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Chronic Pain Management: Measurement-Based Step Care Solutions

For pain specialists, at least in interdisciplinary clinics, there is nothing new about the idea that questionnaire assessment of psychological variables usefully complements history taking. What is new is the idea that such measurements should be used more widely, used to guide diagnosis and treatment even at first presentation, and used to assess treatment outcomes. This change comes about partly because of the failure of the biomedical approach for managing chronic persisting pain, and partly because new technologies make the use of measurement tools and the incorporation of data into the medical record more feasible than ever.

In many countries, including the United States, pain care is overwhelmingly delivered by primary care physicians practicing in community settings.[1–3] In primary care, as in specialty pain practice, chronic noncancer pain care can benefit from systematic and consistent use of multidimensional assessment tools.[4] Measurement explicitly alerts the busy clinician treating pain to significant co-occurring disorders before poor outcomes and treatment failures disappoint and frustrate providers, patients, and the health system itself. Moving beyond the recent biomedical era intent on curative treatments for pain, there is clearly a need to start thinking more about a structured approach. The systematic approach to many other complex biopsychosocial disorders can inform a model of care for the complex chronic pain patient. The objective of the approach described in this issue of *Pain: Clinical Updates* is to marry the step care used for many chronic disease states in primary care with the system of pain assessment and care provided by the pain specialist.

Stepped Care in Chronic Disease Management

Measurement is fundamental to primary care practice. For instance, longitudinal tracking of fasting blood sugar, hemoglobin A1c, urine albumin, serum lipids, blood pressure, weight, retinal and foot exams, and compliance to diet and fitness plans are standards of care when managing diabetes—another complex chronic illness. These measures are useful for patient self-management, for primary and specialty clinical care, and increasingly for determining the quality of an individual or group clinical practice. Primary care specialties, family medicine, and general internal medicine in particular have demonstrated improved treatment outcomes in depression and chronic back pain, when following "stepped" systems of interspecialty collaborative care.[5–8] Following a structured measurement-based approach, pain specialists would similarly be better able to systematically and consistently assess and introduce specified multimodal treatment strategies for chronic pain patients.

Stepped Care in Pain

The WHO cancer pain treatment ladder is a well-known example of a stepped care pain treatment model, albeit purely pharmacological. The pain ladder does not include other domains of distress commonly seen in chronic noncancer pain, where the attention to functional improvement and *biopsychosocial* distress in patients with long life expectancy calls for consideration beyond simply reducing pain intensity.

John Loeser's famously depicted concentric series of domains effectively informs a more enriched stepped care model. Although this model does not detail the clinical steps needed to effectively manage the biopsychosocial domains of chronic pain, it depicts the enveloping layers of suffering and maladaptive behaviors that patients with chronic pain often demonstrate (Fig. 1).[9]

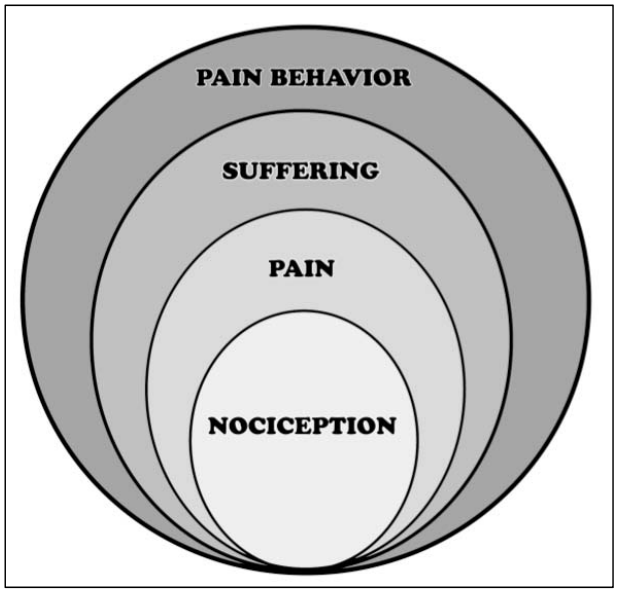


Fig 1. Loeser's biopsychosocial domain (from Loeser[9]).

