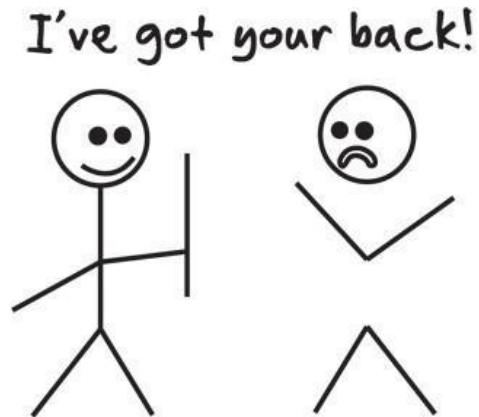


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**Management Of Low Back Pain In Older Adults: Changing Our Approach**

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This is to acknowledge that Una Makris, MD has disclosed that she does not have any financial interests or other relationships with commercial concerns related directly or indirectly to this program. Dr. Makris will not be discussing off-label uses in her presentation.

## **Biographical Information**

Dr. Makris is originally from Los Angeles, CA and received a BS in Immunology/ Microbiology at UC San Diego. She completed her medical training at the George Washington University Medical Center followed by residency in Internal Medicine at University of Washington in Seattle, WA. Drawn to both Rheumatology and Geriatrics, Dr. Makris completed her fellowship in Rheumatology at Yale University with a clinical research focus on degenerative, musculoskeletal conditions that affect older adults. Her research initially focused on elucidating the epidemiology of back pain in older adults. As a clinician, she is particularly interested in developing effective multi-component behavioral interventions for complex older adults with musculoskeletal pain. Her overarching career goal is to improve outcomes, that are most meaningful and relevant, in older adults with back pain/ degenerative musculoskeletal conditions. Dr. Makris brings to UTSW and the Dallas VAMC a strong background in general Rheumatology clinical practice and a unique clinical research interest that bridges Geriatrics and Rheumatology. Outside of medicine, Dr. Makris enjoys spending time with her husband and two daughters, traveling to visit extended family in Serbia and Greece, outdoor activities, and nature.

## **Purpose and Overview:**

The purpose of this presentation is to provide clinicians with a review of the epidemiology, approach, and management of back pain specifically focused on older adults.

## **Objectives:**

1. Review the biopsychosocial impact of back pain in older adults.
2. Acknowledge challenges to managing back pain in older adults.
3. Recognize how a shift from unidimensional to multidimensional approach to back pain management in older adults is appropriate in this population and may improve outcomes.
4. Appreciate importance of multimodal management for back pain in older adults to include nonpharmacological (activity and rehabilitation based therapy), pharmacological and, if necessary, more invasive treatments.

**"You have no quality of life! ...The back pain limits anything. It doesn't limit, it eliminates anything I could do." (86 year old man)**

## Relevance and Significance of Chronic Back Pain in Older Adults

### *Why Focus on Aging?*

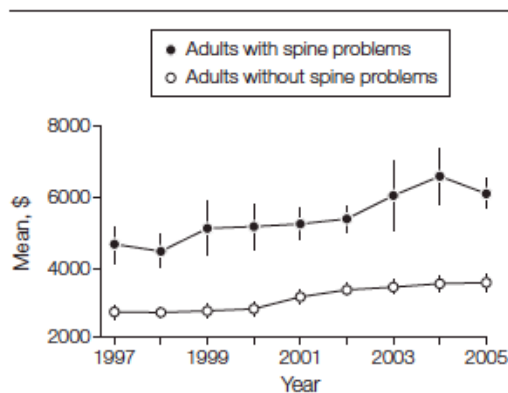
Given the shifting demographics, it is especially appropriate to focus clinical and research efforts on our aging population. According to the National Institute of Aging (NIA), the population  $\geq 65$  years of age was 500 million in 2006 and is projected to increase to 1 billion by 2030 worldwide. Of particular importance, NIA predicts a large increase in disability will be caused by increases in age-related disease-- arthritis and back pain are among the most common. The rising prevalence of and associated morbidity from chronic back pain in older adults has significant implications for our social support system, resources and economy.

### *Epidemiology*

Chronic pain affects millions of Americans and contributes substantial costs both economically and at the individual level due to rising morbidity and disability levels<sup>1</sup>. *Back pain is the most common type of musculoskeletal pain reported by adults*. Over 26% of adults report back pain lasting for at least one day in the past three months, and 2.3% of all office-based physician visits are related to this common condition<sup>2</sup>. Back pain is the second most common reason for a physician office visit. The total health care expenditures for back pain, in 2005 dollars, exceeded \$100 billion<sup>3</sup>, and costs are expected to increase considerably as the population ages<sup>4</sup> and the prevalence of back pain rises<sup>5</sup>.

Martin and colleagues estimated inpatient, outpatient, emergency department, and pharmacy expenditures related to back and neck problems in the United States from 1997 through 2005 (using the Medical Expenditure Panel Survey (MEPS)) and examined the associated trends in health status<sup>6</sup>. The mean age- and sex-adjusted medical costs for those with spine problems from 1997 to 2005 are shown in Figure 1. Total estimated expenditures among respondents with spine problems increased 65% (adjusted for inflation) from 1997 to 2005, more rapidly than overall health expenditures. The estimated proportion of adults with spine problems who self-reported physical functioning limitations increased from 20.7% (95% CI, 19.9%-21.4%) to 24.7% (95% CI, 23.7%-25.6%) from 1997 to 2005. Age- and sex-adjusted self-reported measures of mental health, physical functioning, work or school limitations, and social limitations among adults with

**Figure 1.** Estimated Annual Per Capita Age- and Sex-Adjusted Health Expenditures Among US Adults With and Without Spine Problems, MEPS 1997-2005



Adults presented with self-reported back and neck problems, referred to as "spine problems" based on Medical Expenditure Panel Survey (MEPS) descriptions and *International Classification of Diseases, Ninth Revision, Clinical Modification* definitions. Expenditures for all years were converted to 2005 equivalents using the Consumer Price Index medical component. Error bars indicate 95% confidence intervals.

spine problems were worse in 2005 than in 1997. In this survey population, self-reported back and neck problems accounted for a large proportion of health care expenditures. These investigators found that spine-related expenditures have increased substantially from 1997 to 2005, without evidence of corresponding improvement in self-assessed health status.

Despite the high prevalence, cost, and morbidity attributable to back pain, longitudinal data describing its epidemiology in older adults are sparse. Using data from the Precipitating Events Project (PEP) that included 10+ years of monthly assessments of back pain, severe enough to restrict activity (hereafter referred to as restricting back pain), our research group demonstrated that restricting back pain in older adults is common, affecting about 80% of men and women over a decade, often short-lived, with median duration of one month, and recurrent<sup>7</sup>. Previous studies have shown that back pain in older adults is more common in women than men<sup>2,5,8-12</sup> persons who are overweight<sup>8,11,13</sup>, and those who are depressed or have depressive symptoms<sup>8-10,14</sup>. Most of this literature, however, is cross-sectional and focuses exclusively on chronic (lasting  $\geq$  three months) back pain. Few prospective studies have evaluated risk factors for restricting back pain, especially episodes that are short-lived or recurrent<sup>15,16</sup>.

