# Adapting the RE-AIM Framework for the Pragmatic Evaluation of Exercise is Medicine

Paul Estabrooks, Mark Stoutenberg, Karla Galaviz, Felipe Lobelo, Liz Joy, Gregory Heath, Adrian Hutber

Email: paul.estabrooks@unmc.edu
Twitter: @paul_estabrooks

UNIVERSITY OF NEBRASKA MEDICAL CENTER℠
COLLEGE OF PUBLIC HEALTH

# Introduction

- The Exercise is Medicine® (EIM) Solution uses population health management principles to guide the integration, into standard patient care, of physical activity (PA)
    - Assessment
    - Prescription
    - Patient referral to evidence-based physical activity promotion options

# Principles of population health management

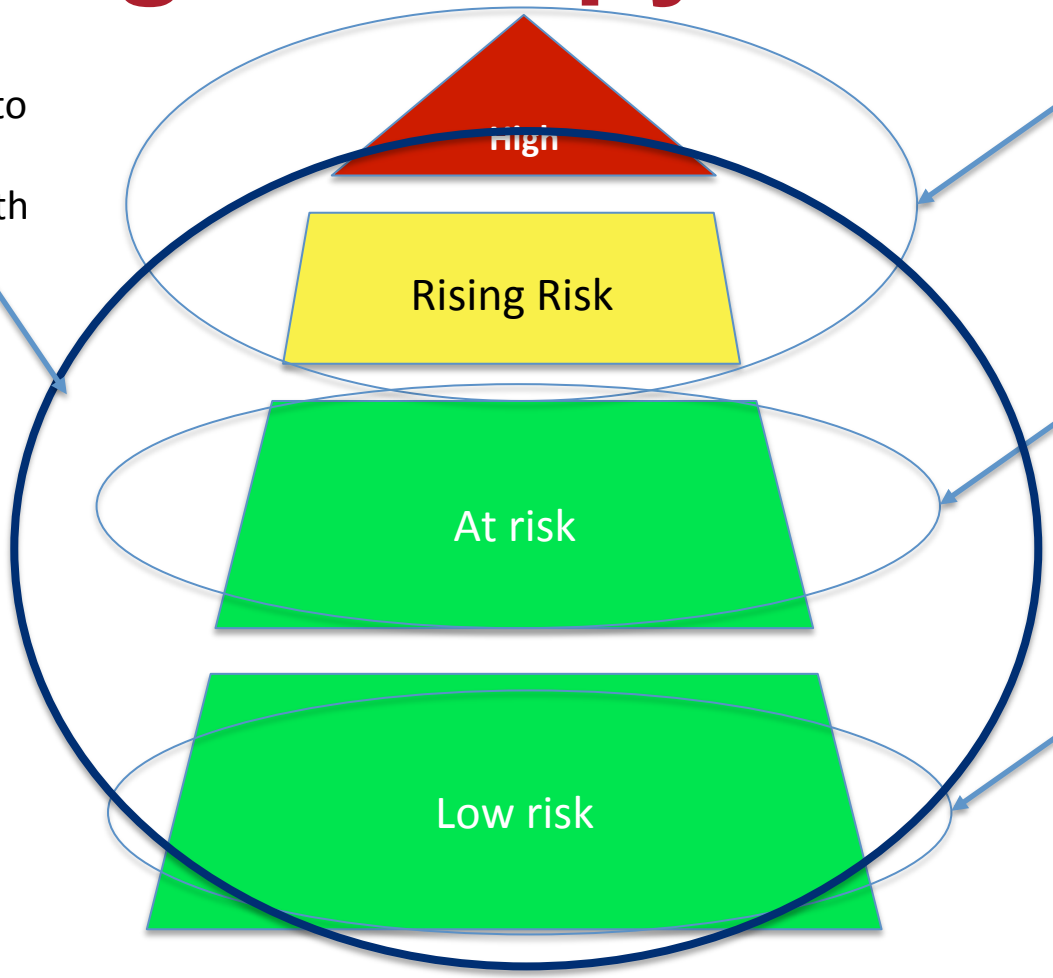
1. Aggregating and analyzing patient data,
2. Identifying at risk patient groups,
3. Developing risk-specific action plans,
4. Using outreach to address issues where clinical resources do not exist, and
5. Creating patient engagement

…Fundamental to PHM is the ability to determine impact.

