# Models, Frameworks, and Theory in Implementation Science

Justin B. Moore, PhD, MS, FACSM

Division of Public Health Sciences, Wake Forest School of Medicine

# About the series

- **Description**
  - This series provides an introduction to dissemination and implementation (D&I) science and a theoretical foundation to translate evidence into clinical practice, health policy, or public health.

- **Sessions**
  - Wed, 9/29: Integrating Implementation Science Frameworks and Behavioral Theory into Implementation Research
  - Wed, 10/13: Process Evaluation and Implementation Monitoring

# A little about me…

- A faculty member in the Departments of Implementation Science (primary), Epidemiology & Prevention, and Family & Community Medicine.

- I have formal training in exercise science, health behavior, epidemiology, & implementation science.

- I've been conducting implementation science research since 2003.

- The primary focus of my research has been the epidemiology of health behaviors related to obesity and the design, delivery, and evaluation of interventions to promote physical activity and healthy eating prevent or treat obesity or related comorbidities.

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# Recommended Texts

- **Dissemination and Implementation Research in Health: Translating Science to Practice (**2nd Edition)
  - Ross C. Brownson, Graham A. Colditz, Enola K. Proctor

- **Handbook on Implementation Science**
  - Per Nilsen & Sarah A. Birken

# Objectives

- By the end of this lecture, learners will be able to…
  - Explain the state of D&I models within the field
  - Describe the components of the consolidated framework for implementation research
  - Describe the components of RE-AIM for dissemination research
  - Describe the role of behavioral theory in D&I research

# When is an innovation ready to be disseminated and implemented?

- In a perfect world…
  - We'd have a systematic review of the evidence for an innovation
- In a less perfect world…
  - We would at least have a successful effectiveness study
- In reality, things are complicated

# Frameworks that can guide Dissemination & Implementation Research

# Bridging Research and Practice:

## Models for Dissemination and Implementation Research

Rachel G. Tabak, PhD, Elaine C. Khoong, BS, [...]
Brownson, PhD
Prevention Research Center in St. Louis, Brown [...]
Public Health Sciences and Alvin J. Siteman Can[...]
Washington University in St. Louis, St. Louis, Mis[...]
(Chambers), NIH, Bethesda, Maryland

## Abstract

**Context**—Theories and frameworks (hereafter c[...]
implementation (D&I) research by making the sp[...]
This work organizes and synthesizes these models[...]
in D&I research; (2) synthesizing this information[...]
model to inform study design and execution.

**Evidence acquisition**—This review began wit[...]
and used snowball sampling to collect models dev[...]
presentations, and books. All models were analyz[...]
author-defined variables: construct flexibility, foc[...]
activities (D/I), and the socio-ecological framewo[...]
rate construct flexibility from broad to operationa[...]
to implementation-focused. All SEF levels (syster[...]
applicable to a model were also extracted. Models[...]

**Evidence synthesis**—Sixty-one models were i[...]
categories in the construct flexibility and D/I scal[...]
were distributed across all levels of the SEF; the f[...]
To assist researchers in selecting and utilizing a n[...]
authors present and explain examples of how mod[...]

**Conclusions**—These findings may enable resea[...]
inform their D&I work.

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# A Thematic Analysis of Theoretical Models for Translational

# Science in Nursing: Mapping the Field

[...]P, PhD, AOCN[1], Cheryl A. Fisher, RN-BC, EdD[1], Clare E. Hastings,
[...]e B. Silverman, BA[1], and Gwenyth R. Wallen, RN, PhD[1]
[...] Institutes of Health, Bethesda, MD

[...]antity and diversity of conceptual models in translational science may
[...]dvance the use of theory.

[...]offers a comparative thematic analysis of the models available to inform
[...]t, transfer, and utilization.

[...]arches identified 47 models for knowledge translation. Four thematic areas
[...]ased practice and knowledge transformation processes; (2) strategic
[...]tion of new knowledge; (3) knowledge exchange and synthesis for
[...] (4) designing and interpreting dissemination research.

[...]lysis distinguishes the contributions made by leaders and researchers at
[...]s of discovery, development, and service delivery. It also informs the
[...]uide activities in knowledge translation.

