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IMPLEMENTATION LABORATORIES: EMBEDDING A/B BEHAVIOURAL TRIALS IN ROUTINE SERVICE SETTINGS

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BACKGROUND

- Consistent evidence of failure to translate research findings into clinical practice
  - 30-40% patients do not get treatments of proven effectiveness
  - 20–25% patients get care that is not needed or potentially harmful
- Suggests that implementation of research findings is fundamental challenge for healthcare systems to optimise care, outcomes and costs

Schuster, McGlynn, Brook (1998). *Milbank Memorial Quarterly*

Grol R (2001). *Med Care*

IMPLEMENTATION SCIENCE

- Implementation is a human enterprise that can be studied to understand and improve implementation approaches
- Implementation science is the scientific study of the determinants, processes and outcomes of implementation.
- Goal is to develop a generalisable empirical and theoretical basis to optimise implementation activities

IMPLEMENTATION SCIENCE

- Knowledge synthesis (what care should we be providing, what do we know about the effectiveness of different implementation approaches);
- Research into the evolution of and critical discourse around research evidence;
- Research into knowledge retrieval, evalu ment infrastructure
- Identification of implementation failures;
- Development of methods to assess barri ntation;
- Development of the methods for optimising im tation programs;
- Evaluations of the effectiveness and efficiency of implementation programs;
- Sustainability and scalability of implementation programs;
- Development of implementation science theory; and
- Development of implementation science research methods.

(Cluster) randomized trials key methodological approach for evaluating implementation programs

CURRENT STATE OF KNOWLEDGE

- Cochrane 2012 review – 140 trials of audit and feedback, median absolute improvement +4%, interquartile range +1% to +16%
- Larger effects were seen if:
  - baseline compliance was low.
  - the source was a supervisor or colleague
  - it was provided more than once
  - it was delivered in both verbal and written formats
  - it included both explicit targets and an action plan

Ivers (2012) *Cochrane Library*

REMAINING UNCERTAINTIES

Annals of Internal Medicine ACADEMIA AND THE PROFESSION

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.

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For author affiliations, see end of text.
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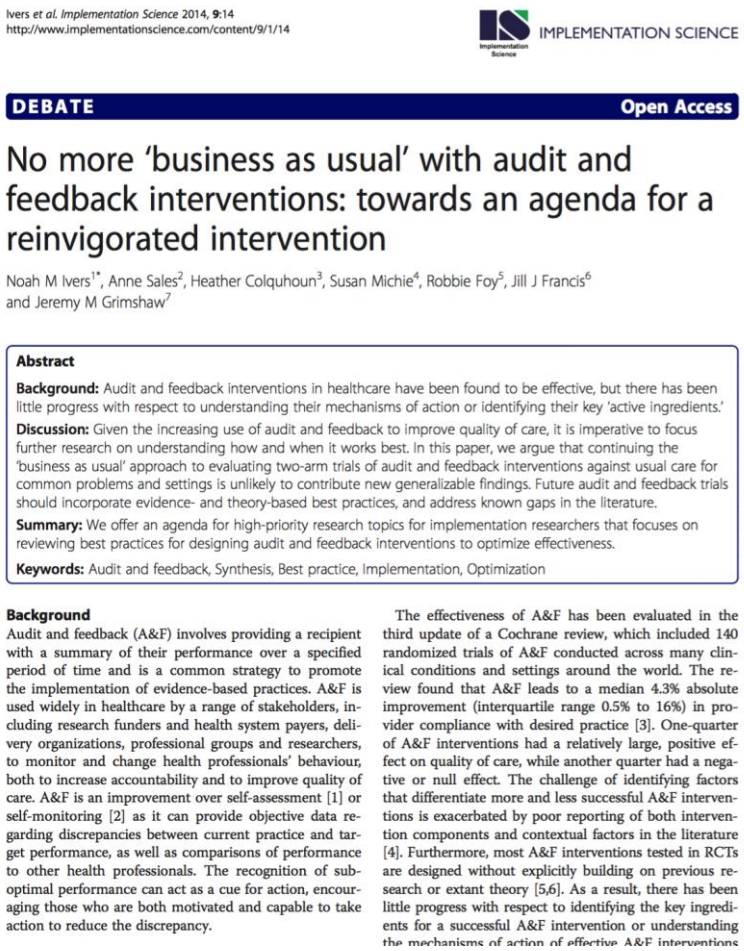
- Be provided multiple times
- Present feedback as soon as possible
- Provide individual rather than general data
- Include clear comparators that reinforce desired behaviour change
- Support an action perceived to be a priority for recipients
- Recommend actions that can improve and are under control of the recipient
- Recommend a specific action
- Tailor feedback interventions based on situation-specific barriers
- Closely link visual display and summary message
- Be presented in multiple ways
- Minimize cognitive load
- Address barriers that prevent use of the feedback
- Provide short, actionable messages followed by more detail
- Address credibility of the information
- Increase motivation to change practice
- Encourage social construction of feedback rather than passive delivery

