

# **A Case Study of Electronic Medical Record Templates for Fibromyalgia Management**

*by Lesley M. Arnold, MD*

## **Abstract**

Electronic medical record (EMR) templates may improve care of fibromyalgia patients and make more efficient use of clinician time. The goal of this study was to develop and assess a protocol for fibromyalgia treatment through the use of EMR templates. The EMR template was developed in Phase I of the study. Diagnostic and tracking tools were added to the clinical record. Information about fibromyalgia, self-management approaches, tools for diagnostic workup, and treatment guidelines were incorporated. History and exam templates included relevant elements for managing fibromyalgia. The EMR template was evaluated in Phase II of the study. Patients were at least 18 years old and met the 1990 American College of Rheumatology fibromyalgia criteria. The template was assessed for ease of use, relevancy of items, completeness of items, efficiency, and overall usefulness. The study included 50 patients followed over a period of six months. All were women with mean age of 45 years. Most (45 patients) were white. Overall, the template was assessed as easy to use with relevant and complete items, flexible, and adaptable. The flowsheets allowed for accurate tracking of responses to treatment. The template moderately improved efficiency of the patient visit and note documentation. The study showed that the use of fibromyalgia EMR templates and incorporation of easily accessible treatment guidelines and diagnostic information may help facilitate care of fibromyalgia patients by guiding the clinician in early diagnosis, multimodal treatment approaches, and the tracking of progress. Providing a framework and protocols for fibromyalgia has the potential for significant improvement in overall care.

**Keywords:** electronic medical record; fibromyalgia; patient care; treatment protocol

## **Introduction**

The management of patients with fibromyalgia in the primary care setting is challenging because many clinicians report difficulty in identifying and diagnosing fibromyalgia. In addition, patients with fibromyalgia are sometimes perceived as difficult to treat, especially in the primary care office, where time and resources may be limited. Previous work has addressed some of these challenges by presenting state-of-the-art information on pathophysiologic mechanisms in fibromyalgia, describing an approach to the differential diagnosis of fibromyalgia in primary care, and providing a framework for the primary care provider to treat fibromyalgia patients effectively and efficiently.<sup>1-3</sup> The importance of assessment tools to aid in the differential diagnosis of patients with chronic pain and to track patients' progress over time was emphasized.<sup>4</sup> Although questionnaires and assessment tools are available for fibromyalgia patients, there is a need to organize these into a protocol that could improve clinical management of patients with fibromyalgia. The growth of health information technology provides an opportunity to improve the assessment and management of fibromyalgia in clinical settings. Electronic medical record (EMR) templates may provide practical assessment and tracking protocols for fibromyalgia that clinicians can

adopt for their practice. Use of EMR templates may allow for an efficient use of clinician time and improve patient satisfaction with care.

The intent of this study was to develop and assess an EMR template for fibromyalgia for use in primary care and specialty settings. The template incorporated previous recommendations<sup>5-7</sup> for effective and efficient diagnosis and management of patients with fibromyalgia.

## Methods

The study was divided into two phases. The aim of Phase I was to develop the EMR template. The EMR program in use at the University of Cincinnati is EpicCare (Epic), a healthcare software program in common use in the greater Cincinnati area. Epic software allows clinicians to efficiently document patient visits through use of charting tools and forms. EMR templates are especially effective because they incorporate guidelines directly into the day-to-day practice of the clinicians, who are already using the EMR to document their encounters with patients.

The goal of Phase II of the study was to assess the EMR template in the University of Cincinnati Fibromyalgia Treatment Program. In this phase, the newly developed template was used as part of the usual care for 50 existing or new fibromyalgia patients over a period of 6 months. Patients were included if they were female or male outpatients 18 years of age or older, met the 1990 American College of Rheumatology criteria for primary fibromyalgia,<sup>8</sup> and had an educational level and degree of understanding such that the patient could communicate intelligibly with the investigator. Patients were excluded if they were unable to keep regular appointments for clinic visits. The study was reviewed by the University of Cincinnati Institutional Review Board (IRB). A waiver of written informed consent was obtained because the study was being implemented as the standard of care in the Fibromyalgia Treatment Program for all new and existing patients. An information sheet explaining the nature of the study was provided to the patient.