Von Korff and Moore's stepped care approach to primary care management of chronic back pain[10] introduces interventions "so that the intensity, complexity, and costs of care are guided by each patient's observed outcome." Otis, McDonald, and Dobscha have published a convincing case-based rationale for integrating and coordinating pain care into primary care practice.[11] Dobscha and others have described a model and preliminary outcomes of collaborative care for chronic musculoskeletal care in primary care practice.[12] Unutzer and Park[13] have recently reiterated their novel behavioral health model of "measurement-based care, treatment to target, and stepped care in which treatments are systematically adjusted and 'stepped up' if patients are not improving as expected." This approach has previously demonstrated improved patient satisfaction and health outcomes for pain and depression management.[14–16]

Recently, Ashburn and Witkin[4] offered commentary promoting integration of patient outcome into clinical pain care, rightly concluding that disease-specific outcome measurement tools "may allow for documentation of an individual patient's health status over time" and that ideally, "patient-generated outcome data should be collected in such a manner that allows for the information to be used to guide individual patient decision making, thus optimizing individual patient outcomes."

Pain Care *Specialist* Progression Model

Dubois, Gallagher, and Lippe[17] have previously proposed a pyramidal model for implementing a "population-based stepped-care approach to chronic pain." They acknowledge the variability of expert pain treatment delivery and poor access to expert pain consultation that confronts primary care physicians. They offer a model that calls for increased levels of pain specialty expertise based on the patient's level of disease complexity. Dubois et al. recognize that a progressively specialized skill set is required for effective pain care and clinical outcomes, essentially a stepped model extending up the continuum of primary care providers to tertiary specialists. Dubois et al. do not themselves anchor these levels to measurement-based benchmarks, but this article sets out a proposed model of care whereby stepped care is linked with the measurement-based approach.

Measuring Pain Intensity and Pain Interference: Step 1

Von Korff and others have developed and validated a two-item pain intensity and interference scale that has been endorsed by the Washington State Agency Medical Directors' Group.[18] It is specifically intended for use by primary care prescribers of opioids, with the goal to quickly—with two questions—assess response to chronic opioid treatment in terms of pain intensity and physical function (Fig. 2).

Other validated but more detailed tools to measure pain interference with function have been used for decades, especially the Oswestry Disability Index (ODI)[19] and the Roland Morris Disability Questionnaire (RMDQ).[20–22] These more complex questionnaires require more time to complete: the ODI has 10 domains with selection from 6 choices for each, and the RMDQ has 24 yes-no questions. The McGill Pain Questionnaire asks 49 questions, the Brief Pain Inventory asks 60 questions, not counting the body diagram, and the Short Form Health Survey asks 36. For primary care specialists, a 1-item question for function measured as a numeric rating scale is useful; for pain specialists, specific detail using a more granular assessment tool is probably necessary.

Measuring Mood: Step 2

Serious, treatment-requiring depression and anxiety commonly co-occur with chronic pain: it is estimated that at least half of patients with chronic pain experience significant depression.[23] Measuring chronic pain patients' mood at each clinical encounter might be considered just as crucial as measuring blood pressure, weight, and pulse when evaluating cardiac status. The nine-question Patient Health Questionnaire (PHQ-9)[24] has been demonstrated to be an effective instrument to measure and monitor patient mood. The seven-question general anxiety instrument, GAD-7,[25] is a validated instrument to assess and track anxiety (Fig. 3).

Pain intensity and interference

In the last month, on average, how would you rate your pain? Use a scale from 0 to 10, where 0 is "no pain" and 10 is "pain as bad as it could be." *[That is, your usual pain at times you were in pain.]*

No Pain										As bad as pain could be
0	1	2	3	4	5	6	7	8	9	10

In the last month, how much has pain interfered with your daily activities? Use a scale from 0 to 10, where 0 is "no interference" and 10 is "unable to carry on any activities."

No Interference						Unable to carry on any activities				
0	1	2	3	4	5	6	7	8	9	10

Fig. 2. Two-question pain intensity and interference measure.[18]

The PHQ-4 is a validated "ultra-brief" combination of two measures from the PHQ-9 depression questionnaire and two measures from the GAD-7 anxiety questionnaire.[26] The PHQ-4 allows a busy clinician to rapidly "quantify" a patient's level of psychological distress, characterizing either predominantly anxiety and/or depressive symptoms. A significantly elevated score, generally considered half or more of maximum score (i.e., PHQ-4 $\geq$ 6) can serve as a prompt to the next level of testing, such as the PHQ-9[24] and GAD-7[25] (Fig. 4).