Traditionally, factors that may contribute to long-term disability from back pain include age, prior back pain, below average self-reported health, strenuous work, unemployment, dissatisfaction with employment, and psychological distress<sup>17,18</sup>. Much of the literature on this condition comes from younger populations. Whether these findings are applicable to older populations is uncertain.

Using a prospective cohort of older adults, PEP, (n=731, age 70 years or older), we evaluated potential risk factors for short-term and persistent/recurrent restricting back pain<sup>19</sup>. Candidate risk factors were ascertained every 18 months for 108 months during comprehensive home-based assessments. Restricting back pain was assessed during monthly telephone interviews for up to 126 months. In a recurrent event multivariable analysis, female sex (HR 1.30; 1.07, 1.58), weak grip strength (HR 1.24; 1.01,1.52), and hip weakness (HR 1.19; 1.07,1.32) were independently associated with an increased likelihood of having short-term restricting back pain, while female sex (HR 1.48; CI 1.13,1.94), depressive symptoms (HR 1.57; 1.23, 2.00), 2 or more chronic conditions (HR 1.38; 1.08, 1.77), and arthritis (HR 1.66; 1.31, 2.09) were independently associated with persistent/recurrent restricting back pain.

The only risk factor that was independently associated with both short-term and persistent/recurrent restricting back pain was female sex. While poor grip strength and hip weakness were independently associated with short-term restricting back pain, having depressive symptoms,  $\geq 2$  chronic conditions, and self-reported arthritis were independently associated with persistent/recurrent restricting back pain. One of the factors that *distinguished* short-term from persistent/recurrent restricting back pain was depressive symptoms. Depression and back pain (and pain in general) are strongly associated<sup>14,20</sup>; this relationship is complex, potentially reciprocal<sup>21</sup>, and mutually exacerbating. Several of the identified risk factors are potentially modifiable (i.e., strength and depression). These findings may help to identify older adults at increased risk for developing different subtypes of restricting back pain and may facilitate recognition of susceptible older adults who warrant interventions or counseling to prevent the occurrence and/or recurrence of this condition.

### ***Impact of Back Pain in Older Adults (Quantitative)***

Cross-sectional data from the Framingham Heart Study have shown that back symptoms account for a large percentage of functional limitations in older adults, especially in women<sup>22</sup>. Other cross-sectional data using the Health, Aging and Body Composition (Health ABC) cohort have shown that the presence and severity of low back pain are independently associated with perceived difficulty in performing functional tasks but not with physical performance<sup>11</sup>. Cross-sectional<sup>23</sup> and longitudinal<sup>24</sup> data from Health ABC have shown a link between trunk muscle composition and functional decline that was more pronounced in older adults with back pain. An earlier longitudinal study demonstrated an independent association between restricting back pain and decline in lower extremity function using two assessments over an 18-month follow-up period<sup>25</sup>. Given the dynamic nature of pain and disability<sup>26</sup>, an important next step is to characterize restricting back pain and subsequent disability over time with frequent assessments that capture changes in these clinical phenomena.

Mobility is critical for maintaining independence in older adults. Those who lose independent mobility are less likely to remain in the community; have higher rates of morbidity, mortality, self-care disability; and experience poorer quality of life<sup>27-29</sup>. In a prior cross-sectional study that used data from the Women’s Health and Aging Study, older women with severe back pain had a higher likelihood of having difficulty with mobility tasks as well as basic activities of daily living (ADLs)<sup>30</sup>. Few longitudinal studies have evaluated back pain and subsequent mobility disability in older men and women.

Using the PEP cohort, we evaluated the association between restricting back pain and subsequent disability in mobility, essential and instrumental activities of daily living<sup>31</sup>. This study included monthly assessments of restricting back pain and disability for more than 13 years in a large cohort of older community-living men and women. All three of the disability episodes lasted for a median of 2 months (interquartile range (IQR) 1–4). In a recurrent-event Cox regression analysis, after adjusting for 11 covariates (listed below the table), restricting back pain was strongly associated with each of the disability outcomes as seen in Table 1.

<b>Table 1: Primary Analysis</b>	<b>Hazard Ratio</b>	<b>(95% CI)</b>	<b>P-value</b>
<b>Mobility disability (N=709)</b>			
Unadjusted	3.53	(3.13-3.97)	<0.001
Adjusted*	3.23	(2.87-3.64)	<0.001
<b>eADL disability (N=754)</b>			
Unadjusted	3.83	(3.35-4.37)	<0.001
Adjusted*	3.47	(3.01-3.99)	<0.001
<b>iADL disability (N=703)</b>			
Unadjusted	2.32	(2.05-2.62)	<0.001
Adjusted*	2.33	(2.08-2.61)	<0.001

\*Adjusted for age > 85, female sex, non white race, living alone status, less than high school education, depressive symptoms, overweight, physical frailty, cognitive impairment, > 2 chronic conditions, hip weakness

Interventions that prevent or ameliorate restricting back pain may be effective for reducing the burden of disability in older adults.

### ***Challenges Specific to Managing Older Adults with Chronic Back Pain***

Pain management and treatment are particularly challenging in this population because clinical guidelines do not currently exist for back pain in older adults. Moreover, guidelines for back pain in younger populations do not account for decision-making complexities that occur commonly in older populations, such as:

1. Multiple comorbid conditions (multimorbidity)<sup>32</sup> -- may include common geriatric syndromes (i.e., falls)
2. Poly-pharmacy
3. Frailty, and potentially
4. Fragmented social support systems<sup>33</sup>

At this time, we have limited evidence for efficacy or safety of commonly used therapies as older adults are under-represented in back pain clinical trials<sup>34</sup>. Older adults are commonly excluded from clinical trials on back pain, not purely based on age cut-off, but usually because of specific comorbidities or potential for drug-drug interactions. It is important to recognize that the pain experience, values and priorities may be different among older adults as compared to younger adults<sup>35-37</sup>, and that it may not be appropriate to use a “one size fits all” approach when applying guidelines from younger to older populations.

While evidence in the literature suggests an overall (all adult populations including younger age groups) rise in overuse of diagnostic and therapeutic resources<sup>6</sup>, a disparity exists as we also recognize that older adults are frequently undertreated<sup>38-40</sup>. The sources of these pain disparities are complex and occur at the provider level (e.g. lack of education), system level (e.g. lack of access to pain medications), and patient level (e.g. cultural beliefs about pain)<sup>41</sup>. Under-recognized or under-treated back pain in older adults is a significant problem as it often renders the individual with significant functional impairments, may exacerbate [existing] depression, may lead to social isolation, and ultimately, may prompt a need for more assistance or skilled living environments. Although several studies have shown that back pain among older adults is frequently undertreated<sup>38-40</sup>, few studies have explored *how* and *why* this is the case<sup>42,43</sup>. Relatively few studies have qualitatively assessed the experience of back pain from the perspective of older adults<sup>42,44</sup>, and how the patient-provider relationship may impact the decision to seek care—both of which could contribute to under-treatment of back pain in older adults.