The EMR template was assessed by the author for ease of use, efficiency, relevancy of items, completeness of items, and overall usefulness. In addition, the amount of time the clinician spent with patients to accomplish diagnosis, treatment planning, education, and documentation of the visit was tracked to assess the impact of the template on the amount of time required for patient care.

## Results

### *Phase I: Development of the EMR Template*

The first step in developing the fibromyalgia template was to include reference tools for clinicians and patients that could be easily accessed in the EMR. Using “fibromyalgia” as a search term, clinicians can open the forms and, if desired, print them or add them to the instructions that are part of the patient’s printed after-visit summary. The following forms were designed and added to the Epic clinical reference section:

1. The 1990 American College of Rheumatology fibromyalgia criteria<sup>9</sup>
2. The 2010 American College of Rheumatology fibromyalgia criteria<sup>10</sup>
3. Core principles for fibromyalgia management, adapted from Arnold et al.<sup>11</sup>
4. Information on differentiating selected medical disorders from fibromyalgia, adapted from Arnold et al.<sup>12</sup> and Arnold<sup>13</sup>
5. Diagnostic screen for fibromyalgia, in clinician and patient forms<sup>14</sup>
6. Fibromyalgia medication algorithm, adapted from Arnold<sup>15</sup>
7. Guidelines for the pharmacological and nonpharmacological treatment of fibromyalgia, adapted from Arnold et al.<sup>16</sup>
8. Guidelines for evaluation of fibromyalgia, adapted from Arnold et al.<sup>17</sup>
9. Stepwise treatment of fibromyalgia, adapted from Arnold<sup>18</sup>

The next step was to create Epic flowsheets to allow clinicians to use diagnostic and tracking tools that can be easily incorporated into the patient's clinical record. The Arnold et al.<sup>19</sup> diagnostic tool was adapted for use as a clinician flowsheet for new patients. The revised Fibromyalgia Impact Questionnaire (FIQR)<sup>20</sup> and the Clinical Global Impression of Severity (CGI-S) and Clinical Global Impression of Improvement (CGI-I)<sup>21</sup> were used as flowsheets for tracking symptoms and function over time. To reduce or eliminate time to enter patient information from questionnaires into the chart, a system was devised to allow patients to enter some of their own data through MyChart, an online system that patients can use to access their medical record and communicate with their healthcare providers. New patients were encouraged to sign up for MyChart as soon as they made their first appointment. The appointment reminder email sent to patients approximately 48 hours before the appointment asked patients to fill out the questionnaires before coming to the appointment. Questionnaires included in the MyChart flowsheets were the Arnold et al.<sup>22</sup> patient questionnaire and the FIQR.<sup>23</sup> Medical, surgical, psychiatric, social, and family history sections and a medication list were included in MyChart and could be updated by patients before their visit. All of the information entered by the patient was verified and added to the patient's progress note by the clinician. The flowsheet review function allowed the clinician to see trends in patients' progress over time. The flowsheets could be viewed as tables, line graphs, or bar charts to provide a visual representation of a patient's progress over time and could be printed for the patients to allow them to monitor their own progress.

The development of the fibromyalgia Epic smart form was the final step in the process. The plan was to design a single form that could be used for both new and existing patients and would include all pertinent elements for the assessment and management of fibromyalgia. The smart form included check boxes, which enabled efficient completion of the form, and comment boxes, which gave the clinician flexibility to add additional information as needed. The information gathered on the form was transformed automatically into a written summary in the patient's "history of present illness" progress note for the visit. Not all elements were required for each visit, allowing the clinician to focus on documenting pertinent information for each visit. The form included the following sections:

1. time of onset of fibromyalgia;
2. triggers/risk factors;
3. assessment of impairment in family life/home responsibilities, social life, and work/school;
4. recent testing completed by the patient;
5. pertinent comorbid disorders;
6. past treatments;
7. current treatments; and
8. overall assessment of improvement on treatment (see Table 1).