Post-traumatic stress disorder (PTSD), increasingly observed to be a co-occurring condition in both military (66–80%) and civilian chronic pain patients, is associated with higher frequency of opioid usage and abnormal pain perception. It follows that chronic pain assessment should include assessment for PTSD, especially for patients with a known history of significant early life trauma or adult abuse or physical and/or emotional trauma.[27–33] Phifer and colleagues[34] recently demonstrated that those individuals scoring high in avoidance cluster symptoms were likely to seek opioids "as a means to avoid thoughts pertaining to traumatic events." Observations of patients seen by the multidisciplinary pain faculty at the University of Washington's outpatient pain clinic (UW Center for Pain Relief) suggest a similar high representation of PTSD, where early data from routine measurements show 50–70% of referred patients are positive for most or all of the four-question Primary Care-PTSD screening tool (PC-PTSD).[35] Using this tool to diagnose PTSD allows a redirection of the treatment approach to yield more effective outcomes, especially in those patients who appear refractory to initial behavioral health medication and counseling interventions. Diagnosing PTSD allows clinicians to resist escalating opioid doses in a futile attempt to manage the existential suffering of these severely distressed and highly vulnerable pain patients (Fig. 5).

Over the last 2 weeks how often have you been bothered by the following problems?	Not at all	Several days	More than half the days	Nearly every day
1. Feeling nervous, anxious, or on edge	0	1	2	3
2. Not being able to stop or control worrying	0	1	2	3
3. Worrying too much about different things	0	1	2	3
4. Trouble relaxing	0	1	2	3
5. Being so restless that it is hard to sit still	0	1	2	3
6. Becoming easily annoyed or irritable	0	1	2	3
7. Feeling afraid as if something awful might happen	0	1	2	3

Total Score ____ = Add Columns ____ + ____ + ____

If you checked off <u>any</u> problems, how <u>difficult</u> have these problems made it for you to do your work, take care of things at home, or get along with other people?

Not difficult at all	Somewhat difficult	Very difficult	Extremely difficult
☐	☐	☐	☐

Fig. 3. Seven-Question Generalized Anxiety Disorder Assessment (GAD-7).[25]

Measuring the Effect of Pain on Sleep: Step 3

Pain nearly always disrupts sleep in chronic pain patients, and insomnia increases pain intensity and frequency and reduces pain threshold—even in people without reported pain complaints.[36] Opioid dose correlates linearly with risk of sleep-disordered breathing, including both central and obstructive sleep apnea.[37] Assessment and management of sleep disturbances is an important first-line approach to care of the patient with chronic pain conditions. A variety of tools are available, including the STOP-BANG,[38] developed to assess risk of obstructive sleep apnea in perioperative patients (Fig. 6).

Proceeding with a sleep assessment for any patient on opioids plus sedatives or hypnotics is also a reasonable approach, to more specifically determine the need for treatment and, perhaps more importantly, to balance the risks of continuing with either or both of these sedating prescriptions.

Over the past few weeks have you been bothered by these problems?	Not at all	Several days	More days than not	Nearly every day
Feeling nervous, anxious, or on edge	0	1	2	3
Not being able to stop or control worrying	0	1	2	3
Feeling down, depressed, or hopeless	0	1	2	3
Little interest or pleasure in doing things	0	1	2	3

Fig. 4. Four-Question Patient Health Questionnaire (PHQ-4).[26]

