



Special Communication

Incorporating Physical Activity Assessments and Behavior Change Techniques Into Geriatrics



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KEYWORDS

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Abstract Ninety-one percent of adults 65 years and older do not perform the recommended levels of physical activity (PA), resulting in increased risk of disability, morbidity, and mortality. Despite knowing the benefits of PA and acknowledging the importance of assessing and addressing inadequate PA levels, 50%-75% of health care providers do not incorporate behavior change techniques into clinical practice. This clinical gap can be explained by a lack of knowledge or confidence in (1) assessing PA levels; (2) addressing inadequate PA levels; and (3) justifying the time needed to use these techniques in clinical practice. In this special communication, we address this gap by providing a 3-step theoretical-based clinical decision pathway that guides health care providers on how to identify older adults with inadequate PA levels, determine readiness to increase PA, and empower patients to develop an action plan that will increase their PA levels. We also provide a conceptual model that supports the use of techniques that assess and address inadequate PA by tying PA to the Age-Friendly Health System's 4Ms (ie, What Matters to the older adult, Mentation, Mobility, and Medications).

List of Abbreviations: PA, physical activity; PAVS, Physical Activity Vital Sign; SMART, Specific, Measurable, Action-Oriented, Realistic, and Timed.

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Nearly all (91%) adults 65 years and older do not perform the recommended 150 minutes of moderate-to-vigorous weekly aerobic physical activity (PA), twice weekly strengthening, and once weekly balance training.^{1,2} These inadequate levels of PA increase the risk of disability, morbidity, and mortality, resulting in significant burden to patients, clinicians, and health care systems.³ In 2013, it is estimated that inadequate PA cost \$53.8 billion globally.³ The importance of incorporating PA into health care is further supported by national organizations and initiatives such as the American Heart Association,⁴ American Physical Therapy Association,⁵ American Colleges of Sports Medicine's Exercise is Medicine Initiative,⁶ and Healthy People 2030.⁷

While health care providers understand the importance of PA, 50%-75% of them do not regularly use techniques that assess and address inadequate PA (ie, behavior change techniques).⁸⁻¹¹ This clinical gap can be explained by a lack of knowledge or confidence on how to assess and address inadequate PA, and an uncertainty on how to justify using behavior change techniques within clinical practice.⁸⁻¹⁴ Within this special communication paper, we address this uncertainty by providing a theoretical-based clinical decision pathway that guides health care providers through the steps of assessing and addressing inadequate PA and a conceptual model that supports the use of these techniques in clinical practice.

A theoretical-based clinical decision pathway that incorporates currently available evidence on assessing and addressing inadequate PA

Our clinical decision pathway, seen in [figure 1](#), guides health care providers through 3 steps: (1) assess PA levels and how they align with the current PA recommendations for older adults, (2) identify readiness to increase PA levels, and (3) select behavior change techniques that empower older adults to stay physically active or become more active. We based the clinical decision pathway on principles of the transtheoretical model, social cognitive theory, evidence on behavior change techniques, and available evidence-informed tools (eg, Exercise is Medicine's *Health Care Provider's Action Guide* and Brief Action Planning).^{6,15-20} These steps should be started at the initial evaluation and can be spread across multiple visits. The assessments (Steps 1 and 2) take approximately 5 minutes, and the incorporation of behavior change techniques (Step 3) takes 10 minutes. The time can be further decreased by having older adults complete the assessments at home or within the waiting room.

For Step 1, there is no criterion standard for PA level assessments. Healthcare providers are encouraged to use the Physical Activity Vital Sign (PAVS), a 2-item PA assessment tool that has successfully been used in clinical practice.^{6,21,22} Potential drawbacks of PAVS include (1) its validity and reliability assessments have been primarily

conducted with younger healthy adults, (2) it does not include a question about balance or strength training activities, and (3) it does not provide guidance on how to address activities that could fall under multiple types of PA (eg, Yoga, Pilates, or Tai Chi). Because PA guidelines recommend older adults perform weekly strength and balance activities,² Exercise is Medicine suggests adding a question about strength training,⁶ and we propose a PA balance question. It is important to note that neither the strength nor the balance questions have been validated. Feasibility and efficiency can be increased by adding these questions to the intake form completed before the initial evaluation. The results of PAVS are used to determine if the PA levels align with PA guidelines.^{23,24}