‘NO MORE BUSINESS AS USUAL’



Ivers *et al. Implementation Science* 2014, **9**:14
http://www.implementationscience.com/content/9/1/14

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

IMPLEMENTATION LABORATORIES TO OPTIMISE AUDIT AND FEEDBACK

Reducing research waste with implementation laboratories

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. However, the potential for implementation science to improve the effectiveness of health systems will not be realised until research waste in the field is systematically addressed.

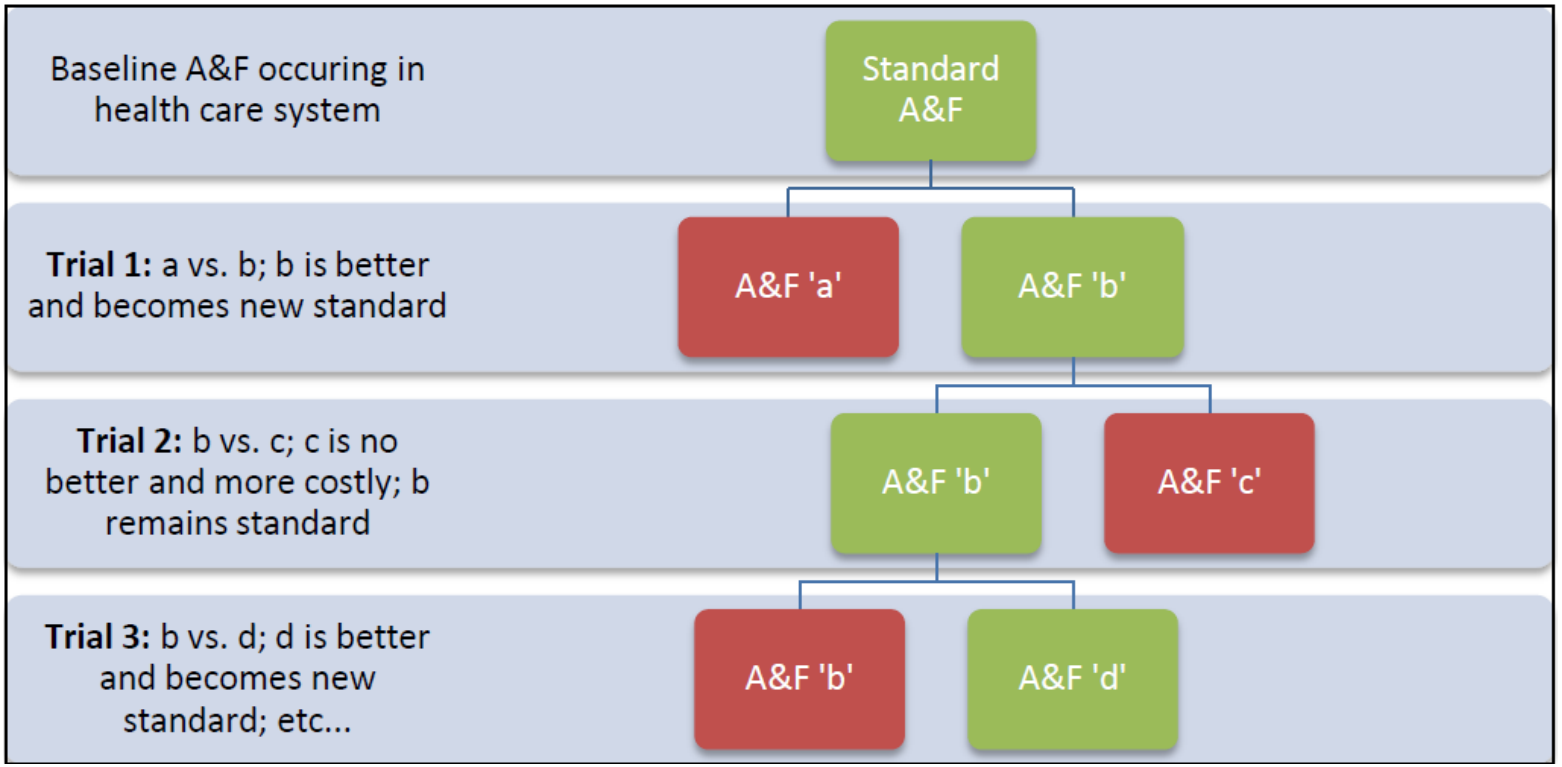
A solid evidence base shows the effectiveness of common implementation strategies—eg, audit and feedback,[2] point of care reminders,[3] educational meetings,[4] and educational outreach[5]—but with substantial unexplained heterogeneity. Yet many current studies that evaluate implementation strategies against control create research waste because they do not build upon the current evidence base or address the key questions to advance the field. For example, for more than a decade we have known that audit and feedback is an effective way to improve care,[2] but researchers continue to undertake trials of audit and feedback versus usual care, testing whether a particular version of audit and feedback can work in a particular setting and for a particular purpose. Such evaluations rarely incorporate relevant theory or best practices[6] in the design and delivery of the intervention and do not address the question of how to optimise the effectiveness of audit and feedback. As a result, there is insufficient evidence on how best to design a new audit and feedback intervention; the same is true for many other implementation strategies.[3,4] Such failures represent substantial waste of scarce implementation research resources and promulgate evidence-practice gaps that incur individual and societal harms.