Andrieni, 2016 in America's Healthcare Transformation: Strategies and Innovations

# Population health management pyramid

Regular physical activity is a key to addressing population health across nearly all aspects of PHM Pyramid




Most focus—Address triple aims of patient experience and cost containment

Some focus--some biometric indicators of heightened risk (pre-diabetes; pre-hypertension)

Little to no focus--no biometric indicators; no behavioral indicators

Andrieni, 2016 in America's Healthcare Transformation: Strategies and Innovations

# Exercise is Medicine and PHM

- **Step 1**
  - Systematic assessment--the Physical Activity Vital Sign *(allows for aggregation and analysis of patient data)*
  - Identifying patients with insufficient physical activity *(ID at risk patient groups)*
- **Step 2.**
  - Provide patients with brief PA counseling/prescription *(developing risk-specific action plans; create patient engagement tools)*
- **Step 3**
  - Refer to self-directed, organizationally supported, or external community-based physical activity promotion programs and resources *(using outreach to address issues where clinical resources do not exist)*
- **Step 4**
  - Develop physical activity networks: certified evidence-based programs and credentialed professionals to support patients to achieve and maintain recommended levels of physical activity

# Determining the impact of Exercise is Medicine

- Despite the focus on the use of patient-data for population health management, methods to assess the integration of physical activity into typical care practice—across patient and organizational indicators—has lagged behind its implementation.

- To provide a **pragmatic** framework to standardize guidance for health care systems in assessing the implementation of the EIM Solution.


Reach • Effectiveness • Adoption • Implementation • Maintenance
RE-AIM

# Research Mission

To develop and test health promotion and behavioral program, policy, and practice interventions that can be **adopted** across a variety of settings, have the ability for **sustained** and consistent **implementation** at a reasonable cost, **reach** large numbers of people, especially those who can most benefit, and produce **replicable and long-lasting** improvements in health.

# *R*E-AIM ELEMENTS: *REACH*

Definition: The number, percent of target audience, and representativeness of those who participate or are exposed to an intervention.


Example:

*Inactive or insufficiently active attending well visit (n=1518 total; 607 eligible; 218 referred)*

*Number of eligible that agreed to participate (n=115)*

*Participation Rate*: 115/607=19%

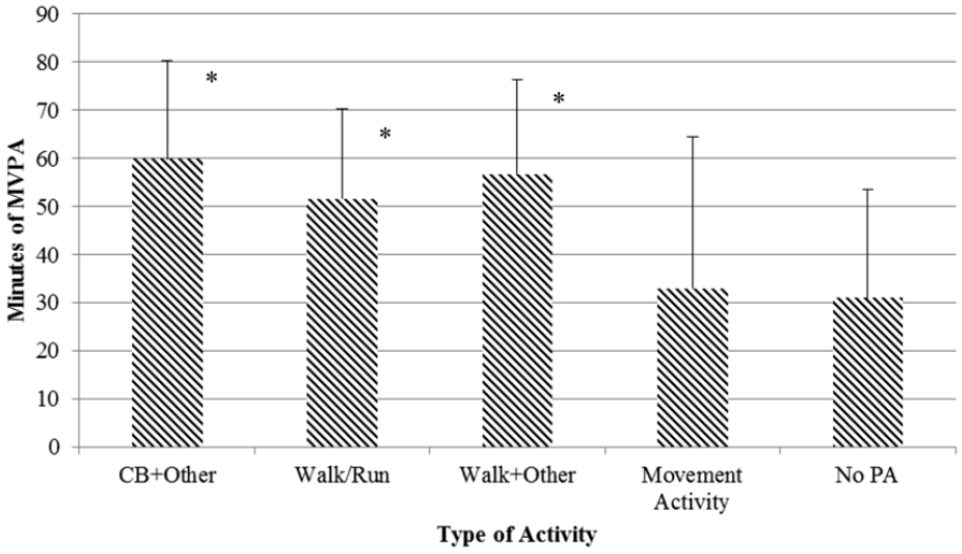
Ethnically *representative* of catchment area; over representation of women

**Estabrooks et al., 2011**

# RE-AIM ELEMENTS:
## *EFFECTIVENESS*

Definition: Change in outcomes and impact on quality of life and any adverse outcomes

Example:
Kearny School Physical Activity Policy Implementation




Holt, Heelan, & Bartee, 2013

# RE-*AIM* ELEMENTS: *ADOPTION*

Definition: Number, percent and representativeness of settings and educators who participate.

