, encouraging those who are both motivated and capable to take action to reduce the discrepancy.

The effectiveness of A&F has been evaluated in the third update of a Cochrane review, which included 140 randomized trials of A&F conducted across many clinical conditions and settings around the world. The review found that A&F leads to a median 4.3% absolute improvement (interquartile range 0.5% to 16%) in provider compliance with desired practice [3]. One-quarter of A&F interventions had a relatively large, positive effect on quality of care, while another quarter had a negative or null effect. The challenge of identifying factors that differentiate more and less successful A&F interventions is exacerbated by poor reporting of both intervention components and contextual factors in the literature [4]. Furthermore, most A&F interventions tested in RCTs are designed without explicitly building on previous research or extant theory [5,6]. As a result, there has been little progress with respect to identifying the key ingredients for a successful A&F intervention or understanding the mechanisms of action of effective A&F interventions.

Head-to-head arm trials evaluating:

- alternative ways of designing and/or delivering audit and feedback

- audit and feedback vs audit and feedback plus co-interventions

- audit and feedback versus alternative interventions

'No more business as usual'

- Comparative effectiveness trials of different methods of delivering A&F need large sample sizes that are unlikely to be realized in one off research projects

- Increasingly healthcare systems are providing A&F at scale creating opportunities to embed comparative effectiveness trials into their A&F programs

Opportunities for innovative system-research partnerships = Implementation Science Laboratories

'No new ideas under the sun'

Comparative effectiveness research is …
comparing different interventions and **strategies...** (to understand) which interventions are most effective for which patients under specific circumstances.
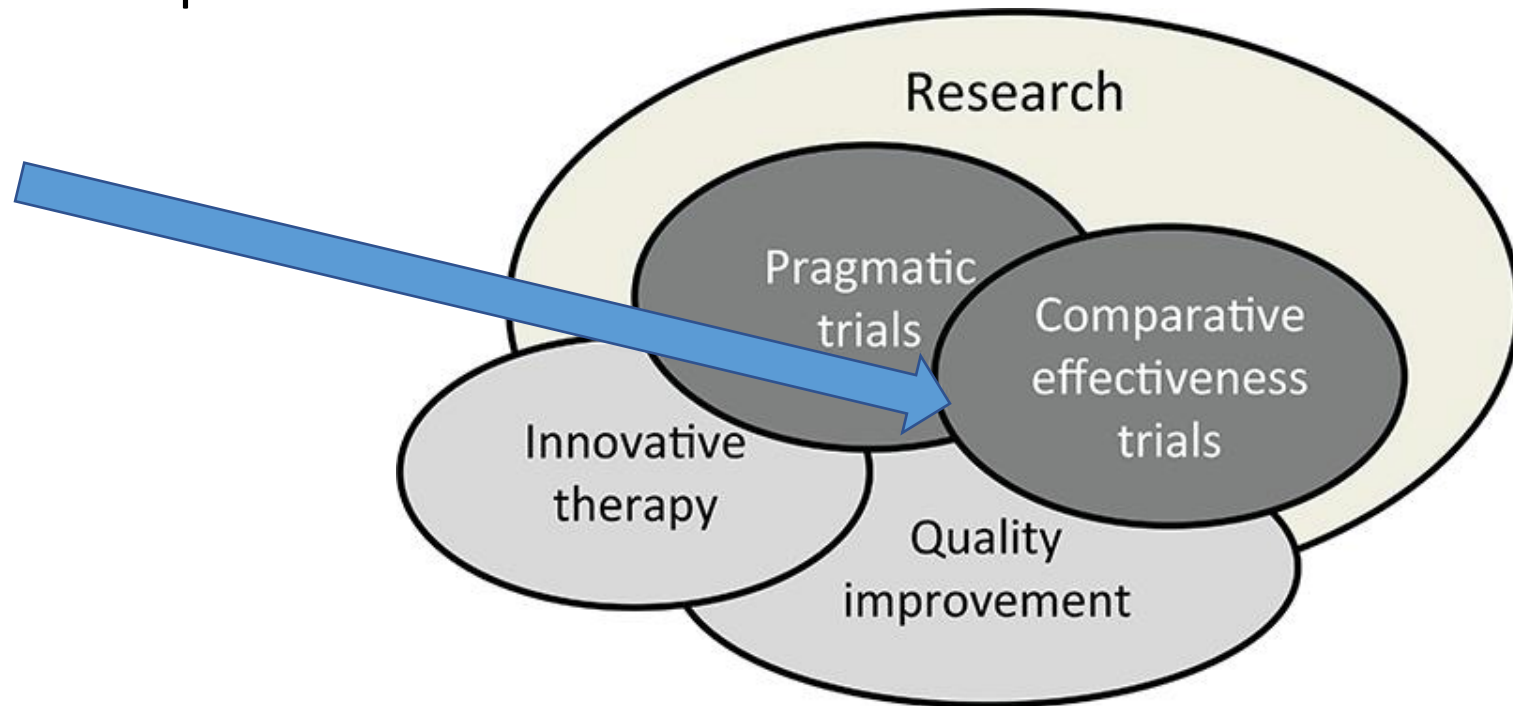
'No new ideas under the sun'