Health systems have a need for generalisable evidence about how to achieve the greatest possible impact with their quality improvement initiatives.[7] Implementation intervention developers must make many decisions about content, format, and delivery of their intervention; even small modifications in these areas could influence the effectiveness of the intervention.[8] Since the question of whether many common implementation strategies can work has been answered, the time has come for a shift to a comparative-effectiveness model for implementation research.[9] Head-to-head trials that test different ways of designing and delivering implementation strategies are needed to provide the evidence base for health system decision makers. Direct comparisons of implementation interventions will more efficiently move the field forward than the current approach involving cumulating evidence from fairly small trials for indirect analyses in systematic reviews. However, the required sample sizes for such research are difficult to achieve unless the research is embedded within existing, large-scale initiatives.

A promising solution is to develop implementation laboratories that involve close collaboration between health systems delivering implementation strategies at scale and research teams. Implementation laboratories provide an opportunity to kick-start the field by ensuring that scholars meet both applied and scientific goals of understanding what works better and why. Such research can address health systems' priorities and produce generalisable knowledge about factors—context,

For more on the Lancet REWARD campaign see http://www.thelancet.com/campaigns/efficiency

IMPLEMENTATION LABORATORIES TO OPTIMISE AUDIT AND FEEDBACK



IMPLEMENTATION LABORATORIES TO OPTIMISE AUDIT AND FEEDBACK

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

IMPLEMENTATION LABORATORIES TO OPTIMISE AUDIT AND FEEDBACK

- 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

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.

ENHANCING INFORMATIVENESS OF EVALUATIONS IN IMPLEMENTATION LABORATORIES

- Design elements
- Process evaluations
  - Qualitative
  - Quantitative
  - Theory based
- Temporal evaluations

ONE OF THE MOST AMBITIOUS AND INFORMATIVE TRIALS OF FEEDBACK

PLOS | MEDICINE

RESEARCH ARTICLE

An Audit and Feedback Intervention for Reducing Antibiotic Prescribing in General Dental Practice: The RAPiD Cluster Randomised Controlled Trial