We recently published a qualitative study that describes potential reasons why older adults may choose *not* to seek care for their chronic back pain<sup>45</sup>. One on one interviews with 23 older adults and 16 focus groups with a more diverse older population in New York City community centers (median age 83) were conducted to understand the impact of restricting back pain on their daily life. Interviews and focus groups with older adults suggested reluctance to seek care for back pain. I was interested to learn what specifically deters older adults from seeking care for the back pain. We identified three themes that emerged as potentially related to participants’ decisions to seek future medical care or not:

1. Participant and perceived provider beliefs about the inevitability of restricting back pain in later life;
2. Participants’ negative attitudes toward medication and/or surgery; and
3. Relative importance of restricting back pain versus other comorbidities.

Underlying all of these perceptions were statements suggesting that patient-provider interactions may serve as powerful deterrents to future care-seeking. This is significant because, while patient-provider communication has been identified as both a significant barrier and facilitator to care in general adult populations<sup>46-48</sup>, this research highlights aspects of the experience unique to older adults with restricting back pain. By documenting the accounts of older adults with restricting back pain and their associated rationales for seeking or not seeking care, this study identified opportunities for clinical intervention (i.e., education for providers to combat ageist beliefs, debunking commonly held beliefs/myths that older adults have about chronic back pain<sup>49</sup>, developing novel non-pharmacologic interventions).

## Current Approach Focuses on a Unidimensional Approach to Pain Management

### *Pain as 5<sup>th</sup> Vital Sign*

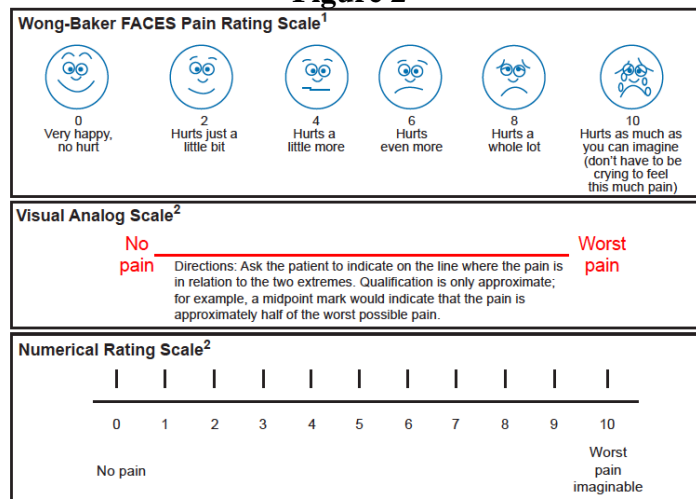
Under-treatment of pain was recognized in the inpatient settings in the early 1970's<sup>50</sup>. It wasn't until the mid 1990's that this issue began to attract greater attention and a larger audience. In 1995, the American Pain Society (APS) proposed guidelines recommending that a first step in improving the treatment of pain is assessment and recording of patients' reports of pain<sup>51</sup>. The motivation for adopting the proposed strategy is captured in the presidential address to the APS in November 1996 by James Campbell, MD, who stated:

“... vital signs are taken seriously ... if pain were assessed with the same zeal as other vital signs are, *it would have a much better chance of being treated properly.*”<sup>52</sup>

In 1998/1999, the Veterans Health Administration (VHA) implemented a national strategy to improve pain management for Veterans and initiated “Pain as the 5th Vital Sign” to measure and document patients' self-report of pain (using a Numeric Rating Scale (NRS)) for all clinical encounters. Beyond documentation of pain intensity, the initiative expected “... that a pain score of 4 or higher would trigger a comprehensive pain assessment and prompt intervention ...” by the healthcare provider.

Effective in 2001, the Joint Commission on Accreditation of Healthcare Organizations issued a comprehensive description of patients' rights and standards of care for pain management. The recommendations focused on making pain assessment and management a priority in daily care of the patient. Pain intensity is now the fifth vital sign. Along with temperature, pulse, respiration, blood pressure, pain intensity is now documented at nearly every clinic visit. Several pain intensity scales exist: verbal, visual, or numeric. The instruments commonly used to measure pain (Figure 2) are unidimensional. Some argue that for chronic [back] pain, a complex condition, these scales when used in isolation are less useful than for acute or postoperative pain.

**Figure 2**



### ***What Do We Do With the Documented Pain Intensity?***

In 2006, just five years after implementation at the VHA, Mularski and colleagues sought to evaluate “Pain as the 5th Vital Sign” initiative on the quality of pain management<sup>52</sup>. The investigators retrospectively reviewed medical records from unique patient visits at a single medical center (focused on primary care providers of a general medicine outpatient clinic) to compare providers' pain management before and after implementing the initiative. They also performed a subgroup analysis of patients reporting substantial pain ( $\geq 4$ ) during a post-implementation visit. Seven process indicators of quality pain management, based on appropriately evaluating and treating pain, were used to assess 300 randomly selected visits before and 300 visits after implementing the pain initiative.

The quality of pain care was unchanged between visits before and after the pain initiative ( $P > .05$  for all comparisons): subjective provider assessment (49.3% before, 48.7% after), pain exam (26.3%, 26.0%), orders to assess pain (11.7%, 8.3%), new analgesic (8.7%, 11.0%), change in existing analgesics (6.7%, 4.3%), other pain treatment (11.7%, 13.7%), or follow-up plans (10.0%, 8.7%). Patients ( $n = 79$ ) who reported pain  $> 4/10$  often did not receive recommended care: 22% had no attention to pain documented in the medical record, 27% had no further assessment documented, and 52% received no new therapy for pain at that visit.

The initiative “Pain as the 5th Vital Sign” by itself did not improve the quality of pain management in an outpatient internal medicine clinic using 7 basic process indicators. Patients with substantial pain documented by the 5th vital sign often had inadequate pain management. In isolation, routine documentation of pain intensity may not be sufficient to improve the quality of pain management. Additional interventions will be needed to improve provider’s awareness of patients’ pain and to increase rates of appropriate management. The authors also concluded that improvements in the quality of pain management will likely require multimodality quality improvement and provider change strategies. *Presenting Internal Medicine Grand Rounds on this topic serves as a reminder to clinicians and researchers who care for older adults with chronic [back] pain: documenting pain is the first step but providing the appropriate management is a critical next step that is often overlooked in our busy work environments.*

### ***Associating Impact of the Back Pain with Intensity May Prompt Appropriate Management***

While routine assessments of pain intensity improved documentation, outcomes have not improved. Perhaps one explanation for this finding is that pain intensity alone does not adequately predict patients' preferences for additional treatment (one reason outcomes may not have improved). Fraenkel and colleagues examined whether patients' (with chronic, noncancer, musculoskeletal pain including back pain) illness perceptions have a stronger association with patient treatment preferences than the pain intensity NRS<sup>53</sup>. These investigators found that pain impact was significantly associated with the preference for a riskier/more effective treatment after adjusting for age, comorbidity, efficacy of current medications and numeracy. Instruments that measure the impact of pain may be a more valuable screening instrument than the NRS alone.