Measuring Risk: Step 4

With estimates of co-occurring addiction and pain ranging from 18% to 30%, and given the well-established increased complexity of care of pain patients with active or remote substance abuse disorders (SUD), it is of vital importance to pay careful attention to assessment and outcomes when prescribing opioids and other risky drugs, including benzodiazepines and sedatives such as carisoprodol.[39–43] Based on a 1-year evaluation of function in primary care patients with musculoskeletal pain and SUD, Morasco et al.[44] proposed a stepped care approach: "Chronic noncancer pain patients with a history of a substance use disorder report poorer pain-related functioning and are less likely to experience clinically significant improvements from usual pain treatment. Providers should assess for SUD status and provide more intensive interventions for these patients." Evidence that use of opioids for pain is a risk factor for developing substance use disorder is also robust.[45–48] Further, measurement of opioid misuse may be needed not only at outset of chronic opioid therapy, but throughout treatment.[49] There are many widely used and validated opioid addiction risk scales. These scales include the Opioid Risk Tool, SOAPP-R, COMM, and DIRE Score. These tools are reviewed by Chou and others in an American Pain Society and American Academy of Pain Medicine clinical practice guideline.[50] Each tool offers advantages and disadvantages, though length and number of questions are a crucial determinant of applicability in workflow of busy clinical practices, so the selection of optimal tool depends on the clinician's practice setting. Regardless, some measure of opioid risk must be recorded prior to committing to long-term opioids, and the degree of risk can also systematically determine frequency of urine drug monitoring and/or frequency of accessing state Prescription Drug Monitoring programs that are now available in 49 of 50 U.S. states.

PC-PTSD
In your life, have you ever had any experience that was so frightening, horrible, of upsetting, that in the past month you:
1. Have had nightmares or thought about it when you didn't want to? *2. Tried hard not to think about it or went out of your way to avoid situations that reminded you of it?* *3. Were constantly on guard, watchful, or easily startled?* *4. Felt numb or detached from others, activities, or your surroundings?*
3/4 yes = positive screen

Fig. 5. Primary Care Four-Question PTSD Screen (PC-PTSD).[35]

Measuring Opioid Dose: Calculating Opioid Dose Equivalency

Increasing evidence shows an association of heightened risk of accidental overdoses and deaths,[51–53] falls,[54] and sleep-disordered breathing[37] with higher opioid dose. Therefore, despite variability among opioid dose conversion tables, it is important to consistently record opioid dose according to a standard equianalgesic formula, or "morphine equivalent dose" (MED). The Washington State Agency Medical Directors Group (AMGD) has published a web-based calculator to determine opioid dose.[55]

1. **S**noring Do you snore loudly (louder than talking or loud enough to be heard through closed doors)?	Yes/No
2. **T**ired Do you often feel tired, fatigued, or sleepy during daytime?	Yes/No
3. **O**bserved apnea Has anyone observed you stop breathing during your sleep?	Yes/No
4. Blood **p**ressure Do you have or are you treated for high blood pressure?	Yes/No
5. **B**MI more than 35 kg/m^2?	Yes/No
6. **A**ge Age over 50 yr old?	Yes/No
7. **N**eck circumference Neck circumference greater than 40 cm?	Yes/No
8. **G**ender Gender male?	Yes/No
High risk of OSA: answering yes to three or more items **Low risk of OSA:** answering yes to fewer than three items	

Fig. 6. STOP-BANG for obstructive sleep apnea. From Chung et al.[38]

Table I Pain metric measurement tool		
	Pain Metric	Measurement Tool
Step 1	Pain intensity	0/10 Intensity NRS
Step 2	Pain interference with function	0/10 Interference NRS
Step 3	Mood	PHQ-4 (or PHQ-9); PC-PTSD
Step 4	Sleep	STOP-BANG
Step 5	Risk	ORT (or SOAPP-R)
Always	Opioid dose	MED calculator
Abbreviations: MED, morphine equivalent dose; NRS, numeric rating scale; ORT, Opioid Risk Tool; PC-PTSD, Primary Care-PTSD Screen; PHQ, Patient Health Questionnaire; SOAPP-R, Screener and Opioid Assessment for Patients with Pain-Revised; STOP-BANG, see Fig. 6.		

Longitudinal Tracking

PainTracker™ (Fig. 7) is a web-based tool currently introduced at the University of Washington to assess and graph core patient-reported outcomes of chronic pain management over time.[56] Key pain metrics are displayed on a clinical flow-sheet during each patient visit.