The form included a list of the key fibromyalgia symptoms of pain, sleep disturbance, fatigue, cognitive disturbance, anxiety, and depression, with a comment box for other symptoms. If the clinician checked one of the symptoms as being present, additional questions could be addressed about location (for pain only), severity, duration, quality, frequency, modifying factors, and progression since onset (see Table 2). Patients were directed to the FibroGuide website (<http://fibroguide.med.umich.edu/>), developed by the University of Michigan and available for free online, for fibromyalgia educational materials and self-management strategies rather than incorporating the materials into the Epic system.

Other documentation time-saving elements were introduced into the Epic fibromyalgia template. Epic "macros" allowed for the creation of a fibromyalgia-based review of systems and physical exam. In addition, several "smart phrases" were created to capture commonly used notes in the fibromyalgia patient's chart. One example of a smart phrase is as follows: "Reviewed pathophysiology of fibromyalgia and approaches to management including pharmacological and non-pharmacological treatments."

### *Phase 2: Testing of the EMR Template*

Both new and existing patients in the Fibromyalgia Treatment Program were assessed for study eligibility. The patients were managed with the medical standard of care and were given an orientation to the use of EMR templates and fibromyalgia assessment tools. The first 50 scheduled existing or new

patients who agreed to participate and met the study criteria were enrolled after receiving the IRB-approved study information sheet. The patients were followed for 6 months. The first patient was enrolled in November 2014, and the last patient was enrolled in March 2015. The study was completed in September 2015. Thirty-three existing patients and 17 new patients participated in the study. All of the patients were women with mean age of 45 years. Most (45 of 50 patients) were white. Three patients were African American, one was Asian American, and one was Hispanic.

The template was assessed by the clinician as being easy to use with relevant and complete items. The template included comment boxes and “other” boxes throughout, which made it possible to expand on existing items if needed to provide more detailed information. The template was also flexible and adaptable for each individual patient. The flowsheets proved to be useful in tracking patient progress and allowed for documentation of the diagnosis and response to treatment. The availability of reference materials was helpful when additional management guidelines were needed.

The template moderately improved efficiency of the patient visit and note documentation. The template reduced the time to completion of a note by allowing the clinician to complete the history and exam items and instructions during the visit. Because of the ease of completion of the forms, the documentation during the visit did not compromise the doctor-patient interaction. At the end of the appointment, the clinician printed the patient instructions, which were subsequently copied and added to the assessment and plan in the patient’s chart, saving documentation time. However, finishing the entire note still required additional time after the patient had left the office in order to review the patient information, complete documentation of the assessment and plan, and complete billing and other administrative elements. The ideal situation of completing all of the documentation during the patient’s visit was not achieved. Between 5 and 10 minutes were required to complete the note after the patient visit. One contributing problem was that most patients did not fill out forms and updates prior to their visit through MyChart. Only 4 of the 50 patients used MyChart to complete questionnaires before the visit. Most of the patients completed the forms and updated their history and medications during their appointment, which slowed documentation. Another factor was related to the complexity of care of the fibromyalgia patients. The patients consistently reported multiple symptoms and functional impairment over the six-month follow-up period, which required time to review, document, and manage. In addition, the care of the patients often involved consultations/referrals involving other healthcare providers and the need to address disability issues, which contributed to time necessary to complete the notes and visits. All patients were referred to the FibroGuide website for education and self-management strategies, but none of the patients reported using the site.