[...]ible theoretical stance is essential to simultaneously develop new
[...]e the translation of that knowledge into practice behaviors and programs
[...]mal patient outcomes.

[...]vidence-based practice; knowledge translation; dissemination research;

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**IMPLEMENTATION SCIENCE**

**SYSTEMATIC REVIEW**                                  **Open Access**

# Disseminating research findings: what should researchers do? A systematic scoping review of conceptual frameworks

Paul M Wilson[1*], Mark Petticrew[2], Mike W Calnan[3], Irwin Nazareth[4]

## Abstract

**Background:** Addressing deficiencies in the dissemination and transfer of research-based knowledge into routine clinical practice is high on the policy agenda both in the UK and internationally.
However, there is lack of clarity between funding agencies as to what represents dissemination. Moreover, the expectations and guidance provided to researchers vary from one agency to another. Against this background, we performed a systematic scoping to identify and describe any conceptual/organising frameworks that could be used by researchers to guide their dissemination activity.

**Methods:** We searched twelve electronic databases (including MEDLINE, EMBASE, CINAHL, and PsycINFO), the reference lists of included studies and of individual funding agency websites to identify potential studies for inclusion. To be included, papers had to present an explicit framework or plan either designed for use by researchers or that could be used to guide dissemination activity. Papers which mentioned dissemination (but did not provide any detail) in the context of a wider knowledge translation framework, were excluded. References were screened independently by at least two reviewers; disagreements were resolved by discussion. For each included paper, the source, the date of publication, a description of the main elements of the framework, and whether there was any implicit/explicit reference to theory were extracted. A narrative synthesis was undertaken.

**Results:** Thirty-three frameworks met our inclusion criteria, 20 of which were designed to be used by researchers to guide their dissemination activities. Twenty-eight included frameworks were underpinned at least in part by one or more of three different theoretical approaches, namely persuasive communication, diffusion of innovations theory, and social marketing.

**Conclusions:** There are currently a number of theoretically-informed frameworks available to researchers that can be used to help guide their dissemination planning and activity. Given the current emphasis on enhancing the uptake of knowledge about the effects of interventions into routine practice, funders could consider encouraging researchers to adopt a theoretically-informed approach to their research dissemination.

# Many models to choose from…

## Bridging Research and Practice
### Models for Dissemination and Implementation Research

Rachel G. Tabak, PhD, Elaine C. Khoong, BS, David A. Chambers, DPhil, Ross C. Brownson, PhD

**Context:** Theories and frameworks (hereafter called models) enhance dissemination and implementation (D&I) research by making the spread of evidence-based interventions more likely. This work organizes and synthesizes these models by (1) developing an inventory of models used in D&I research; (2) synthesizing this information; and (3) providing guidance on how to select a model to inform study design and execution.

**Evidence acquisition:** This review began with commonly cited models and model developers and used snowball sampling to collect models developed in any year from journal articles, presentations, and books. All models were analyzed and categorized in 2011 based on three author-defined variables: construct flexibility, focus on dissemination and/or implementation activities (D/I), and the socioecologic framework (SEF) level. Five-point scales were used to rate construct flexibility from broad to operational and D/I activities from dissemination-focused to implementation-focused. All SEF levels (system, community, organization, and individual) applicable to a model were also

Sixty-one models were included in this review.

the construct flexibility and D/I scales had at least four models. Models were distributed across all levels of the SEF; the fewest models (n=8) addressed policy activities. To assist researchers in selecting and utilizing a model throughout the research process, the authors present and explain examples of how models have been used.

**Conclusions:** These findings may enable researchers to better identify and select models to inform their D&I work.

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# Why do we choose a certain model?