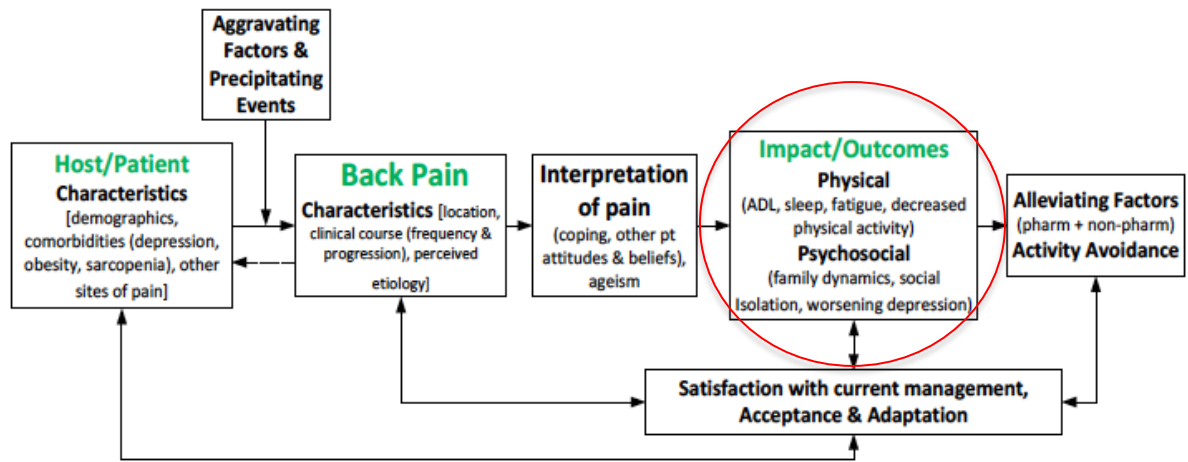


***Impact of Back Pain from the Older Adult’s Perspective (Qualitative)***

Given that the majority of research has been conducted on chronic [back] pain in younger populations, the [quantitative and qualitative] experience of pain among older adults remains poorly understood<sup>54-58</sup>. Our research group sought to directly address this knowledge gap by contributing qualitative data about the multi-dimensional impacts of restricting back pain from the perspective of a diverse, older adult population. By understanding older adults’ experiences with restricting back pain, and what this population perceives are important impacts, we will have more data on which to base interventions that are age-appropriate, relevant and of importance to older adults with this common condition<sup>59</sup>. Results from this qualitative study are summarized, broadly, in Figure 3, with emphasis placed on impact/outcomes identified by older adults.

As described above, we conducted a qualitative research study in a diverse sample of 93 community-living older adults (median age 83) with restricting back pain. We used a semi-structured guide in 23 interviews<sup>59</sup> and 16 focus groups to discuss the various ways that restricting back pain impacted participants. Transcripts were analyzed in an iterative process to develop thematic categories. The data revealed that restricting back pain affected participants physically (inability to execute routine tasks, disruption of sleep and exercise), psychologically (feelings of sadness and irritability, fears about worsening health, loss of hope toward recovery or pain relief), and socially (experiences of isolation, inability to pursue enjoyable hobbies). These results enhance our understanding of the biopsychosocial impacts of restricting back pain in a sample of diverse older adults. Using these data as a foundation to develop a multi-component intervention may improve outcomes of greatest relevance to older adults with this condition.

**Figure 3: Conceptual Model Summarizes (Broadly) Our Qualitative Results**



Our research is the first to describe the experience of restricting back pain from a diverse community-based sample of older adults.

### ***Impacts Identified by Older Adults Are Consistent with the Biopsychosocial Model***

The fields of behavioral medicine and health psychology have developed conceptualizations of the interdependence of multiple impacts that individuals experience as a result of physical disease<sup>60</sup>. Perhaps the most well-known and widely-accepted of these, the biopsychosocial model, describes how pain is experienced physically, psychologically, and socially, and how these factors can modulate or exacerbate the clinical presentation of disease<sup>60-63</sup>. Our qualitative results, above, align nicely with the biopsychosocial model of chronic [back] pain.

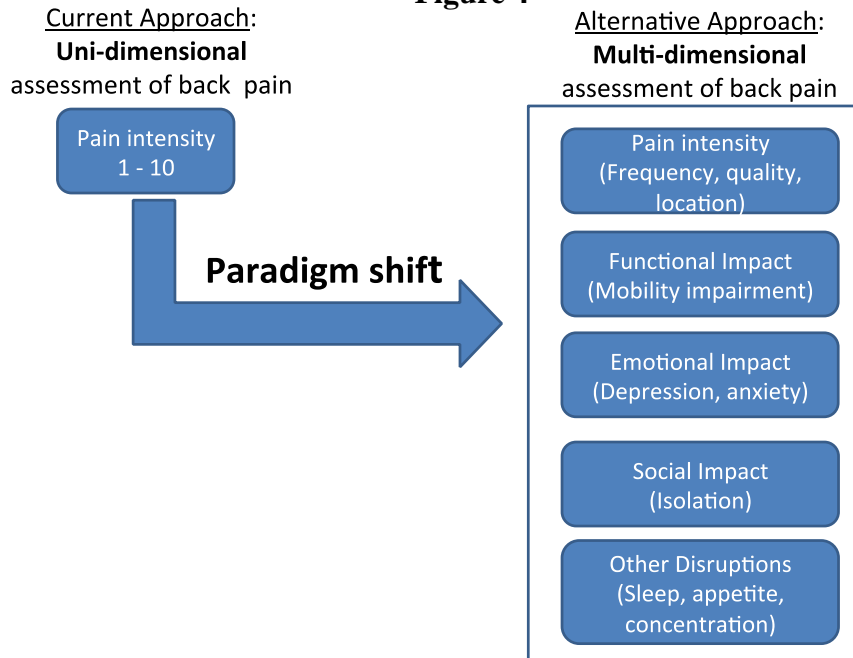
Research that incorporates the biopsychosocial model is particularly timely and relevant. The 2014 publication from the NIH Task Force on Research Standards for Chronic Low Back Pain<sup>64</sup> emphasized the importance of incorporating a biopsychosocial model of chronic pain, stratifying back pain by its impact rather than attempting classification solely by pathophysiology, and reporting data on multiple domains using a minimum dataset. However, the NIH Research Task Force acknowledged uncertainty regarding the generalizability of their recommendations/ suggestions for older adults with back pain, largely due to limited research in this population. Much of the research to date has focused on younger and chronic pain patients, and we cannot assume that these findings apply equally to the impacts of back pain on older adults<sup>55,65-68</sup>. Our research is timely, especially because older adults are the fastest growing segment of the population, back pain is the most common type of pain reported by older adults, and we lack guidelines in this population.

### **Shifting from Unidimensional to Multidimensional Approach to Chronic Back Pain Management**

#### ***Complex Problems Rarely Find Their Solution In One Place***

Recognition of the need for a multi-dimensional approach to pain management is not new, and dates back to the 1970's<sup>61,62,69</sup>. Clinical pain management strategies have focused on measuring and reducing the intensity or frequency of pain<sup>70</sup>. Figure 4 below depicts a shift from a unidimensional to multidimensional approach to assessing and managing chronic back pain. This shift requires a) acknowledgement that these multiple domains are relevant to a specific population (see above), b) measurements/ instruments that accurately assess these domains (see next section), and c) interdisciplinary teams to collaboratively manage this complex condition.