## **Discussion**

This study developed and tested an EMR template for fibromyalgia with the goal of facilitating the assessment and management of patients in the clinical setting. The template was found to be easy to use and useful in identifying and documenting pertinent fibromyalgia symptoms and comorbidities, as well as treatment response. Tracking tools proved useful in providing a summary of change over time, facilitating treatment adjustments as needed. The availability of references about fibromyalgia embedded in the EMR provided guidance about fibromyalgia diagnostic criteria, differential diagnosis, and multimodal management strategies.

The template reduced the time required to document the patient’s visit, but additional time after the appointment was still required to complete the note. Therefore, although information about fibromyalgia symptoms, treatments, and comorbidities embedded in the template proved useful in guiding patient care, the complexity of the patients’ presentation and treatment presented challenges for the efficient care of fibromyalgia patients. Future studies should examine the use of the fibromyalgia EMR template in the context of clinical settings in which multiple healthcare providers operate as a team in the management of fibromyalgia patients.<sup>24</sup>

Another area of concern was the lack of participation by most patients in the completion of forms prior to the visit, although they all received prompts to complete the questionnaires before their

appointment. The EMR has the potential to engage patients in their own care through access to their medical record and availability of tracking tools,<sup>25</sup> but patients did not get involved as expected. The patients also did not engage in self-management as described in the FibroGuide website that was recommended to all of the patients. It is unclear why the patients did not become more involved in their care, but this finding may be related to symptoms common in fibromyalgia that may interfere with motivation, such as fatigue and mood disturbance. In addition, some patients may have been uncomfortable with use of the technology. Exploration of these and other potential barriers to patient engagement and the development of strategies for improving involvement of patients in self-management of fibromyalgia should be explored in future studies.

The study has several limitations. First, the template was developed and tested by a single clinician and will require assessment by other clinicians in multiple settings with more study participants to confirm its usefulness in clinical practice. Second, the study participants were all women, and most were white; therefore, they may not be representative of all patients with fibromyalgia. Third, the template was developed in an Epic EMR system and may not be transferable to other EMR systems, although the general principles may be adapted to other systems. Fourth, the time and staffing required to develop new templates may interfere with the ability of healthcare providers in other sites to create their own version of the fibromyalgia template. Furthermore, some of the desired forms could not be incorporated due to restrictions established at the university regarding the number of forms and best-practice alerts (BPAs) allowed in the local Epic system. For example, the author could not include a fibromyalgia BPA that would have triggered the clinician to assess for fibromyalgia if the patient's chart indicated pain, fatigue, and sleep disturbance in the diagnosis, problem list, or history. Finally, it is unclear whether the use of the template affected the quality of care of the fibromyalgia patients, and this should be examined in future studies.

## **Conclusion**

Fibromyalgia is a complex disorder that can be difficult to manage in clinical settings. The use of a fibromyalgia EMR template may facilitate the care of fibromyalgia patients by guiding the clinician in the diagnosis and identification of symptoms and comorbidities, multimodal treatment approaches, and tracking progress. Continued efforts should be directed at improving the efficiency of the EMR and developing best-practice care strategies for patients with fibromyalgia to improve patient outcomes.

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## **Conflict of Interest Statement**

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Lesley M. Arnold, MD, is a professor of psychiatry and behavioral neuroscience at the University of Cincinnati College of Medicine in Cincinnati, OH.

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## Table 1

### Electronic Medical Record Smart Form Template: Overview of Fibromyalgia

**Onset:** 3-6 months ago, more than 6 months ago, more than 1 year ago, more than 2 years ago, more than 5 years ago, more than 10 years ago; (comment box)

**Triggers/risk factors (can be more than one):** none, family history, physical trauma/injury, emotional trauma, stress, disability/workman's compensation, weather changes, other; (comment box)

**Impairment in family life/home responsibilities:** none, mild, moderate, severe; (comment box)

**Impairment in social life:** none, mild, moderate, severe; (comment box)

**Impairment in work/school:** none, mild, moderate, severe; (comment box)

**Testing (can be more than one):** comprehensive metabolic panel, complete blood count thyroid function tests, erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), rheumatoid factor (RF), antinuclear antibody (ANA), ferritin, iron-binding capacity and percentage of saturation, Vitamin B12, Vitamin D, MRI, EMG, x-ray, sleep study, other; (comment box)