Step 2 is only conducted with those who do not meet recommended PA levels (ie, are inadequately active). This step applies transtheoretical model-based questions to identify readiness to increase the PA levels (ie, stage of change).^{6,25-29} The first question within this second step asks older adults if they intend to increase their PA in the next month (see "*Identify short-term intent*" box in [fig 1](#)).²⁵⁻³¹ Those who do not intend to increase their PA in the next month are asked if they intend to increase their PA in the next 6 months (see "*Identify long-term intent*" box in [fig 1](#)).²⁵⁻²⁹ Based on their responses, older adults are categorized into the following stages of change: (1) pre-contemplation-do not intend to increase their PA, (2) contemplation-intend to increase their PA in the next 6 months, and (3) preparation-intend to increase their PA in the next month.²⁵⁻²⁹ Individuals in the preparation stage are also asked if they have an action plan to increase their PA levels (see "*Identify presence of plan*" box in [fig 1](#)).^{6,25-29} These questions are based on a previously validated algorithm.³² The validated algorithm was modified because of updated PA recommendations, which no longer align with the recommendations included in the algorithm (ie, PA should be performed 3-5 times/week for 20-60 minutes/session).³² The algorithm's modifications follow the recommendations made by Reed et al (1997).³³

For Step 3, an appropriate behavior change technique is identified based on readiness to change. For those in the pre-contemplation stage of change, Step 3 consists of validating their perspective (ie, lack of readiness to change), highlighting the value of PA and how health care providers can help if and when they decide to become more active (see the "*Pre-contemplation*" box within Step 3 of [fig 1](#)). These recommended behavior change techniques are based on change processes within the transtheoretical model.^{15,25,28,34} For those in the contemplation or preparation stage without a plan, Step 3 consists of developing goals and action plans (see "*Contemplation/preparation without plan*" box within Step 3 of [fig 1](#)). Developing goals and action plans are supported by multiple behavior change protocols and evidence-informed tools.^{18,20,35,36} Specifically, Brief Action Planning is promoted by Canada's Centre for

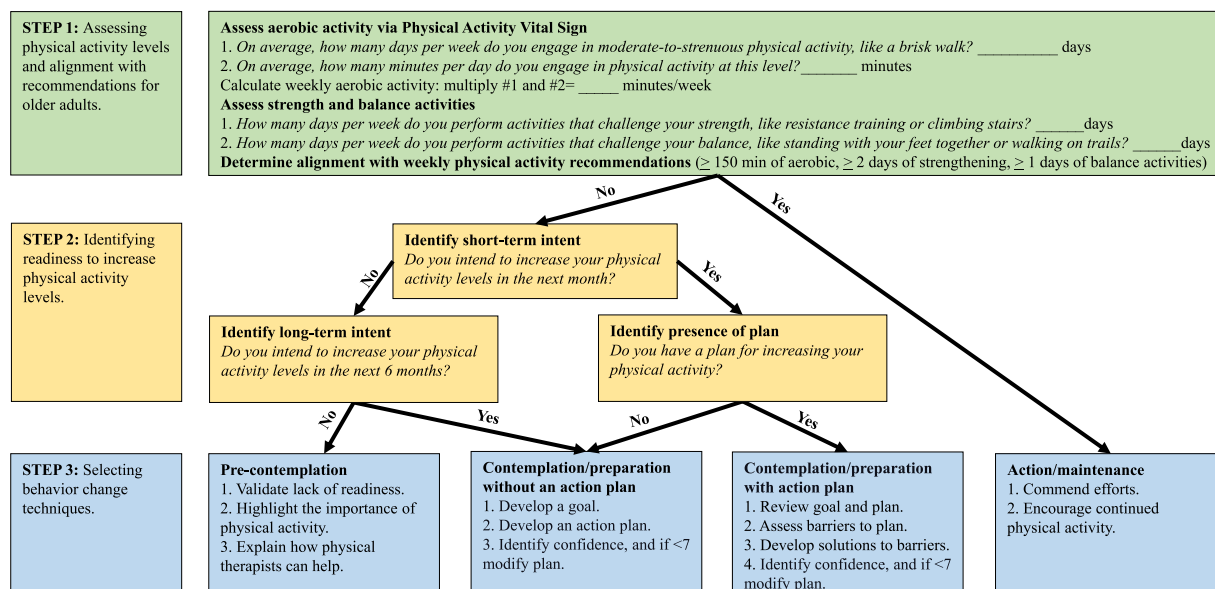


Fig 1 Step-by-step guidance for techniques to assess and address inadequate physical activity levels.