**Figure 4**



### ***Assessment of Multiple Domains Using Patient Reported Outcomes***

The current approach that focuses on “Pain as the 5th Vital Sign” falls short as pain intensity is unidimensional. We cannot accurately assess the various dimensions of the pain experience using a VAS or NRS alone. While measurement/ instrument development is not the focus of this review, it is critical to identify (and use) appropriate and relevant assessment tools for a specific population. Our qualitative work has helped to inform what specific domains older adults identify as back pain “impacts.” An important next step is to determine which outcome measures accurately reflect these “impacts” of interest, in an efficient, feasible, and cost effective manner.

In the last decade, there have been considerable advances in the area of patient reported outcomes (PRO) instrument development. NIH has invested >\$90 million to develop, test, and implement the Patient Reported Outcomes Information Measurement System (PROMIS)<sup>71-75</sup>. The goal of PROMIS is to develop reliable and valid item banks using PRO across different medical conditions. These PRO are the state of the science in clinical outcomes assessments. One of the benefits of PROMIS is the opportunity to administer them as computer adaptive tests (CAT) or on paper short forms. This versatility makes PROMIS a compelling option; however, PROMIS measures have not been validated for use in older adults with back pain. Our research group (in collaboration with the Dallas VAMC PM&R Spine Clinic) is currently evaluating whether patient reported outcomes (using PROMIS), in various domains identified in our qualitative research (physical, psychological, social) are feasible and reliable in older Veterans with chronic back pain. We are comparing PROMIS instruments to the existing, validated (“legacy”) measures in older Veterans with chronic back pain receiving epidural steroid injections. Table 2 includes the specific PROMIS domains and corresponding legacy measures under evaluation.

<b>Table 2: PROMIS instruments and respective legacy instruments</b>		
<b>Variable/Domain</b>	<b>PROMIS</b>	<b>Legacy Instrument</b>
<b>Instruments</b>		
Pain Interference	PROMIS Pain Interference	Brief Pain Inventory (BPI): measures pain interference with activities
Pain Behavior	PROMIS Pain behavior	SF-36 Bodily Pain; Pain Catastrophizing Scale; Fear Avoidance Belief Questionnaire
Pain Intensity	PROMIS Intensity	Numerical rating scale
Functional status	PROMIS physical function	Roland-Morris Disability Questionnaire (RMDQ)
Depression and anxiety	PROMIS emotional distress-depression and anxiety	Patient Health Questionnaire (PHQ)-Depression and Anxiety Screen
Fatigue	PROMIS fatigue	Functional assessment of chronic illness therapy (FACIT)-fatigue
Sleep	PROMIS sleep disturbance	Medical outcomes study (MOS) sleep scale
Social	PROMIS satisfaction with social roles and activities vs. PROMIS social isolation	MOS Social support survey
Global health status	PROMIS- 29 profile and global health scale; includes rating of the five primary PROMIS domains- physical function, fatigue, pain, emotional distress, social health	SF-36 physical and mental scores; EQ-5D

Ultimately, results of our VA pilot project will provide data that will help support use of either PROMIS or legacy measures (or a combination thereof, as suggested by the 2014 NIH Research Task Force)<sup>64</sup> in medically complex older adults with chronic back pain.

## **Approach: Components of Multimodal Management**

### ***Basics***

The role of the clinician in assessing and managing back pain in older adults focuses on:

1. identifying those conditions that require immediate attention (e.g., infections and tumors)
2. recognizing the usual patterns of pain for defined causes of back pain
3. assisting the patient with therapy for these specific conditions
4. educating the patient on the natural history, precipitating events, and therapeutic approaches to nonspecific mechanical low back pain
5. establishing realistic expectations, identifying goals of management, assessing progress towards these goals over time

The evaluation of the older adult with back pain depends heavily on the history, physical examination, and observation of the patient. The history and physical examination remain the most helpful tools in the assessment of back pain in older adults, particularly because of the high false-positive rate of spinal diagnostic imaging tests in this age group. Laboratory tests and diagnostic imaging studies have a secondary role in the assessment of these patients. The clinician must verify that the clinical presentation of the patient fits the results of the diagnostic imaging tests before proceeding with interventions.

Generally, management of back pain in older adults focuses on addressing the structural cause that is the most likely source of pain; identifying this source of pain is usually the most challenging step. The most appropriate therapy for an older patient with back pain must be determined in the context of the individual’s comorbid conditions, understanding potential interactions with other medications, and after discussing their preferences and goals of treatment.

***Back Pain in the Older Adult Has a Broad Differential Diagnosis***

A number of discrete conditions may cause back pain in older adults (Table 3). These conditions include mechanical causes, lumbar spinal stenosis, sciatica, vertebral compression fractures, osteoporotic sacral fractures, tumors, and infections. Systemic conditions such as malignancy and infections, although rarely the cause of back pain, are more common in older compared to younger age groups. One of the most challenging aspects of assessing and managing back pain is identifying the source(s) of pain in the older adult who often has multiple musculoskeletal comorbidities (for example, trochanteric bursitis, hip osteoarthritis, multi-level lumbar degenerative changes and lumbar stenosis). These conditions rarely occur in isolation and pinpointing which one contributes most to the patient’s pain may be difficult, but vital.

The vast majority of low back pain seen in primary care settings is labeled “nonspecific low back pain” as there is no specific attributable disease or spinal pathology. The natural history, associated features, and the etiology of back pain in older adults remains poorly characterized. However, one approach to the assessment of back pain in older adults is to evaluate those patients for the historical, physical, and diagnostic imaging features of these discrete conditions, (i.e., osteoporotic compression fracture, discitis, metastatic disease), and then to appraise the patient with nonspecific low back pain without one of these conditions.

<b>Table 3: Differential Diagnoses for Back Pain in Older Adults</b>
<b>Non-systemic/Mechanical Causes of Back Pain</b>
Lumbar strain (muscle)
Spinal stenosis
Degenerative disease: spondylosis (discs and facet joints)
Spondylolisthesis
Spondylolysis
Sciatica
Piriformis syndrome
Herniated disc
Osteoporotic vertebral or sacral compression fractures
Diffuse idiopathic skeletal hyperostosis (DISH)
Congenital disease: kyphosis, scoliosis
<b>Systemic Causes of Back Pain</b>
Malignancy: Multiple myeloma, metastatic disease, lymphoma, spinal cord tumors, retroperitoneal tumors
Infection: Osteomyelitis, septic discitis, paraspinous abscess, bacterial endocarditis
Inflammatory arthritis: Ankylosing spondylitis, psoriatic arthritis, reactive arthritis,

inflammatory bowel disease
Osteochondrosis
Paget's disease
Visceral: Aortic aneurysm, prostatitis, nephrolithiasis, pyelonephritis, perinephric abscess, pancreatitis, cholecystitis, penetrating ulcer, fat herniation of lumbar space

On history there are several clues that may help differentiate causes of back pain. The focus of this review is nonspecific, mechanical low back pain. Older adults with a mechanical cause for pain usually have intermittent, positional pain, often with the peak intensity of pain at the episode onset (Table 4). Hadjistavropoulos and colleagues<sup>76</sup> provide a helpful resource that includes specific questions and clues for history-taking with older adults who have chronic low back +/- leg pain. The table below provides history items that may help differentiate causes of back pain.