Radical incrementalism

- A deliberate strategy for business operations (particularly in information technology) in which a series of small changes are enacted one after the other, resulting in **radical** cumulative changes in infrastructure.

Imp Sci Labs: a definition (in progress)

Partnership:

Organizations already delivering interventions at scale keen to optimize those interventions

and

Researchers keen to advance generalizable knowledge in implementation

Summary | Full Text | Tables and Figures | References

The *Lancet* REWARD (REduce research Waste And Reward Diligence) campaign has encouraged researchers to examine how they work and make efforts to reduce waste and maximise efficiency. Research waste is undermining efforts to improve the effectiveness of health systems. A consistent finding in health services research is inappropriate variations in care and evidence–practice gaps. Implementation science—the study of methods to promote the systematic uptake of clinical research findings and other evidence-based practices into routine practice[1]—can inform health systems on how to reliably improve care and outcomes.

- **LABORATORY** per Merriam-Webster:

• a place equipped for experimental study in a science or for testing and analysis;

• broadly: a place providing opportunity for experimentation, observation, or practice in a field of study
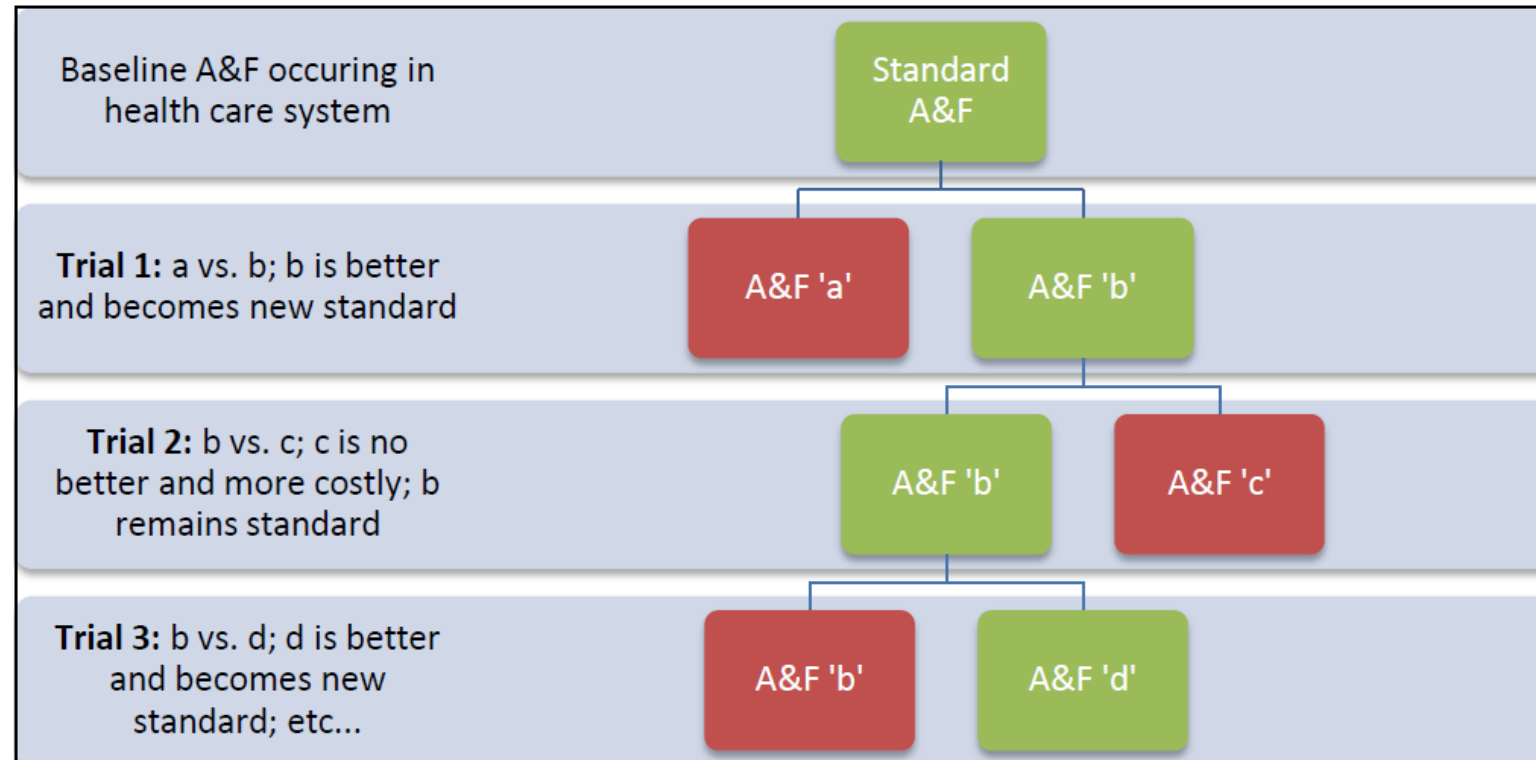
Imp Sci Labs