Example:

*105 counties in Kansas eligible to participate*

48 agreed; 48/105=46%

*Representativeness*—Less active agent, less likely to deliver; Smaller population counties, more likely to deliver


Estabrooks, et al., 2004; 2008

# RE-A*I*M ELEMENTS: *IMPLEMENTATION*


Definition: Extent to which a program or policy is delivere consistently, and the time and costs of the program.

Example:
Proportion of objectives achieved
6 bi-weekly family sessions: 82-98%
6 bi-weekly parent support call: 95-98%
18 exercise sessions (2/week): 80-90%

Cost—to be determined

# RE-AIM ELEMENTS: *MAINTENANCE*

Definition: *Individual/member target:* Long-term effects and attrition.

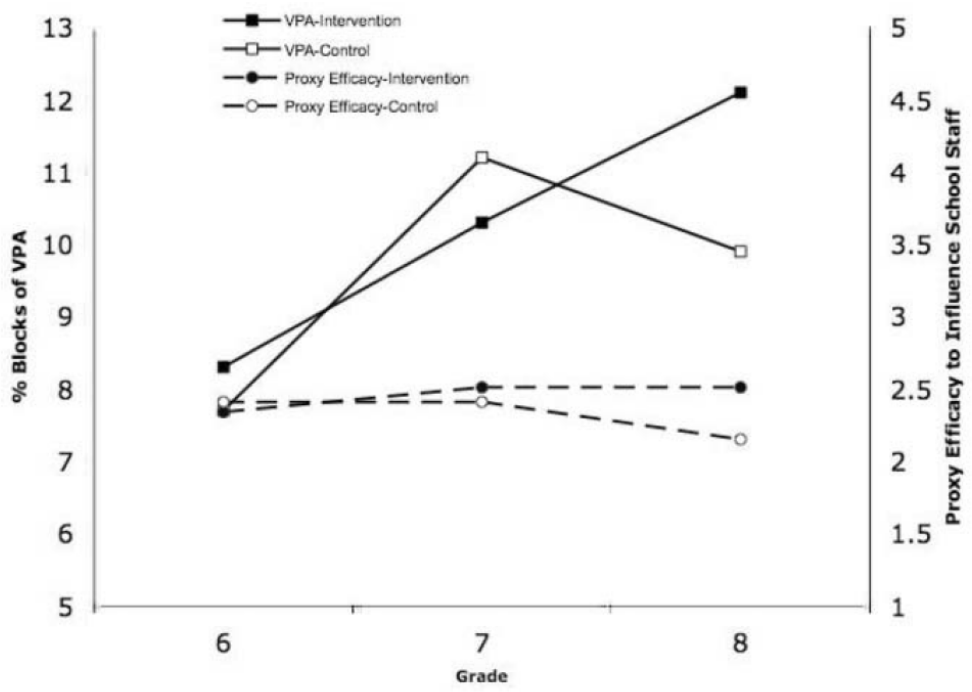



**Figure 3.** The effect of the intervention on percentage of 30-min blocks of vigorous physical activity (VPA) per day after school from 3:00 until 11:30 and proxy efficacy to influence school staff to change school environments.

Healthy Places

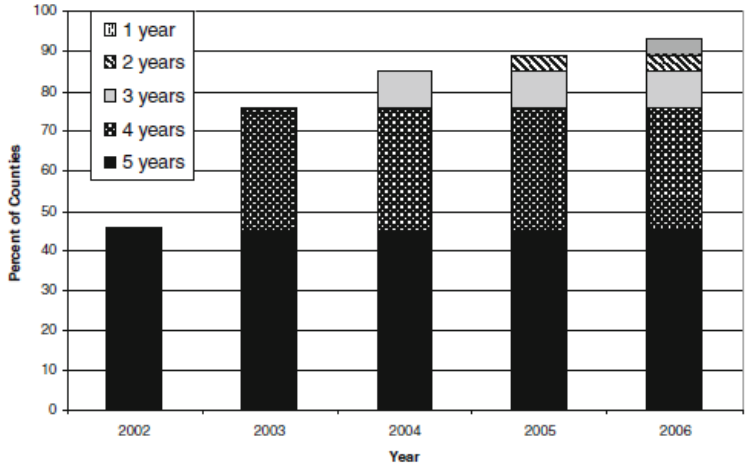
**Dzewaltowski et al, 2009**

# RE-AI*M* ELEMENTS: *MAINTENANCE*

Definition: *Individual/member target:* Long-term effects and attrition. *Setting/educator:* Extent of discontinuation, modification, or sustainability of program.