Most important criteria in a survey of implementation researchers and practitioners:

- Empirical support

- Explanatory power/testability

- Applicability to setting

- Description of change process

- Analytic level

Birken SA. Criteria for selecting implementation frameworks and theories among implementation researchers and practitioners. 9th Annual Conference on the Science of Dissemination and Implementation in Health. Washington DC. Dec 2016

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# Considerable variability in focus, flexibility, and level of focus exists

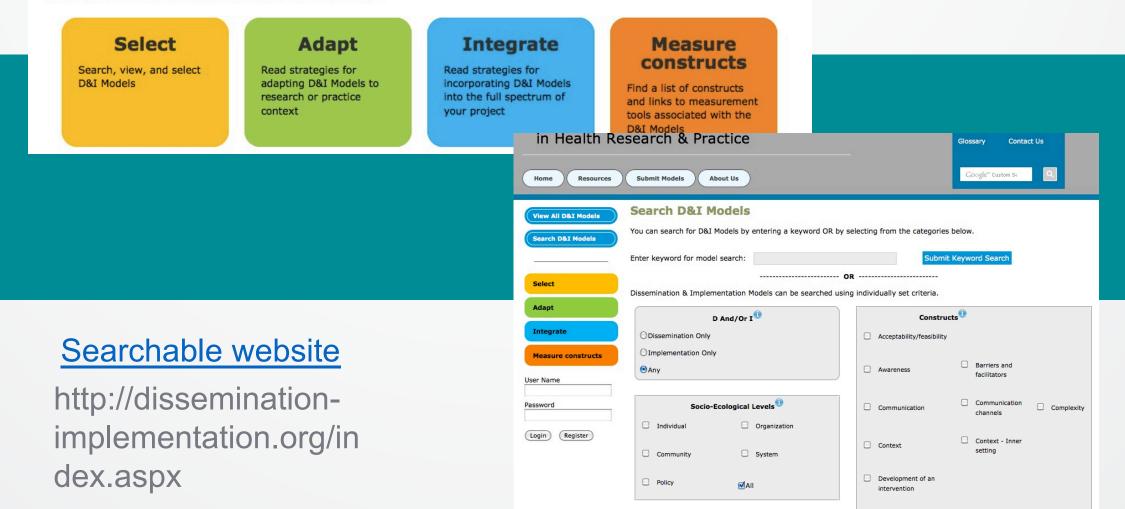**Table 2.** Categorization of D&I models for use in research studies

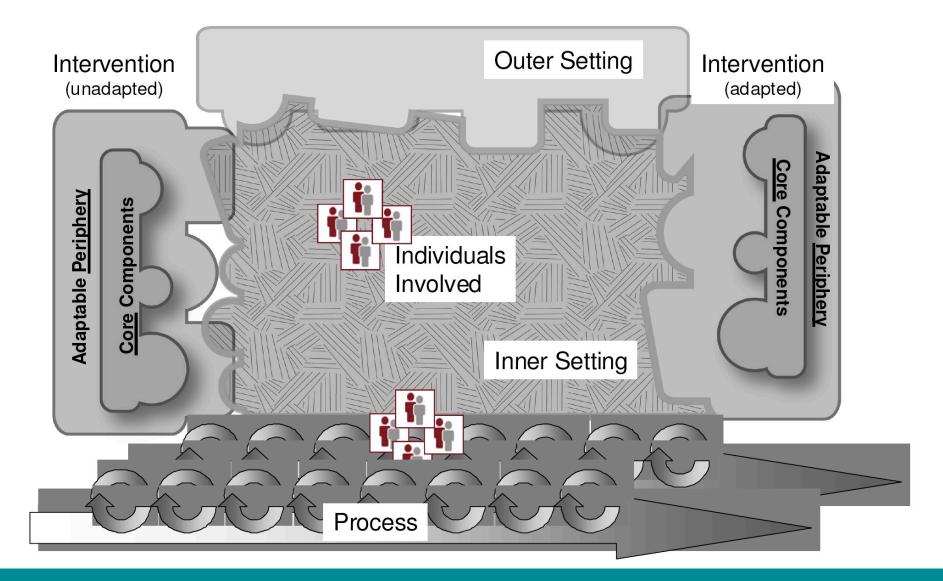| Model | Dissemination and/or implementation | Construct flexibility: broad to operational | Socioecologic Level | | | | | References |
|---|---|---|---|---|---|---|---|---|
| | | | System | Community | Organization | Individual | Policy | |
| Diffusion of Innovation | D-only | 1 | | x | x | x | | 21 |
| RAND Model of Persuasive Communication and Diffusion of Medical Innovation | D-only | 1 | | x | x | x | | 22 |
| Effective Dissemination Strategies | D-only | 2 | | x | x | x | | 23 |
| Model for Locally Based Research Transfer Development | D-only | 2 | | x | x | | | 24 |
| Streams of Policy Process | D-only | 2 | x | x | x | | x | 25, 26 |
| A Conceptual Model of Knowledge Utilization | D-only | 3 | x | x | | | x | 27 |
| Conceptual Framework for Research Knowledge Transfer and Utilization | D-only | 3 | | | x | | | 28 |
| Conceptualizing Dissemination Research and Activity: Canadian Heart Health Initiative | D-only | 3 | | x | x | | | 29, 30 |
| Policy Framework for Increasing Diffusion of Evidence-Based Physical Activity Interventions | D-only | 3 | x | x | x | | x | 31 |