Imp Sci Labs

Role	Health system	Researcher
Develop priorities	X	
Develop prototype A&F	X	X
Delivery of A&F	X	
Data collection	X	
Analysis		X
Interpretation	X	X

Opportunities to seek research funding to cover additional marginal costs of research

What (we think) is an IS Lab; what is it not?

IS Labs are both a structure and a process

IS Labs are characterized by

- Alignment with partners' service mission
- Sustained partnership between researchers and healthcare organizations
- Commitment to both local improvement and generalizable science via evaluative rigor
- Population-scale impact via incrementalism

What is an IS Lab; what is it not?

	Alignment of scientific and applied goals	Sustained engagement of partners	Generalizable implementation science research	Incremental population-level impact
Implementation Science Laboratory	✔	✔	✔	✔
Learning Health System	✔	✔	?	✔
Learning Collaboratives	✔	?	-	✔
Practice Based Research Network	?	?	✔	-
Embedded Researcher models	✔	-	?	?
Participatory / Action research	?	✔	?	?

Imp Sci Labs

- Benefits for health system – learning organisation; demonstrable improvements in its quality improvement activities; linkages to academic experts

- Benefits for implementation science – ability to test important (but potentially subtle) variations in audit and feedback that may be important effect modifiers

Imp Sci Labs: challenges

HEALTH SYSTEM PARTNERS:
- Willingness to acknowledge arbitrariness of decisions
- Ability to respond to emerging evidence
- Compromise

RESEARCH PARTNERS:
- Lack of control over topic and outcomes and timing
- Scientific effort as a means to an end
- Compromise

Personal example: Ontario A&F Implementation Lab

'Meta' Implementation Labs

Creates opportunities to:

- Coordinate and replicate

- Compare role of inner context prospectively within a lab

- Compare role of outer context across labs
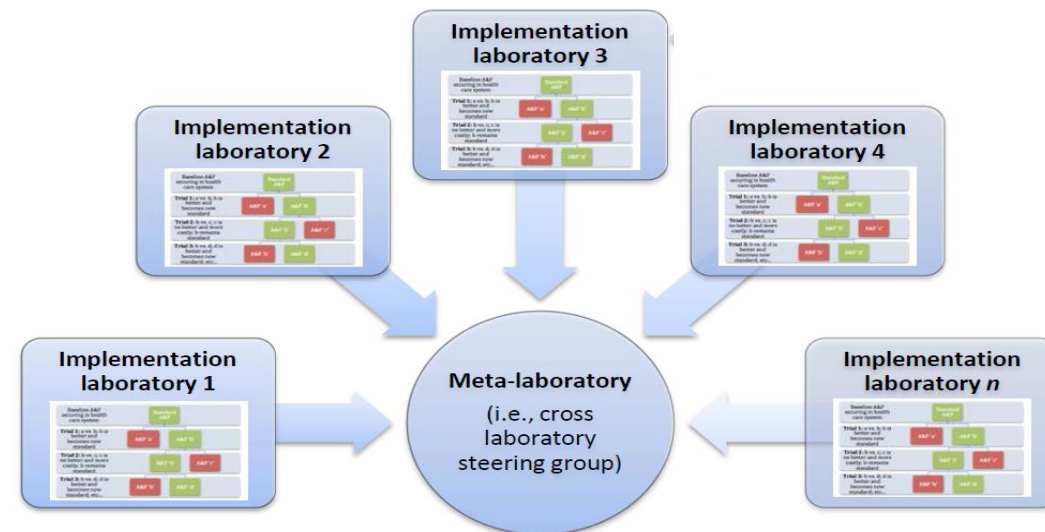
A&F MetaLab

A global community of science and practice

- Shared learning across studies and laboratories

- Shared expertise

- Opportunities for planned replication to explore replicability and outer context issues

- Building international community of health care system organisations with shared interests

- http://www.ohri.ca/auditfeedback/

- @afMetaLab

A&F MetaLab Website

www.ohri.ca/auditfeedback

- resources on theory, recommendations and relevant reading

- access to previous webinars with access to videos and slides

- resources from previous conferences

- Information about A&F laboratories
  - See how A&F is used in a real-world example

Twitter

@afMetaLab

- 890 tweets!

- Quick way to keep up to date with A&F publications, and upcoming events such as webinars and conferences

- Great way to participate in conferences even if you are unable to attend

  - The International A&F MetaLab Symposium is usually live tweeted!

Creating shared learning and expertise on Audit & Feedback

Audit & Feedback
MetaLab

Edit profile

A&F MetaLab
@afMetaLab

Aiming to improve healthcare outcomes by optimizing performance with Audit & Feedback (A&F). Running trials at scale with partners using A&F laboratories.

🔗 ohri.ca/auditfeedback/   📅 Joined September 2017

155 Following   **348** Followers

A&F MetaLab ListServ

- Allows people to stay up-to-date on upcoming events
- Members can ask questions and start dialogue with each other
- Currently have 93 subscribers
- Confirmation by the MetaLab coordinator is required to post to the list
  - No spam sent and your inbox isn't overflowing! (more than usual...)

Logged in as: slinklater@ohri.ca (Owner)

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AF-METALAB   Hide Latest Messages

3.The privacy policy for **this mailing list** (link above)

The A&F MetaLab collaboration aims to connect those using A&F and researchers in the field and create shared learning across A&F laboratories around the world to increase the effectiveness of A&F

Webinars

- Webinars focusing on 3 different areas, to appeal to all audiences

- monthly, with rebroadcasts scheduled afterwards for those in Australia & New Zealand

- recorded and posted on the A&F MetaLab website along with slides (where possible)

- Scheduled

- Webinars

International A&F MetaLab Conferences

- Pre-COVID, were hosted annually, usually in the spring (TBD going forward)
- Alternate between North American and European/UK locations
- Relatively small (less than 200 attendees) allowing for collaboration
- Consist of a day dedicated to the science of A&F and 1-2 days open to the public
- A great opportunity for researchers and those in the healthcare service world to connect and learn from each other
- Trainee specific day to share work and develop experience presenting

Trainee Group

- Currently 37 trainees

- Host webinars every 2 months for trainees to present their work

- Also have MetaLab scientists present to the group about their work
  - Have had open Q&A sessions about science, careers and anything else that comes up!

- Great opportunity for learning and collaboration between trainees and groups using A&F