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¶ Membership of the Translation Research in a Dental Setting (TRiaDS) Research Methodology Group is provided in the Acknowledgments.
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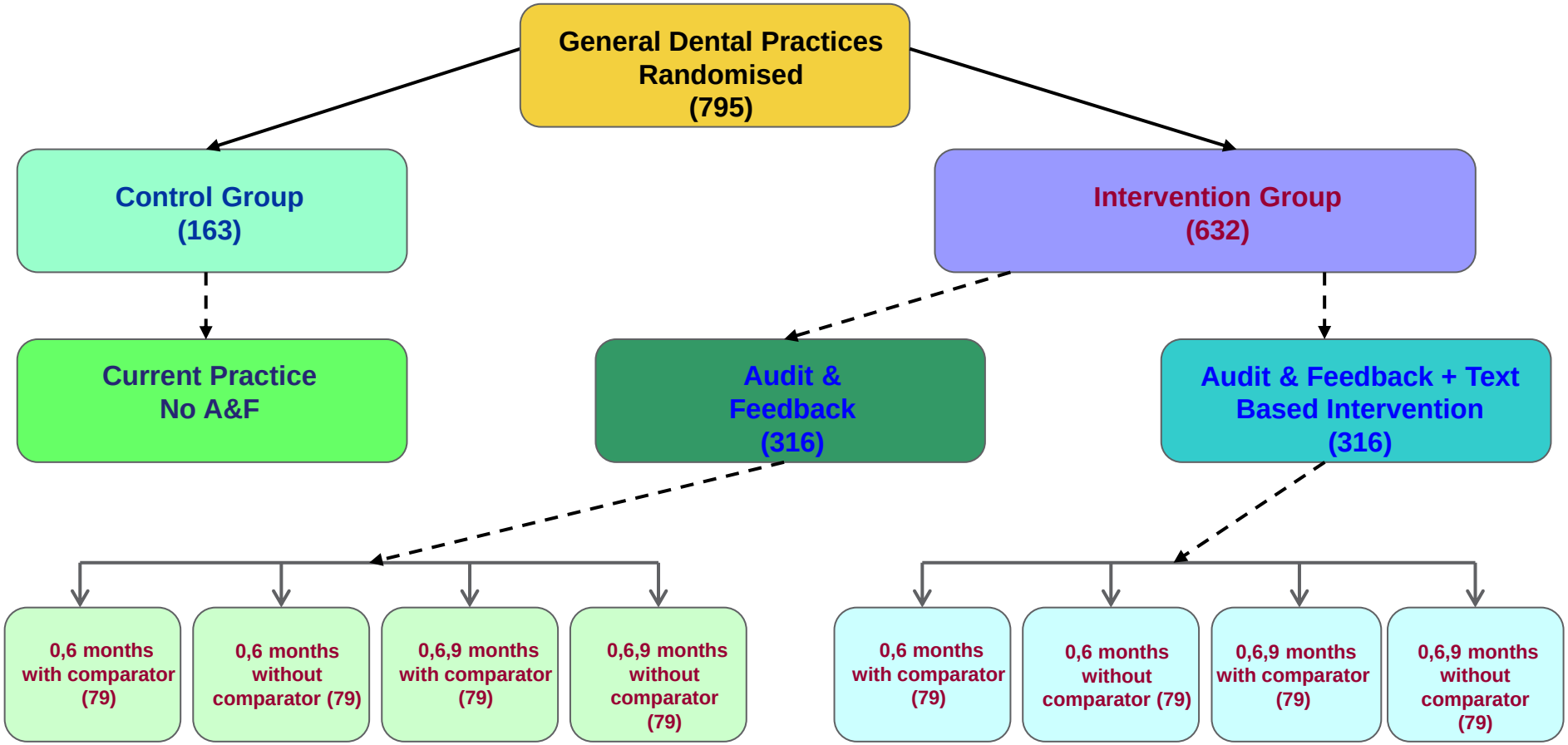
ONE OF THE MOST AMBITIOUS AND INFORMATIVE TRIALS OF FEEDBACK