Decreased BMI z-scores sustained 6 months after intervention complete





# A full application of RE-AIM to Exercise is Medicine

- RE-AIM could be applied to each step of the EIM initiative.
    - Step 1. Strategy to improve reach through identification of insufficiently active patients.
    - Step 2. Strategy to initiate behavior change
    - Step 3. Strategy to initiate and maintain behavior change.
    - Step 4. Strategy to improve options and enhance likelihood that opportunities are available for a diverse population of patients.
- After repeated proposals, agreement to develop a pragmatic evaluation approach.

# Pragmatic Applications of RE-AIM

- Similar to differences in research and practice relative to intervention development—a full employment of the RE-AIM framework is costly and potentially impractical in clinical or community settings.
- Pragmatic approaches:
  - Use RE-AIM as a planning model to enhance individual and setting level impact
  - Identify metrics that are, when possible, integrated into the intervention or system's existing data tools
  - **Identify RE-AIM outcomes that are key for decision making**
  - Provide justification for excluding some RE-AIM indicators

# Pragmatic Applications of RE-AIM: Exercise is Medicine

- Why the RE-AIM Framework?
  - A planning and evaluation that balances factors related to both internal and external validity
  - Focusing on participant and organizational level outcomes.
  - At the patient level—directs attention to the degree to which the integration of PA into a health system can reach a large and representative proportion of patients and effectively produce and maintain changes in physical activity.
  - At the organizational level—directs attention to adoption by health systems and their staff, implementation quality, and sustained long-term in practice settings.
  - Allows for composite metrics across measures.

# Pragmatic Applications of RE-AIM: Exercise is Medicine

- Developed an Exercise is Medicine Evaluation Workgroup
    - Provide pragmatic guidance on operationalizing the EIM Solution using the RE-AIM dimensions based on data that is typically available in healthcare settings
    - Provide recommendations for additional RE-AIM indicators that could be reasonably assessed to determine the potential impact of activities associated with referral schemes and programs where existing data may not currently be available.

# Pragmatic Applications of RE-AIM: Exercise is Medicine

- Workgroup consensus on developing a model, informed by RE-AIM, that
  - Relies upon data that is readily available in a health system and collected as a part of good clinical practice
  - Can be applied across an array of health systems,
  - Considered pragmatic measures that are important to stakeholder decision making, inexpensive, placed a low burden to staff, and sensitive to change over time
  - Made use of electronic health records
  - Focused on the components of Exercise is Medicine related to the clinical care setting, rather than the community setting where pragmatic information is not yet systematically collected or reported
  - Considered RE-AIM across Exercise is Medicine steps rather than within each step

# Recommendations for evaluation: Reach Standard

- Assessing the number of patients that were:
  - 1) screened for their current PA levels,
  - 2) received brief counseling and/or a PA prescription, and
  - 3) were referred to PA programming.
- Determine proportion of:
  - 1) total patient population screened
  - 2) proportion of insufficiently active patients that received brief counseling and/or a PA prescription
  - 3) proportion of insufficiently active patients that received a referral to PA programming.
  - 3) proportion of insufficiently active patients that received a referral to PA programming that is part of a PA referral network.
- Document representativeness across 3 groups by:
  - comparing the characteristics of those reached (i.e., numerator)at each step to the characteristics of all eligible patients (i.e., denominator)

# Recommendations for evaluation:
# Reach Expanded

- When healthcare organizations that have developed either internal or external PA referral networks (step 4)

- Assess the number and proportion of referred patients that participate in these PA networks

- Determine representativeness of by comparing the characteristics of patients who receive a referral and participate in a PA program session compared to:
    - a) eligible patients who did not receive a referral, and
    - b) eligible patients who received a referral, but did not attend the PA programming.

# Recommendations for evaluation: Effectiveness Standard

- Using the physical activity vital sign and EHR available information assess, on a regular basis changes in:
  - Physical activity and proportion of patients meeting recommended guidelines
  - Cardiometabolic biometric values (e.g., body mass index (BMI), systolic and/or diastolic blood pressure, lipid concentrations, triglyceride levels, fasting blood glucose levels, and HbA1c concentrations)
  - The incidence of chronic disease, disease burden, and/or disease complications

# Recommendations for evaluation: Effectiveness Expanded

- Assess changes in :
  - Healthcare utilization and costs.