**Table 4: History Items That Help Differentiate Causes of Back Pain**

**Abrupt onset of pain**

- Vertebral compression fractures
- Mechanical low back pain

**Insidious onset, progressive course, nonpositional pain**

- Tumor
- Infection
- Nonspinal visceral pain

**Positional pain**

- Pain when lying to sitting or bending
- Mechanical low back pain
- Pain when standing and walking, relieved with sitting
- Lumbar spinal stenosis

**Nonpositional**

- Tumor
- Infection

**Physical Exam**

While critical to the evaluation of older adults with back pain, the physical examination is beyond the scope of this review. *Please see resources in appendix including a video from the POGOe website (developed here at UTSW in collaboration with Geriatrics) as well as the book chapter entitled Back Pain and Spinal Stenosis in: Hazzard's Geriatric Medicine and Gerontology, 7<sup>th</sup> Edition due soon!*

**Laboratory Tests**

The interpretation of diagnostic tests in older patients with back pain is a challenge, given the high rate of abnormal tests in asymptomatic individuals in this age group. A CBC and an

ESR/CRP are reasonable screening tests if the patient’s history and physical examination suggests a tumor or infection.

### ***Imaging***

While routine imaging for low back pain in younger populations is not recommended, plain films of the spine have been recommended for older adults despite lack of evidence supporting routine imaging in this population.

According to the American College of Radiology, the criteria listed in Table 5 should be used to determine who is at higher risk for systemic disease-related back pain and if imaging is appropriate:

<b>Table 5: Red Flags for Back Pain Due to Systemic Disease</b>
Age >70 (note, this age cut-off differs in European guidelines, age >55)
Recent significant trauma or milder trauma (age >50)
Unexplained weight loss or fever
Immunosuppression (such as diabetes mellitus)
History of cancer
Osteoporosis or prolonged use of glucocorticoids
Focal neurologic deficits that are progressive or produce disabling symptoms
Duration of symptoms > six weeks or more (subacute or chronic)
IV drug use

When to order advanced imaging (CT or MRI) in older adults with back pain remains controversial<sup>77,78</sup>. Approximately 90% of older adults have incidental findings on spine imaging. MRIs of the lumbar spine often demonstrate anatomic abnormalities in asymptomatic individuals, especially in the elderly. In a 1990 study of MRIs of the lumbar spine in asymptomatic individuals, 36% of subjects older than 60 years had a herniated nucleus pulposus, 21% had spinal stenosis, and 93% had degenerative disc disease<sup>77</sup>.

Given the high prevalence of incidental findings in older adults, imaging soon after initial presentation may lead to subsequent interventions that increase costs without benefits. Jarvik and colleagues recently published a study using the Back Pain Outcomes Using Longitudinal Data (BOLD)<sup>79</sup> cohort to compare outcomes and health care utilization in older adults presenting to primary care/urgent care for an episode of low back pain who received early imaging as compared to those who do not receive early imaging. The study demonstrated that older adults who had imaging within 6 weeks of a new primary care visit for back pain had pain and disability over the following year that was not different from matched patients who did not have early imaging. Patients who had early imaging had substantially higher resource use and reimbursement expenditures as compared to matched controls<sup>80</sup>. This recent study suggests that age alone should not serve as a red flag and that holding off on imaging may cut costs, avoid unnecessary interventions and yield similar outcomes compared with those who receive imaging.

The above findings indicate that the clinician should not depend on imaging studies to diagnose the cause of back pain in older adults. History and physical can often “rule out” significant

problems; red flags (see above, require further attention). Deyo and colleagues suggest avoiding imaging in the 1<sup>st</sup> month unless red flags are present. CT and MRI are reserved for surgical candidates or for those whom the clinician has high suspicion for systemic disease. These studies are used to confirm a diagnosis, indicated by the history, physical examination, and by the clinician's knowledge of applied anatomy.

## **Specific Management Approaches**

Management of back pain should begin with a combination of non-pharmacologic and rehabilitative approaches, as described below, along with pharmacologic and then more invasive management strategies if indicated, depending on the circumstance.

Two guidelines and several consensus statements provide useful information regarding the assessment and management of later life pain, although these are not all specific to back pain.<sup>76,81-84</sup> The American Geriatrics Society guideline provides helpful recommendations regarding the initiation and titration of commonly employed pharmacotherapies.<sup>83</sup> The quality of evidence underlying most recommendations in the two guidelines is rated as low or moderate largely because almost all of the evidence comes from studies of younger adults or of older adults without comorbidity. Despite this knowledge gap, there is broad consensus around the need to intervene aggressively using a multimodal approach that includes both pharmacologic and nonpharmacologic treatments. Frequently prescribed or recommended non-pharmacologic, rehabilitative, and pharmacologic approaches for managing chronic back pain in older adults are presented below.

### ***Non-pharmacologic***

Interest in non-pharmacologic approaches for managing pain in older adults is increasing.<sup>85</sup> Reasons for this interest include provider and patient concerns about the potential for treatment-related adverse events and provider concerns about drug-drug interactions in the setting of polypharmacy.<sup>33</sup> Many nonpharmacologic approaches involve cognitive (eg, distraction) and/or behavioral (eg, goal setting, exercise) techniques that constitute well established methods for treating pain.<sup>83</sup> Existing evidence suggests that these therapies are safe, can reduce pain, and in many cases improve functioning<sup>68</sup>. However, almost all studies of nonpharmacologic interventions conducted to date have been short-term (less than 6 months), constituting a significant limitation. The long-term efficacy and ability of older adults to sustain their use over time remain inadequately defined. However, even temporary relief may offer an opportunity for development of positive expectations and commitments that can be reinforced by the provider.

*Physical activity* (variable definitions include: walking/steps vs. repeated spinal extension, strengthening of trunk extensor muscles) is core to managing chronic back pain. Throughout the back pain literature, exercise is the one treatment modality that improves outcomes. There are several programs that now involve tracking/monitoring mechanisms (i.e. pedometer versus accelerometer) and positive feedback loops that may improve motivation (i.e. Fitbit). These programs have yet to be evaluated in older adults with chronic back pain. Similar to other behavioral interventions, adherence to these programs poses issues with sustained response. Group dynamics may bolster adherence via social interaction, group bonding and behavioral imitation. Hicks and colleagues evaluated factors predictive of improved pain status among older



adults (n=392, ages 50-88) with chronic back pain participating in an Adaptive Physical Activity programs and to identify predictors of adherence to this program. These investigators found that developing separate classes for older adults with different functional levels and use of psychosocial interventions to reduce health pessimism and depression may serve as potential targets for improving adherence<sup>86</sup>.