PainTracker is designed to be brief and visual, allowing patients and providers to "better understand the relationship between chronic pain treatments and outcomes that matter to patients, such as pain, function, mood, sleep, and treatment satisfaction" (M. Sullivan, personal communication, 2012). Measurement-based step care requires that multiple patient clinical outcomes and their relation to treatments be monitored over time, so tools that allow effects of several concurrent treatments to be tracked over time and presented in an easily interpreted display will promote implementation into the busy clinical workflow of both primary care and specialty pain providers. Use of PainTracker or similar brief assessment tools actively engages patients in the selection and assessment of personally important goals and outcomes. Longitudinal tracking is then graphically displayed at the time of each subsequent encounter so that treatment of impairment of function, mood, and sleep is immediately visible to provider and patient, fostering improved communication, collaboration, and self-management.

Measurement-Based Step Care Approach to Chronic Pain Management

Systematic recording of measurements sensitive to the multidisciplinary domains of chronic pain management allows clinicians to quickly identify specific problem areas either at outset of care or developing as pain treatment progresses. Tools such as PainTracker flag chosen threshold values, such as a PHQ-4 above 5, or an Opioid Risk Tool score above 7 (Table I). This approach reduces inadvertent omission of key problems needing pain specialist involvement. This structured approach allows specific treatments to be systematically "stepped up" when patients are not improving as expected, and follows core principles for complex disease management[4,14] (Table II, Fig. 8).