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**Searchable website**

http://dissemination-implementation.org/index.aspx

# Consolidated Framework for Implementation Research

# CFIR domains

- Intervention characteristics
- Outer setting
- Inner setting
- Characteristics of individuals
- Process

# CFIR: Intervention

| | I. INTERVENTION CHARACTERISTICS | |
|---|---|---|
| A | Intervention Source | Perception of key stakeholders about whether the intervention is externally or internally developed. |
| B | Evidence Strength & Quality | Stakeholders' perceptions of the quality and validity of evidence supporting the belief that the intervention will have desired outcomes. |
| C | Relative Advantage | Stakeholders' perception of the advantage of implementing the intervention versus an alternative solution. |
| D | Adaptability | The degree to which an intervention can be adapted, tailored, refined, or reinvented to meet local needs. |
| E | Trialability | The ability to test the intervention on a small scale in the organization, and to be able to reverse course (undo implementation) if warranted. |
| F | Complexity | Perceived difficulty of implementation, reflected by duration, scope, radicalness, disruptiveness, centrality, and intricacy and number of steps required to implement. |
| G | Design Quality & Packaging | Perceived excellence in how the intervention is bundled, presented, and assembled. |
| H | Cost | Costs of the intervention and costs associated with implementing the intervention including investment, supply, and opportunity costs. |

# CFIR: Outer setting

| II. OUTER SETTING | | |
|---|---|---|
| A | Patient Needs & Resources | The extent to which patient needs, as well as barriers and facilitators to meet those needs, are accurately known and prioritized by the organization. |
| B | Cosmopolitanism | The degree to which an organization is networked with other external organizations. |
| C | Peer Pressure | Mimetic or competitive pressure to implement an intervention; typically because most or other key peer or competing organizations have already implemented or are in a bid for a competitive edge. |
| D | External Policy & Incentives | A broad construct that includes external strategies to spread interventions, including policy and regulations (governmental or other central entity), external mandates, recommendations and guidelines, pay-for-performance, collaboratives, and public or benchmark reporting. |

# CFIR: Inner setting

| III. INNER SETTING | | |
|---|---|---|
| A | Structural Characteristics | The social architecture, age, maturity, and size of an organization. |
| B | Networks & Communications | The nature and quality of webs of social networks and the nature and quality of formal and informal communications within an organization. |
| C | Culture | Norms, values, and basic assumptions of a given organization. |
| D | Implementation Climate | The absorptive capacity for change, shared receptivity of involved individuals to an intervention, and the extent to which use of that intervention will be rewarded, supported, and expected within their organization. |
| 1 | Tension for Change | The degree to which stakeholders perceive the current situation as intolerable or needing change. |
| 2 | Compatibility | The degree of tangible fit between meaning and values attached to the intervention by involved individuals, how those align with individuals' own norms, values, and perceived risks and needs, and how the intervention fits with existing workflows and systems. |
| 3 | Relative Priority | Individuals' shared perception of the importance of the implementation within the organization. |
| 4 | Organizational Incentives & Rewards | Extrinsic incentives such as goal-sharing awards, performance reviews, promotions, and raises in salary, and less tangible incentives such as increased stature or respect. |