- Determine changes by ‘dose’ of Exercise is Medicine Steps received:
  - Assessed PA levels only
  - Assessed and provided brief PA counseling and/ or prescription
  - Assessed and referred
  - Assessed, provided counseling, and referred

# Recommendations for evaluation:
# Adoption Standard

- Assessing the number of providers/clinics that:
  - 1) screen >50% of patients for their current PA levels,
  - 2) provide brief counseling and/or a PA prescription for >50% of eligible patients, and
  - 3) refer >50% of eligible to PA programming.
  - NOTE: 50% marker can be set by clinical organization based on system goals.
- Determine proportion of:
  - 1) providers/clinics completing screening
  - 2) providers/clinics providing brief counseling and/or a PA prescription to insufficiently active patients
  - 3) providers/clinics providing a referral to PA programming for eligible patients.
- Document representativeness across 3 groups by:
  - comparing the characteristics of providers/clinics (i.e., numerator) at each step to the characteristics of all providers/clinics (i.e., denominator)

# Recommendations for evaluation: Adoption Expanded

- Assess number and type of PA programs or certified professionals where patients are referred.

- Assess the costs of adopting an electronic or paper-based method of assessing PA, providing PA counseling and/or prescription, and providing PA referrals.

# Recommendations for evaluation: Implementation Standard

- Using the data used to assess reach and adoption report on:
  - The number, proportion and characteristics of patients who received 1, 2 or 3 of the clinical steps of the EIM Solution across clinics.
  - The number, proportion and characteristics of healthcare providers that use steps 1, 2 , or 3 with eligible patients.
  - Implementation reported as an average proportion of Steps 1-3 delivered (i.e., 33%, 66%, 100%)

# Recommendations for evaluation: Implementation Expanded

- When available report on:
  - The number, proportion, and characteristics of patients reporting that they received 1, 2, or 3 of the clinical steps of the EIM Solution
  - Cost of implementation (i.e., time providers spend conducting PA assessments) and accounting records to identify costs allocated to implementing PA assessment, providing PA counseling and/or prescriptions, or PA referrals to the health setting.
  - Implementation fidelity of internal physical activity promotion programs using fidelity checklists.
  - Implementation fidelity for community programs and certified professionals through patient report or provider self-report

# Recommendations for evaluation:
# Maintenance standard

- Indicators of maintenance should be assessed at both the patient and the organization level.
- At the patient level report changes at least 12 months post intervention on:
    - Physical activity and proportion of patients meeting recommended guidelines
    - Cardiometabolic biometric values (e.g., body mass index (BMI), systolic and/or diastolic blood pressure, lipid concentrations, triglyceride levels, fasting blood glucose levels, and HbA1c concentrations)
    - The incidence of chronic disease, disease burden, and/or disease complications
- At the institutional level, report on adoption and implementation on an annual basis over time to determine sustained delivery.

# Recommendations for evaluation: Maintenance Expanded

- 12 months post intervention assess changes in :
  - Healthcare utilization and costs.

- Determine maintenance by ‘dose’ of Exercise is Medicine Steps received:
  - Assessed PA levels only
  - Assessed and provided brief PA counseling and/ or prescription
  - Assessed and referred
  - Assessed, provided counseling, and referred

# Recommendations for evaluation: Internal Referrals Standard

- When examining the referral of patients to internal resources within a health setting:
  - Assess reach indicators -- the number and proportion of referred patients from a health setting that interact (at least once) with either an PA program facilitator
  - Assess representativeness of referred patients who attend or interact with the PA professionals or programs
  - Assess effectiveness and maintenance outcomes
  - Assess adoption based on number of clinical sites program is available for or serves and characteristics of sites with access compared to those without.
  - Assess organizational maintenance based on adoption over time (e.g., consistent adoption across years)
  - (Expanded) If available, the number, proportion, and characteristics of patients who attend 25%, 50%, and 75% of planned sessions
  - (Expanded) Assess dose response on changes in patient

# Recommendations for evaluation: Internal Referrals Expanded

- When examining the referral of patients to internal resources within a health setting:
  - (Expanded) If available, the number, proportion, and characteristics of patients who attend 25%, 50%, and 75% of planned sessions
  - (Expanded) Assess dose response on changes in patient outcomes.
  - (Expanded) Assess implementation quality and costs

# Recommendations for evaluation:
# External Referrals Expanded Only

- Not the difficulty with obtaining data from external programs or professionals with consistency across settings.