Collaboration, Motivation and Innovation.²⁰ The goals should align with what matters most to the older adult and should be Specific, Measurable, Action-Oriented, Realistic, and Timed (SMART).^{35,37} This process starts by asking about the patient’s overall health outcome goal and ends by incorporating how PA will help achieve this goal. An example of a goal is to be sufficiently physically fit to care for my vegetable garden this summer, this month, I will perform weekly 150 minutes of aerobic PA and at least 2 PA sessions focusing on strength and balance. If an older adult lives a more sedentary lifestyle, their initial goal may be to be able to independently stand up from my couch and walk to the bathroom without breathlessness, I will perform 10 minutes of daily PA.

Goal development is followed by the creation of an action plan that outlines how the goal will be achieved.^{35,37–43} An older adult can be guided through action plan development via questions, such as (1) what type of PA do you want to do, (2) where do you want to do it, (3) what day and time of day do you want to do it, (4) what duration would you like to do it for, and (5) how frequently do you want to do the PA.^{35,37–43} The next part of this step is assessing confidence levels. Confidence is assessed by asking the following question: “Considering a scale of 0-10, where “0” means you are not at all confident and “10” means you are very confident, how confident do you feel about carrying out your plan?”³⁷ Confidence and self-efficacy, defined as an individual’s belief in their capability to execute a behavior, significantly affects plan completion.^{35,44–46} Thus, those who rate their confidence less than 7 are asked to modify their action plan to a plan they feel more confident accomplishing.³⁷ Accomplishing a PA plan results in increased self-efficacy and increased likelihood of performing regular PA, even when barriers arise.^{35,47,48}

The steps for those in the preparation stage who already have a plan are very similar to those without a plan. The only difference is the addition of PA barrier identification and the creation of action plans that incorporate PA-barrier-specific solutions (see “Contemplation/preparation with

plan” box in Step 3 of fig 1). An example of integrating a solution for environmental or transportation PA barriers is to modify an action plan of bi-weekly classes at a local gym to an action plan with 2 virtual exercise classes. Barriers can be identified via the valid and reliable 27-item Inventory of Physical Activity Barriers (IPAB), which assesses barriers in 8 domains: (1) Environmental, (2) Physical Health, (3) PA-Related Motivation, (4) Emotional Health, (5) Time, (6) Skills, (7) Social, and (8) Energy.⁴⁹ The development and validation of the IPAB were completed with healthy older adults who were primarily white, well-educated, and had higher socioeconomic status. Validation in other populations is warranted. Using goals and action plans, health care providers can provide strategies to empower the patient to overcome their barriers.

The last box (ie, “Action/maintenance” box in fig 1) within Step 3 is for those who meet the recommended weekly PA levels. These individuals are either in the action or maintenance stage of the transtheoretical model. Behavior change techniques between these 2 stages do not significantly differ, resulting in the ability to skip Step 2 of the clinical decision pathway. Step 3 for those who meet the recommended PA level consists of commending their efforts and encouraging them to continue being active.⁶ Older adults should also be informed that a temporary reduction in one’s PA level is normal, and it is recommended that they have a plan to return to prior PA levels promptly.⁶

At the next session, health care providers should ask how the plan went and recognize successes, even if the success consists of following a small part of the action plan.²⁰ Recognizing success is essential as it increases self-efficacy, which can lead to greater levels of PA.^{47,50} Those who complete their plan and achieve their goal repeat the steps in the “Contemplation/preparation without plan” box in figure 1. The new goal and action plan should be a progression toward meeting the recommended PA levels. Older adults who do not complete their action plan proceed to the steps in the