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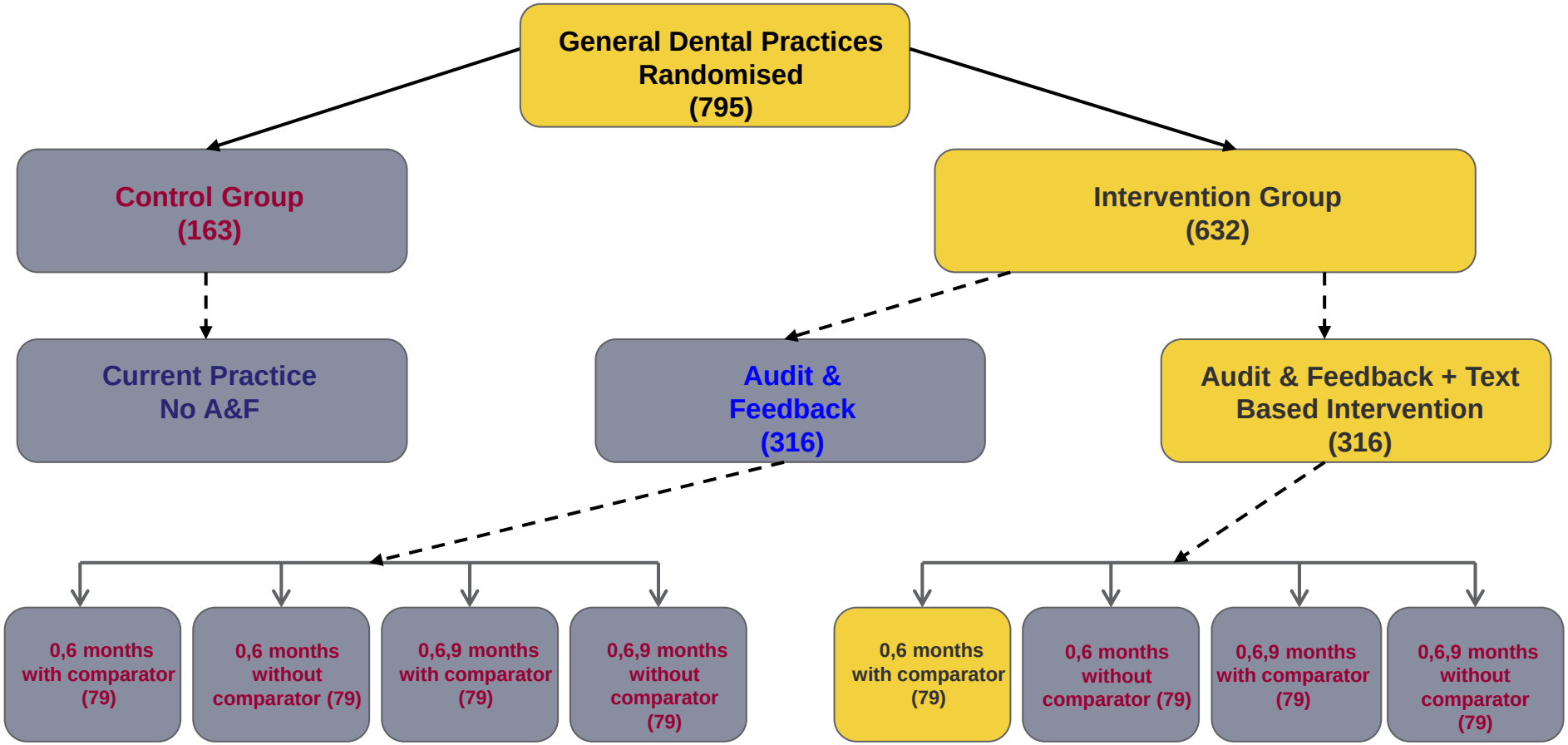


IMPLEMENTATION LABORATORIES TO OPTIMISE AUDIT AND FEEDBACK

Affinite

NHS Blood and Transplant

- UK NIHR funded 5 year research program
- 2x2 factorial trial testing different ways of designing and delivering blood utilisation audits
- Randomising 140+ NHS trusts