- When available follow the protocol developed for internal referral programs and professionals.

# Pragmatic Applications of RE-AIM: Weigh & Win

- 12-month weight loss program
- Primarily web-based, daily email and text support, online access to a health coach, & modest financial incentives intended to increase reach (e.g., ~$1 per percent body weight lost per month)
- Community-based kiosks (n=~83) that include a calibrated scale to assess weight and a camera to provide authentication for incentives as well as provide participants with pictures that document the weight loss process.
- Under-written by Kaiser Permanente Community Benefit

# Identification of RE-AIM outcomes

- Reach
  - The number and representativeness of participants was valued by program delivery organization and Kaiser Permanente.
  - Proportional reach was not considered an key aspect or easily quantifiable
- Effectiveness
  - Intention to treat analysis was questioned as best method
  - Multiple indicators proposed

# Midstream learnings and thoughts

- Exercise is Medicine includes steps that can be evaluated at an organizational or patient level
- RE-AIM is an outcomes framework that can be used for planning and evaluation
- RE-AIM can be used pragmatically—used to plan all aspects, but may only evaluate outcomes that will help decision making
- Still, is there a metric that could be used for high level evaluation with other metrics to be used to address process in low performing clinics/providers

# Looking for a key evaluation metric: The Example of Weigh & Win

- 12-month weight loss program
- Primarily web-based, daily email and text support, online access to a health coach, & modest financial incentives intended to increase reach (e.g., ~$1 per percent body weight lost per month)
- Community-based kiosks (n=~83) that include a calibrated scale to assess weight and a camera to provide authentication for incentives as well as provide participants with pictures that document the weight loss process.
- Under-written by Local Integrated Health Care System Community Benefit

# An example of Weigh and Win Identification of RE-AIM outcomes

- Adoption
  - One underwriting and one delivery organization, adoption not applicable
  - Describe characteristics of setting
- Implementation
  - Assessed electronically, but costs associated with assessing health coach or other indicators was deemed to high for the value of the information.
  - Interested in cost
- Maintenance
  - Report on the duration of participant engagement and percent weight loss over time (beyond 6 months).
  - Organizational maintenance, document by sustained delivery since 2011
- Also identified the need for combined metrics
  - Primary outcome most interested in… reachXeffectivenessXcost

# Weigh & Win Reach

- Reach
  - 40,308 (79% female; 73% white; 53.5 years old) between Jan 2011 and December 2014.
  - Participants were more likely to be women (78% vs 48%), more likely to be African American (8% vs 2%), and representative of the proportion of individuals that report being Hispanic/Latino (~19%).
  - Proportion?
- Additional Reach-Related indicators
  - Used weigh-in kiosks 4.9 (SD=12.2) times
  - Enrolled for 0.44 (0.78) years.

# Weigh & Win Effectiveness and Costs

- Effectiveness
  - 46% of the participants lost weight
  - 2.1 (6.47)kg weight loss.
- Implementation costs
  - Total $2,882,698
  - Technological system support ($1,124,803)
  - Program delivery & marketing personnel ($612,319)
  - Kiosk leasing ($349,500)
  - Incentives ($300,000).

# Weigh & Win Single Pragmatic Metric?

- Combine Reach, Effectiveness and Costs
  - 18% of participants reached 5% weight loss
  - Cost per enrolled participant $48.49 (6.47).
  - Cost per pound lost was $17.37.
  - **Cost per clinically meaningful weight loss averaged $258.82.**
- Conclusion
  - The value of each clinically meaningful weight loss suggests program affordability and impact.
  - This cost should be balanced against the proportion of participants that do not achieve a clinically meaningful weight loss.

# Some concluding Exercise is Medicine Evaluation Thoughts

- The pragmatic RE-AIM approach is still very complex
- Unclear how best to communicate this is the training plan for healthcare systems
- Could indicators—that are more consistent with other population health management approaches—be the standard measures and all others could be 'expanded' or 'trouble-shooting' metrics applied when changes are not being achieved?
- Thoughts for future—
    - Proportion of patient population that is meeting the guidelines
    - Proportion of insufficiently active patients that achieve recommended guidelines and maintain them—at what cost.