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# CFIR: Inner setting

| | | |
|---|---|---|
| 5 | Goals and Feedback | The degree to which goals are clearly communicated, acted upon, and fed back to staff, and alignment of that feedback with goals. |
| 6 | Learning Climate | A climate in which: a) leaders express their own fallibility and need for team members' assistance and input; b) team members feel that they are essential, valued, and knowledgeable partners in the change process; c) individuals feel psychologically safe to try new methods; and d) there is sufficient time and space for reflective thinking and evaluation. |
| E | Readiness for Implementation | Tangible and immediate indicators of organizational commitment to its decision to implement an intervention. |
| 1 | Leadership Engagement | Commitment, involvement, and accountability of leaders and managers with the implementation. |
| 2 | Available Resources | The level of resources dedicated for implementation and on-going operations, including money, training, education, physical space, and time. |
| 3 | Access to Knowledge & Information | Ease of access to digestible information and knowledge about the intervention and how to incorporate it into work tasks. |

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# CFIR: Individuals

| IV. CHARACTERISTICS OF INDIVIDUALS | | |
|---|---|---|
| A | Knowledge & Beliefs about the Intervention | Individuals' attitudes toward and value placed on the intervention as well as familiarity with facts, truths, and principles related to the intervention. |
| B | Self-efficacy | Individual belief in their own capabilities to execute courses of action to achieve implementation goals. |
| C | Individual Stage of Change | Characterization of the phase an individual is in, as he or she progresses toward skilled, enthusiastic, and sustained use of the intervention. |
| D | Individual Identification with Organization | A broad construct related to how individuals perceive the organization, and their relationship and degree of commitment with that organization. |
| E | Other Personal Attributes | A broad construct to include other personal traits such as tolerance of ambiguity, intellectual ability, motivation, values, competence, capacity, and learning style. |

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# CFIR: Process

| V. PROCESS | | | |
|---|---|---|---|
| A | | Planning | The degree to which a scheme or method of behavior and tasks for implementing an intervention are developed in advance, and the quality of those schemes or methods. |
| B | | Engaging | Attracting and involving appropriate individuals in the implementation and use of the intervention through a combined strategy of social marketing, education, role modeling, training, and other similar activities. |
| | 1 | Opinion Leaders | Individuals in an organization who have formal or informal influence on the attitudes and beliefs of their colleagues with respect to implementing the intervention. |
| | 2 | Formally Appointed Internal Implementation Leaders | Individuals from within the organization who have been formally appointed with responsibility for implementing an intervention as coordinator, project manager, team leader, or other similar role. |
| | 3 | Champions | "Individuals who dedicate themselves to supporting, marketing, and 'driving through' an [implementation]" [101] (p. 182), overcoming indifference or resistance that the intervention may provoke in an organization. |
| | 4 | External Change Agents | Individuals who are affiliated with an outside entity who formally influence or facilitate intervention decisions in a desirable direction. |
| C | | Executing | Carrying out or accomplishing the implementation according to plan. |
| D | | Reflecting & Evaluating | Quantitative and qualitative feedback about the progress and quality of implementation accompanied with regular personal and team debriefing about progress and experience. |

# The RE-AIM Framework



www.re-aim.org

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# The RE-AIM Framework

- Focus on enhancing:
  - Reach – Participation rates and representativeness
  - Effectiveness – Breadth (quality of life), including negative or unintended effects
  - Adoption - Setting and staff participation rate and representativeness
  - Implementation – Consistency, adaptation and costs of the program
  - Maintenance – Extent to which program and effects are sustained

Gaglio B, et al. The RE-AIM Framework:  A systematic review of use over time.  Am J Public Health. 2013 Jun;103(6):e38-46.

Kessler RS, et al. What does it mean to "Employ" the RE-AIM Model?  Eval Health Prof. 2012 Mar; 36(1):44-66.