Cognitive behavioral therapy (CBT) is effective for a variety of chronic pain conditions. Lamb and colleagues conducted a multicenter randomized controlled trial of group cognitive behavioral therapy (control was self-management and advise to stay active) in adults with chronic back pain in the primary care setting<sup>87</sup>. The investigators showed significant improvement in the primary outcomes (Roland Morris Disability Questionnaire and modified Von Korff scores) at 12 months, as well as fear avoidance, self- efficacy, SF-12 scores. The major goals of CBT are to replace maladaptive patient cognitions and behaviors with more adaptive ones. Components covered in CBT may include: self-instructions (e.g., distraction, imagery, motivational self-talk), relaxation or biofeedback, development of coping strategies (e.g., increasing assertiveness, minimizing of negative self-defeating thoughts), changing maladaptive beliefs about pain, and goal setting.

Published recently in 2015, a systematic review of randomized controlled trials (41 trials, 6858 participants) assessed the long term effects of multidisciplinary biopsychosocial rehabilitation for adults (*average age in late 40's*) with chronic low back pain<sup>88</sup>. Multidisciplinary rehabilitation involved a physical component and one or both of a psychological component or a social or work targeted component (the latter not always appropriate for older adults). The interventions were delivered by healthcare professionals from at least two different professional backgrounds. Multidisciplinary rehabilitation was compared with a non- multidisciplinary intervention. Sixteen trials provided moderate quality evidence that multidisciplinary rehabilitation decreased pain (standardized mean difference 0.21, 95% confidence interval 0.04 to 0.37; equivalent to 0.5 points in a 10 point pain scale) and disability (0.23, 0.06 to 0.40; equivalent to 1.5 points in a 24 point Roland-Morris index) compared with usual care. Nineteen trials provided low quality evidence that multidisciplinary rehabilitation decreased pain (standardized mean difference 0.51, -0.01 to 1.04) and disability (0.68, 0.16 to 1.19) compared with physical treatments, but significant statistical heterogeneity across trials was present. Two trials that compared multidisciplinary rehabilitation with surgery found little difference in outcomes and an increased risk of adverse events with surgery. While multidisciplinary biopsychosocial rehabilitation interventions were more effective than usual care (moderate quality evidence) and physical treatments (low quality evidence) in decreasing pain and disability in [young] adults with chronic low back pain, future research should focus on developing similar programs for older adults and assessing outcomes most relevant to this population.

Communicating to older patients that employing both non-drug and drug therapies is the “standard of care” can be productive, particularly with individuals who are reluctant to engage in nonpharmacologic treatments. Recommending a specific nonpharmacologic modality will depend upon its availability, affordability (eg, Medicare may not cover), patient preferences, and the physician’s ability to accurately describe its benefits and risks. As there are no head-to-head comparisons evaluating the nonpharmacologic approaches (for example, mindfulness vs. walking program), recommending a modality that is accessible and affordable is recommended.

Reinforcing the importance of socialization as a pain management technique to both the patient and caregivers may also be promising.<sup>89</sup> This recommendation could take the form of encouraging more frequent communication with family members by way of telephone or if far away, with Skype.<sup>90</sup> Providers can also search the Eldercare Locator ([www.eldercare.gov](http://www.eldercare.gov)), which provides information about local social support services for older adults to find programs (eg, internet chat groups for seniors<sup>91</sup>) that may provide benefit. Finally, encouraging participation in group-based activities (eg, chair yoga, music appreciation classes) at a senior center or other agency might help to reduce her social isolation, pain, and functional impairment.<sup>92</sup>

### ***Rehabilitation***

Addressing function and fall risk is critically important for all geriatric patients, particularly in those with chronic back pain.<sup>93</sup> Rehabilitative therapies, including physical therapy (PT) and occupational therapy (OT), can help older adults maintain and possibly enhance functional independence. Geriatric pain management guidelines<sup>81,83</sup> recommend that all older patients with persistent pain adopt physical activity regimens that include strengthening, flexibility, balance<sup>94</sup> and endurance exercises.<sup>95,96</sup> PTs/OTs can help older adults with chronic back pain and multiple comorbidities implement individualized home-based treatment programs.<sup>97</sup> A recent clinical review highlights the critical role PTs can play in developing “function-enhancing interventions” in older adults with mobility limitations.<sup>98</sup>

In addition, PTs can conduct an inventory of existing equipment (eg, does the patient have a functional walker?) and make recommendations about new assistive/mobility devices.<sup>99</sup> OTs can directly observe a patient’s ADL functioning in the home and make recommendations about assistive devices that may help to improve ADL functioning. Both paid and family caregivers, especially of older adults with cognitive impairment,<sup>100</sup> can reinforce patients ongoing use of rehabilitative techniques and should be engaged and empowered to do so.<sup>100</sup> Finally, PTs/OTs can also train caregivers to reinforce concepts learned during treatment sessions, including coaching on fall risk, safety, body mechanics and pacing.

### ***Pharmacologic Approaches***

Acetaminophen remains the first-line analgesic treatment for older adults with mild-to-moderate pain, although recent evidence is suggesting it's limited efficacy<sup>81,84</sup>. In addition, both geriatric pain management guidelines<sup>81,84</sup> recommend that oral non-steroidal anti-inflammatory agents (NSAIDs) be used with caution and for the shortest time possible given significant cardiovascular, gastrointestinal, and renal risks. While the short-term efficacy of opioids has been established,<sup>101</sup> data supporting their long-term use are lacking. An emerging body of evidence, including our own research using VA data, has documented that opioid therapy for chronic non-cancer pain in older adults is associated with significant risks, including falls and fall-related injuries, hospitalization and all-cause mortality.<sup>102-105</sup> These risks need to be weighed against the risks of untreated or partially treated pain. A trial of an opioid is reasonable in the older patient with pain that has not responded to other treatments, where significant pain-related functional impairments are present despite treatment, and if more invasive procedures are not

appropriate. A careful surveillance plan is required, however, to determine whether treatment goals are being met; if goals are not met, the medication should be tapered and discontinued<sup>68</sup>.

It is important to note that analgesic side effects occur frequently in older patients, whether the individual is receiving a first prescription or a change in medication. Moreover, side effects increase in the setting of multimorbidity, polypharmacy, and physiologic vulnerability,<sup>33</sup> and often lead patients to stop taking their pain medications altogether.<sup>106,107</sup> After initiating a new (or making a change in) analgesic therapy, careful surveillance in the form of follow-up phone calls or email is mandatory to address side effects and decrease the risk of treatment discontinuation.

### ***Epidural Steroid Injections***

While there are a number of uncontrolled studies suggesting a positive outcome with injections for lumbar spinal stenosis (commonly seen in older adults), randomized controlled trials have had inconsistent results. Until recently, few high quality trials had been conducted to evaluate efficacy of epidural steroid injections specifically in an older adults. In 2014, the first randomized trial of older adults (n=400) with lumbar spinal stenosis and moderate to severe leg pain and disability showed minimal or no short-term benefit in outcomes (disability and leg pain intensity) between the group who received epidural steroid injections of glucocorticoids plus lidocaine versus injection with lidocaine alone<sup>108,109</sup>. A placebo group was not included in this study. It is unclear how these results will change practice.