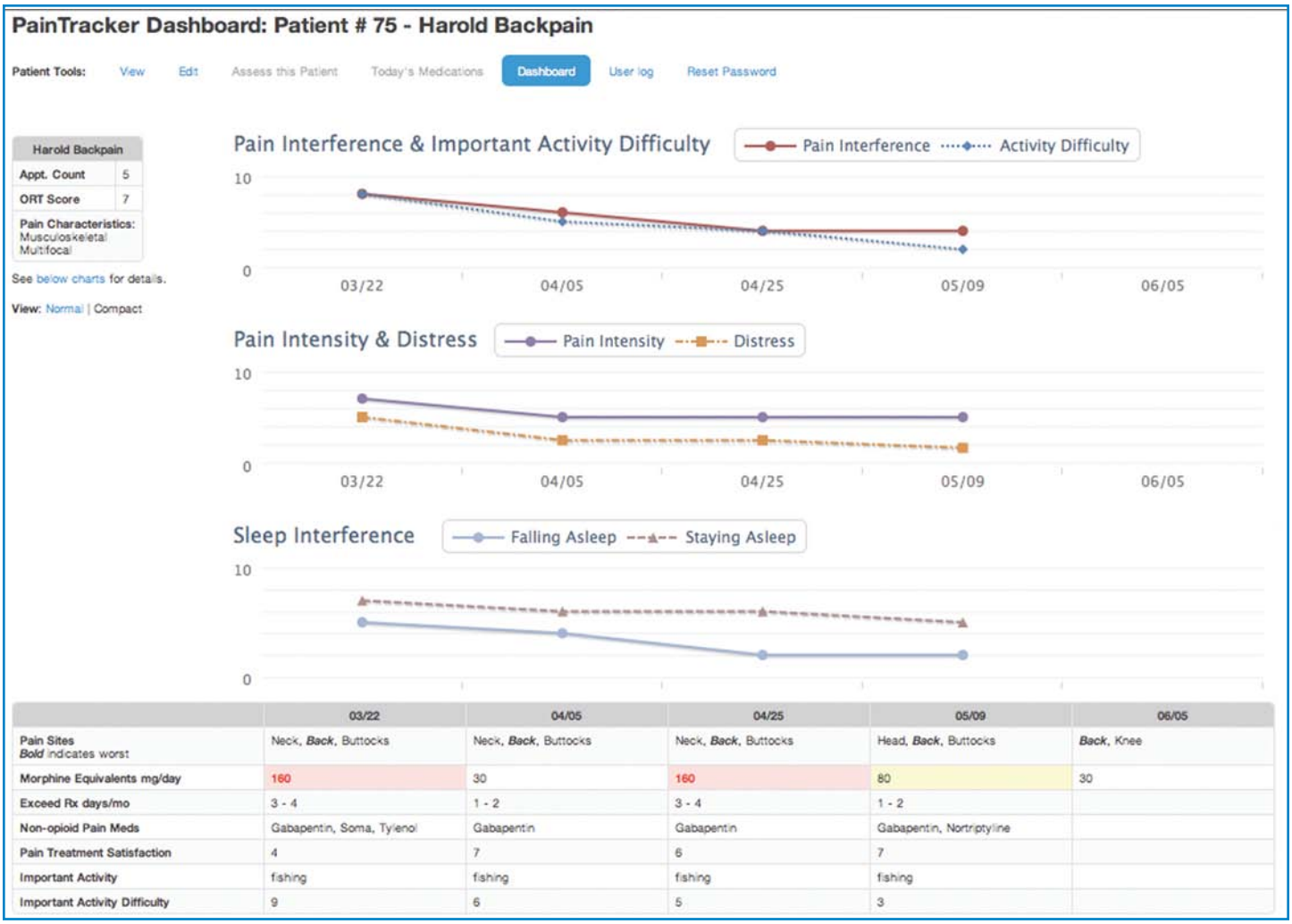
Step 1: Functional Interference

When a patient shows a high degree of physical function limitation, referral to rehabilitation medicine or occupational medicine specialists is helpful. Physical and occupational therapy may also be requested. Vocational counseling can be added when pain or permanent injury delay or prevent return to prior work.

Step 2: Mood Assessment

Evidence of serious behavioral health problems should prompt referral to a psychiatrist or clinical psychologist. The importance

Table II Measurement-based score and step response	
Measurement-Based Score	Step Care Referral
Pain intensity ≥ 7 without diagnosis/plan	Pain specialist
Pain interference > 4	Physiatry and/or occupational therapy and/or physical therapy or vocational rehabilitation specialist
PHQ-4 ≥ 6; PC-PTSD ≥ 3	Behavioral health specialist
STOP-BANG ≥ 3; high MED; opioids + sedatives	Sleep specialist
ORT ≥ 8; minor urinary drug test aberrancy > 4; serious aberrancies	Addiction specialist
MED ≥ 100; high risk, poor function; PHQ-4 ≥ 6	Pain specialist
Abbreviations: See Table I.	



	03/22	04/05	04/25	05/09	06/05
Pain Sites *Bold* indicates worst	Neck, ***Back***, Buttocks	Neck, ***Back***, Buttocks	Neck, ***Back***, Buttocks	Head, ***Back***, Buttocks	***Back***, Knee
Morphine Equivalents mg/day	160	30	160	80	30
Exceed Rx days/mo	3 - 4	1 - 2	3 - 4	1 - 2	
Non-opioid Pain Meds	Gabapentin, Soma, Tylenol	Gabapentin	Gabapentin	Gabapentin, Nortriptyline	
Pain Treatment Satisfaction	4	7	6	7	
Important Activity	fishing	fishing	fishing	fishing	
Important Activity Difficulty	9	6	5	3	

Fig. 7. University of Washington PainTracker™ (courtesy of M. Sullivan). Copyrighted by the University of Washington.

of early diagnosis and treatment of anxiety, depression, PTSD, and other poorly controlled psychiatric disorders cannot be overstated. Ideally, involvement of a nurse care coordinator and/or social worker is indicated when missed appointments and frequent unscheduled patient calls suggest poor treatment adherence.

Step 3: Sleep Assessment

Sleep disorders can be identified and treatment recommended when sleep interference persists or when measurement shows increased risk of sleep apnea. Higher doses of opioids, or even moderate doses when combined with sedatives, justify a referral to a sleep specialist.

Step 4: Risk Assessment

When there is a systematic process to assess and follow evidence of substance use disorder, there can be an increase in the intensity of adherence monitoring, such as more frequent urine drug monitoring and accessing of state prescription drug monitoring data. Evidence of noncompliance (a need for early refills, unexpected urine drug results, or lost or stolen prescriptions), should trigger referral to an addiction specialist and/or specialized counseling. In some cases, the risk may preclude initiation or continuation of opioid therapy, especially when the estimated or calculated benefit is low.

Multidisciplinary Pain Medicine Referral

When the pain persists without a diagnosis, or when treatments show no improvement in pain relief and function, especially where opioid dose has escalated, referral to a pain specialist is generally indicated. This stepped care incorporates specific benchmarks to consistently and collaboratively guide the progression of pain care.