OPPORTUNITIES FOR METHODOLOGICAL INNOVATION

SCT
SOCIETY FOR CLINICAL TRIALS

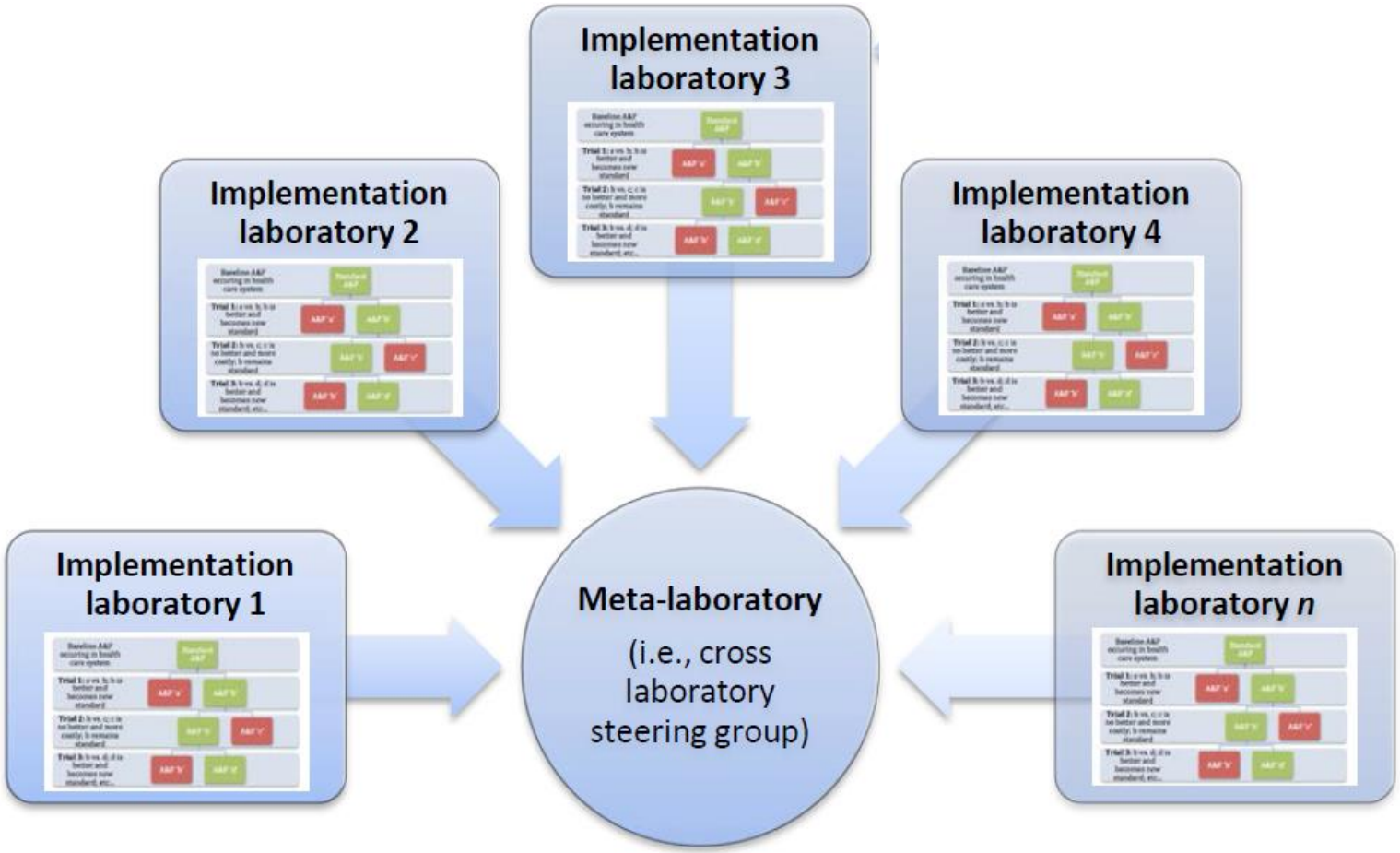
Longitudinal cluster randomized trials
Sequential Multiple-Assignment Randomized Trials
Adaptive designs

INVITED SESSION 6 - DESIGNING TRIALS WITHI

REBECCA WAL

Implementation science can be defined as the "study of
implementing evidence-based practice in healthcare". In
feedback) are complex. When two-arm trials have shown that, i
is effective, the next logical step is to establish whether a particular
effective and if this generalizes across settings. The large number of different potential versions of a complex intervention, means that it is likely that a series of trials will be needed to identify the optimal intervention. Implementation laboratories have recently been proposed as a way of utilising existing large-scale service implementation programmes (e.g. national clinical audits) to embed sequential randomised trials that would test different ways of delivering implementation interventions in comparisons at scale. Implementation laboratories involve healthcare system partners in continuous improvement using rigorous methods to identify more effective variants of an intervention that can be routinely and sustainably embedded into their ongoing programs.

IMPLEMENTATION META-LABORATORIES



IMPLEMENTATION META-LABORATORIES

- Shared learning across studies and laboratories
- Shared expertise
- Opportunities for planned replication to explore replicability and outer context issues
- Evidence and theory-based resources
- Building international community of health care system organisations with shared interests

A&F METALAB

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

@afMetaLab

SUMMARY (1)

- Implementation laboratories are specific manifestation of learning health care systems that aim to generate knowledge about how to optimize specific implementation interventions
- Implementation laboratories are formal sustained collaborations between implementation researchers and healthcare system partners
- Protoypical implementation laboratory undertakes sequential A/B testing

SUMMARY (2)

- Large (often population based) sample sizes available provide opportunities for use of more innovative and ambitions designs
- Raises methodological and theoretical challenges and opportunities
- Implementation Meta-laboratories offer opportunities for shared learning (including planned replication) and sharing expertise

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