Table 1 Comparison of physical activity related measures and tools

Measure/ Tool-Time Requirement	Evidence	Resources
Assessment Tool for Physical Activity Level		
Physical Activity Vital Sign (PAVS) - 2 minutes	<p><u>Concurrent Validity with Modified Activity Questionnaire (MAQ):</u> agreement met - 89.6% ($\kappa=0.55$, $\rho=0.57$; $P<.001$) and correlation - $r=0.71$ ($P<.001$).⁵⁴</p> <p><u>Concurrent Validity with Speedy Nutritional and Physical Activity Assessment (SNAP):</u> agreement - $\kappa=0.12$ ($P<.05$) and correlation - $r=0.31$ ($P<.05$).⁵⁵</p> <p><u>Correlation with Accelerometry:</u> agreement - $r=0.52$ ($P<.001$) and correlation - $\kappa=0.46$ ($P<.001$).⁵⁵</p> <p><u>Sensitivity:</u> 27%-59%.⁵⁶</p> <p><u>Specificity:</u> 74%-89%.⁵⁶</p>	PAVS
Assessment Tool for Readiness to Increase/Initiate Physical Activity		
Stages of change - 2 minutes	<p>Differentiates between those who perform moderate-strenuous activity and those who do not ($P<.001$).²⁶</p> <p>Explains 53% of the variance in exercise levels.⁵⁷</p>	Stages of Change Action Steps
Assessment Tool for Barriers of Physical Activity		
Inventory of Physical Activity Barriers - less than 10 minutes	<p><u>Internal consistency:</u> $\alpha=0.91$.^{49,58}</p> <p><u>Test-retest reliability:</u> intraclass correlation coefficient =0.99.⁴⁹</p> <p><u>Construct validity:</u> Statistically different IPAB scores between those who met the recommended PA levels and those who did not $P<.001$.⁴⁹</p> <p><u>Formats:</u> Validated in both electronic and pen-and-paper version.⁵⁹</p>	IPAB
Toolkit For Assessing and Addressing Inadequate Physical Activity Levels		
Exercise is Medicine Healthcare Provider Action Guide - less than 10 minutes	Are affectively implemented, ^{19,60} but there continues to be a lack of structures to support exercise integration and absence of staff/resources to facilitate its delivery. ⁶¹	Healthcare Provider's Action Guide
Toolkit for Addressing Inadequate Physical Activity Levels		
Bridging the Gap Between Physical Therapy and Lifelong Physical Activity and Exercise in People with Neurologic Conditions - time requirement variable	Evidence-informed toolkit published by the Academy of Neurologic Physical Therapy Health Promotion and Wellness Committee. No available evidence on effectiveness and efficacy.	Bridging the Gap Toolkit
Brief Action Planning - less than 10 minutes	Patients with arthritis who received a Brief Action Planning intervention by their physical therapist had 9.4 minutes/day more MVPA than those who did not (95% CI: -0.5, 19.3, $P=.06$) and a significant effect was found in pain (-2.45 [95% CI -4.78, -0.13], $P=.04$) and perceived walking habit (0.54 [95% CI 0.08, 0.99], $P=.02$). ⁶²	Example of Brief Action Planning Brief Action Planning Certification Publication Explaining the Development and Steps of Brief Action Planning
5A's and 5R's - time requirement variable	Patients seen by clinicians who used the 5A's had higher physical activity levels ($P=.01$), higher daily step counts ($P=.04$), and lower sitting time ($P=.05$). ^{63,64} Effectiveness and efficacy studies are primarily from smoking cessation literature. ⁶⁵	US Preventative Taskforce World Health Organization's Training Modules