Conclusion

Chronic pain is not a simple nociceptive experience. Selection of appropriate treatment is improved by following a systematically structured multidimensional approach.[57] Step care is a well-established approach to managing complex chronic illness, adding increased levels of treatment intensity when there is no improvement after simple measures are instituted. My personal observation of medical students taught using this approach shows that within 5 days of training they are able to quickly assess and recommend multidimensional treatment for the most daunting of pain patients presenting to a tertiary pain clinic. Primary care providers following this measurement-based step care approach have reported: “I never knew I was supposed to even ask these questions.”

Measurement-based care identifies the immediate next step up the referral pathway for patients who do not response to early

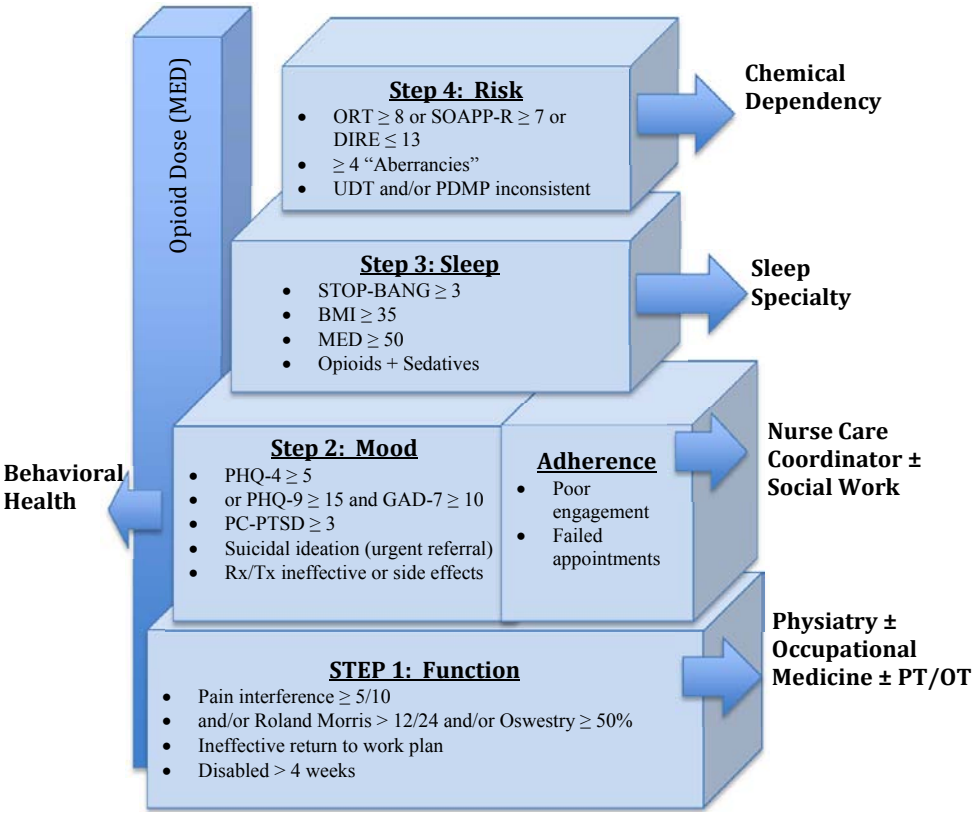


Fig. 8. Proposed model for measurement-based stepped pain care. From Tauben and Theodore.[57]

measures. This approach is well established as a useful primary care model for complex chronic illness involving collaborative interspecialty support. Primary care providers are well conditioned to seek help for their patients when they encounter evidence of complicating co-occurring disorders; as generalists, they must do so. Measurement-based pain care would be expected to lead to earlier referral to appropriate care, before pain has become intractable and costly due to chronicity and progressively increasing layers of biopsychosocial distress. Moreover, as the need to assess the value of treatments becomes ever more pressing, data from regular patient reporting can play a valuable role in assessing outcomes in a timely manner.[3]

We live in an era in which measurement is highly feasible and can form the basis of structured medical decision making. When time spent with patients is limited, as it tends to be in modern practice settings, it becomes more important to utilize all available means of understanding pain's complexity, and treat the person and not simply the pain.

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