### ***Surgical Referral***

Indications for immediate referral to a surgeon include cauda equina syndrome, suspected cord compression, and progressive or severe neurologic deficits. Most other surgical interventions (decompression, laminectomy, fusion) are non-urgent so it is imperative to work closely with a thoughtful, conservative surgeon who can take time to explain the procedure, risks, and benefits to the older patient.

Surgery in older adults is associated with higher adverse events rates which should be discussed with the patient along with expectations for long-term outcomes from surgery. An observational study from four surgical centers found that the most powerful predictors of good outcomes of greater walking capacity, milder symptoms, and greater satisfaction were the patient's report of good or excellent health prior to surgery, as well as low cardiovascular comorbidity. An interdisciplinary team may work synergistically to help optimize specific medical and psychological conditions prior to surgery. Systematic outcome assessments (in domains already discussed) should be administered over time.

### ***Therapeutic Alliance***

The patient-provider relationship lies at the center of treatment for patients with persistent pain, including chronic back pain as we describe in our Care Seeking manuscript. Therapeutic alliance, defined most simply as a constructive collaboration between the patient and provider,<sup>110</sup> is critical when managing complex conditions such as chronic back pain. Although few studies

have addressed the specific contribution of the therapeutic alliance to treatment outcomes in patients with pain,<sup>111</sup> a positive patient–provider relationship has been associated with improved treatment outcomes among patients receiving general<sup>112</sup> and rehabilitative medical care.<sup>113</sup> Devoting the time to establish mutually agreed-upon treatment goals is an important step in building a therapeutic alliance.<sup>114</sup> Other core elements<sup>114</sup> of the therapeutic alliance include 1) setting realistic expectations about what can and cannot be accomplished, taking into account such immutable factors as patient age, etiology and duration of the pain; 2) availability of the physician for advice, reassurance, and support during pain flares; 3) tenacity and commitment on the part of both provider and patient; 4) mutual respect; and finally 5) a reciprocal bond of warmth generated by both parties having an emotional investment in the outcomes of treatment.<sup>57,115,116</sup> More accurately, the caption for the cartoon on the front of this protocol should read “We have your back” as developing a trusting relationship with members of an interdisciplinary team is critical.

### ***Interdisciplinary Program for Management of Chronic Back Pain<sup>117</sup>***

Gatchel and colleagues distinguish between multidisciplinary and interdisciplinary pain management. Multidisciplinary programs involve several health care providers (MD, psychologist, PT, OT). However, the integration of their services as well as communication among providers may be limited because these providers are not usually located in the same facility. Interdisciplinary care consists of greater coordination of services in a comprehensive program and frequent communication<sup>118</sup>.

Interdisciplinary pain management (or functional restoration) at UTSW provides an integrated comprehensive pain program (usually twice a week for four weeks) that includes the multidimensional approaches reviewed above. The team includes a physician with pain management expertise, a psychiatrist, a nurse and/or nurse practitioners, a PT, OT, case manager/social worker, and psychologist. Services include PT (graded exercise, development of home exercise programs, addressing fear of movement), behavioral health (education about the behavioral and emotional consequences of pain: depression, anxiety, sleep disturbances, relaxation training, hypnosis, meditation, mindfulness) and treatment of pain. Several of the CBT techniques discussed above are embedded in this program, particularly with a focus on pain catastrophizing. The team at Eugene McDermott Center for Pain Management collects outcome measures (including PROMIS) pre, mid, and post program.

### **Conclusion**

Managing chronic back pain in the older adult, who often has multiple chronic conditions and takes multiple medications, remains a formidable challenge. A unidimensional approach to managing chronic back pain in older adults is not sufficient to address the varied biopsychosocial impacts that older adults identified. In this review, a proposed switch to a multi-modal interdisciplinary approach would involve a combination of nonpharmacologic (including activity based rehabilitation), pharmacologic, and when appropriate more invasive procedures. Box 1, below, summarizes several of the key take-home messages regarding overall approach to management of persistent pain in older adults<sup>68</sup>—this applies directly to chronic back pain as well. Given the relative paucity of research in older adults with chronic back pain, future

research is needed to 1) develop multi-modal, multi-component interventions that are feasible and safe in an older population, 2) evaluate novel intervention delivery modalities for this population, 3) implement and disseminate such an intervention to improve reach for older adults in the community who may not have access to our clinical setting and resources. As a rheumatologist focused on aging research, I am well positioned and committed to improving outcomes in older adults with chronic back pain. I look forward to moving this field forward.

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**Box 1. Key Points Regarding Overall Approach to Management of Persistent Pain in the Older Adult**

1. Determine patient's comorbidities, cognitive and functional status, treatment goals and expectations, and social and family supports prior to initiating treatment
2. Intervene using a multimodal approach, including pharmacologic and nonpharmacologic treatments as well as physical and occupational rehabilitation modalities
3. Develop and enrich therapeutic alliance between patient and physician (physician must respond promptly and reliably to patient calls and provide backup coverage when away; consider all patient input seriously; encourage hope without overpromising therapeutic success)
4. Be willing to revisit previously used pharmacologic and nonpharmacologic treatment modalities with indicated modifications
5. Involve and engage caregivers and seek out other resources (eg, community-based programs) that can help to reinforce treatment adherence and maintain treatment gains
6. Reinforce positive outcomes at each visit

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## **Appendix: Resources**

Multiple resources exist to help both clinicians and patients manage back pain. We advocate for clinicians to seek out/ learn about resources that exist within the community by contacting the local Area Agency on Aging (AoA) to find out if they have lists of relevant programs. Also, for example, many Continuing Care Retirement Communities offer wellness/exercise programs that are run by trained staff.

### **Dallas Area Agency on Aging:**

<http://www.ccgd.org/seniors/daaa.html>

### **Finding a Physical Therapist**

<http://www.apta.org/apta/findapt/index.aspx?navID=10737422525>

<http://www.aaompt.org/directory/fellowSearch.cfm>

### **Link to POGOe back pain older adults module:**

Dr. Una E. Makris, Dr. Vivienne Roche and Miss Lindsay Oksenberg. It's My Old Back, Again: An Approach to Diagnosing and Managing Back Pain in the Older Adult. POGOe - Portal of Geriatrics Online Education; 2013 Available from: <http://www.pogoe.org/productid/21670>

### **Helpful Links for Patients (and for you):**

<http://www.knowyourback.org/Pages/Other/AboutNass.aspx>

<http://www.aaos.org>

[http://www.niams.nih.gov/health\\_info/back\\_pain/](http://www.niams.nih.gov/health_info/back_pain/)

<http://www.nlm.nih.gov/medlineplus/backpain.html#cat4>

### **Video from North American Spine Society:**

<http://www.knowyourback.org/Pages/BackPainPrevention/Exercise/ExerciseVideo.aspx>

### **Fantastic Cartoon**

Dr. Mike Evans: provides evidence-based health information out of the clinic.

Video/ cartoon on back pain for providers and patients:

<http://www.evanshealthlab.com/pain/>

<https://www.youtube.com/watch?v=BOjTegn9RuY>