# Why is this important? Impact of loss at each RE-AIM CONCEPT

| Example of Translation of Interventions into Practice | | |
|---|---|---|
| **Dissemination Step** | **RE-AIM Concept** | **% Impact** |
| 50% of settings use intervention | Adoption | 50.0% |
| 50% of staff take part | Adoption | 25.0% |
| 50% of patients identified, accept | Reach | 12.5% |
| 50% follow regimen correctly | Implementation | 6.2% |
| 50% benefit from the intervention | Effectiveness | 3.2% |
| 50% continue to benefit after six months | Maintenance | **1.6%** |

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# Example of RE-AIM in action

**RLAE**
Revista
Latino-Americana
de Enfermagem

Original Article

## Applying the RE-AIM conceptual framework for the promotion of physical activity in low- and middle-income countries

Rebecca E. Lee[1]
Karla I. Galavíz[2]
Erica G. Soltero[3]
Jose Rosales Chavez[4]
Edtna Jauregui[5]
Lucie Lévesque[6]
Luis Ortiz Hernández[7]
Juan Lopez y Taylor[8]
Paul A. Estabrooks[9]

The purpose of this manuscript is to describe the RE-AIM framework, the process and materials developed for a one-day workshop in Guadalajara, and the acceptability and satisfaction of participants that attended the workshop.

**RE-AIM components used in the development and implementation of the workshop**

**Reach**
1. Method to identify target population
2. Inclusion criteria
3. Exclusion criteria
4. Participation rate
5. Representativeness

**Efficacy=effectiveness**
6. Measures=results for at least one follow-up
7. Intent-to-treat analysis utilized
8. Quality-of-life or potential negative outcomes
9. Percent attrition

**Adoption**
10. Description of intervention location
11. Description of staff who delivered intervention
12. Method to identify staff who delivered intervention
13. Level of expertise of delivery agent
14. Inclusion=exclusion criteria of delivery agent or setting
15. Adoption rate of delivery agent or Setting

**Implementation**
16. Intervention duration and frequency
17. Extent protocol delivered as intended (%)
18. Measures of cost of implementation

**Maintenance**
19. Assessed outcomes 2'.6 months post intervention
20. Indicators of program-level maintenance
21. Measures of cost of maintenance

Figure 1 - RE-AIM components used in the development and implementation of the workshop.

| Programs | Reach | Effectiveness |
|---|---|---|
| *Setting*: 1 University/10 Clinics<br>*Program*: 6 month weight loss program with nutrition counseling, a physical activity class, and monthly healthy eating newsletters. | Out of 300 patients, 200 were eligible and 50 participated. Younger patients and men were less likely to join. | 80% of participants lost more than 5% of their body weight. Quality of life improved for all participants. No reports of unhealthy weight loss practices. |

| Adoption | Implementation | Maintenance |
|---|---|---|
| 50% of doctors participated and a registered dietician was trained at each clinic. | 75% of the program and 50% of the counseling was delivered as intended.<br><br>No cost data available.<br><br>*Time commitment*:<br>Physicians =15 minutes/ participant<br>Dietitians= 12 hours/participant<br>Volunteers= 36 hours for 50 participants | 75% of patients who lost weight maintained their new weight at 6 months follow up. Only the walking group was sustained beyond research study. |

Program examples used for interactive activities to demonstrate RE-AIM constructs

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# What about the role of Theory?

# A word on change theories

- There have been countless theories developed to explain behavior at the policy, system, environment, organization, and individual levels.

- The level of empirical or setting specific support for each varies considerably.

- Depending on the level you're intervening, several theories or theoretical constructs may be necessary to understand the determinants, mediators, and moderators of change.

# How does this all fit together?

| Ecological Levels | | | RE-AIM | | |
|---|---|---|---|---|---|
| | Reach | Adoption | Effectiveness | Implementation | Maintenance |
| Policy | **Theories of Policy Process** | | | | |
| System | **Organizational Change Theories** | | | | |
| Setting: Environments & Individuals | **Environmental Change Theories** | | | | |
| Patient | **Behavior Change Theories** | | | | |

# Summary

- Several models and frameworks exist to guide D&I research
  - We probably don't need another one
- Existing models and frameworks can be tailored for use in specific settings using empirical data
- Policy, system, environment, organization, and individual behavior change theories can inform the application of these models and frameworks

# Questions?