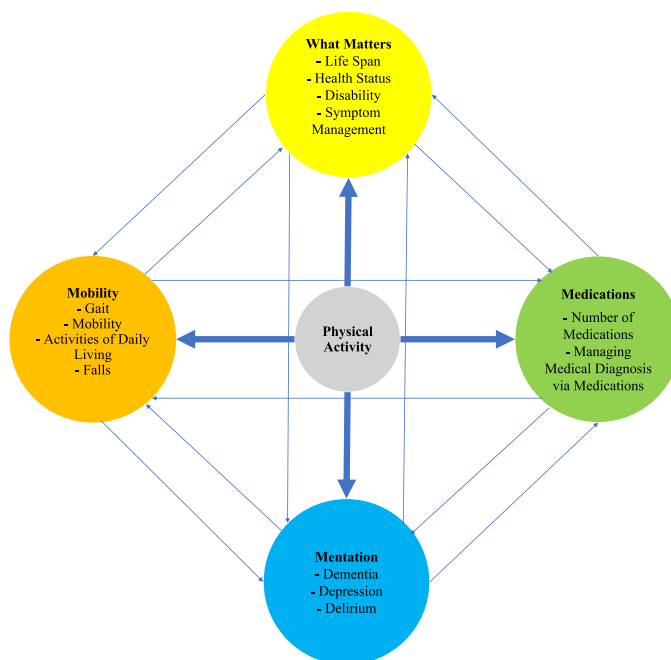


Fig 2 Using the age-friendly health system’s 4M framework to justify techniques for assessing and addressing inadequate physical activity.

“*Contemplation/ preparation with plan*” box in figure 1. While individuals who meet the recommended PA levels move to the “*Action/maintenance*” box in figure 1.

For additional specifics on behavior change techniques, clinicians can complete the Brief Action Planning certification,²⁰ or learn about other behavior change interventions, such as the 5 As (ask, advise, assess, assist, and arrange), 5 Rs (relevance, risks, roadblocks, rewards, and repetition),⁵¹ Coach2Move,^{52,53} and SMART Coaching.³⁵ See table 1 for additional information and links on PA-related assessments and behavior change techniques.

A conceptual model that supports the use of techniques that assess and address inadequate PA

Healthcare providers continue to emphasize a biomedical approach (ie, a focus on the biological aspects of the injury or diagnosis) over a biopsychosocial approach (ie, incorporate behaviors associated with the injury or diagnosis).^{9,66} A biomedical approach may initially be appropriate, especially if significant pain is present. However, at some point within the plan of care, health care providers should incorporate the biopsychosocial approach and consider the behavioral components that led to the current problem (eg, inadequate PA). This holistic approach is further supported by the International Classification for Functioning which considers the interactions between an individual’s health, their function, and the moderating influences of personal and environmental contextual factors.^{67–69} By shifting to a more holistic view, behavior change can be promoted and older adults can be empowered to adopt new PA behaviors.^{66,70}

Healthcare providers can also justify techniques used to assess and address inadequate PA by aligning patient care with the Age Friendly Healthcare initiative, a nationally recognized, evidence-based approach to care.^{71,72} Age Friendly Healthcare fosters person-centered care through an emphasis on the “4Ms”: (1) What Matters, align health care with older adults’ health outcome goals and care preferences, (2) Mentation, prevent, identify, treat, and manage dementia, depression, and delirium, (3) Mobility, optimize physical function and safety, and (4) Medication, minimize the use of inappropriate medications and polypharmacy.⁷¹ Figure 2 presents the effect of PA on each of the Ms and its associated health outcomes, with direct effects seen via thicker arrows and indirect effects via thinner arrows. See table 1 within the supplemental digital content file (See table 1 within the Appendix available online only at <http://www.archives-pmr.org/>) for supportive evidence for the relation between PA and each of the 4Ms.^{73–86} Healthcare providers can use the health outcomes presented in figure 2 to document and support the techniques mentioned in this manuscript.

Summary

Despite widespread inadequate PA among older adults, most health care providers do not assess and address inadequate PA. In this manuscript, we provide strategies for assessing and addressing inadequate PA, including a clinical decision pathway that provides 3 steps for assessing and addressing inadequate PA and a conceptual model that supports the incorporation of these techniques within patient care. We developed the pathway and conceptual model through the application of current evidence and theories. Additional research is needed to

address the current knowledge gaps within PA research and advance the theory-based recommendations to evidence-based recommendations (ie, CPGs). These gaps include refinement and validation of the PA assessments that incorporate the balance and strength recommendations, evaluation and comparison of the behavior change techniques presented in the clinical decision pathway (eg, Brief Action Planning, SMART Coaching, and Coach2-Move), and conduct implementation science studies to implement these tools in clinical practice.

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