**Pertinent comorbid disorders (can be more than one):** osteoarthritis, degenerative disc disease, neuropathy, radiculopathy, interstitial cystitis, irritable bowel disorder, migraine, chronic daily headache, chronic fatigue syndrome, obesity, sleep apnea, periodic limb movement disorder, restless leg syndrome, depression, anxiety, bipolar disorder, other

**Past treatments (can be more than one):** other, duloxetine, pregabalin, milnacipran, gabapentin, amitriptyline, SSRI, venlafaxine, cyclobenzaprine, baclofen, tizanidine, metaxalone, methocarbamol, opioids, benzodiazepines, zolpidem, NSAIDs, aerobic exercise, strength training, stretching, yoga, Tai Chi, physical therapy, chiropractor, acupuncture, massage, psychotherapy, diet, supplements, tender point injections; (comment box)

**Current treatments (can be more than one):** other, duloxetine, pregabalin, milnacipran, gabapentin, amitriptyline, SSRI, venlafaxine, cyclobenzaprine, baclofen, tizanidine, metaxalone, methocarbamol, opioids, benzodiazepines, zolpidem, NSAIDs, aerobic exercise, strength training, stretching, yoga, Tai Chi, physical therapy, chiropractor, acupuncture, massage, psychotherapy, diet, supplements, tender point injections; (comment box)

**Improvement on treatment:** very much worse, much worse, minimally worse, no change, minimally improved, much improved, very much improved; (comment box)

## **Table 2**

### Electronic Medical Record Smart Form Template: Review of Fibromyalgia Symptoms

#### **Pain +/-** (comment box)

Location (can be more than one): head, neck, chest, abdomen, upper back, lower back, jaw (r), jaw (l), shoulder (r), shoulder (l), upper arm (r), upper arm (l), elbow (r), elbow (l), lower arm (r), lower arm (l), hand (r), hand (l), hip (r), hip (l), upper leg (r), upper leg (l), knee (r), knee (l), lower leg (r), lower leg (l), ankle (r), ankle (l), foot (r), foot (l); (comment box)

Severity: mild, moderate, severe; (comment box)

Duration: 3-6 months ago, more than 6 months ago, more than 1 year ago, more than 2 years ago, more than 5 years ago, more than 10 years ago; (comment box)

Quality (can be more than one): Burning, aching, sharp, tingling, shooting, stabbing, stiffness; (comment box)

Frequency: constantly, 2 to 4 times per day, once daily, every several days, intermittently, rarely; (comment box)

Modifying factors (can be more than one): physical activity, stress, sleep disturbance, weather, temperature, noise, lights; (comment box)

Progression since onset: unchanged, resolved, gradually improving, rapidly improving, gradually worsening, rapidly worsening, waxing and waning

#### **Sleep disturbance +/-** (comment box)

Severity: mild, moderate, severe; (comment box)

Duration: 3-6 months ago, more than 6 months ago, more than 1 year ago, more than 2 years ago, more than 5 years ago, more than 10 years ago; (comment box)

Quality (can be more than one): difficulty falling asleep, difficulty staying asleep, unrefreshing sleep, snoring; (comment box)

Frequency: daily, every several days, intermittently, rarely; (comment box)

Timing: less than 4 hours of sleep, 4-6 hours of sleep, 7-8 hours of sleep, 9-10 hours of sleep, greater than 10 hours of sleep; (comment box)

Modifying factors (can be more than one): physical activity, stress, worry, racing thoughts, pain, weather, temperature; (comment box)

Progression since onset: unchanged, resolved, gradually improving, rapidly improving, gradually worsening, rapidly worsening, waxing and waning

**Fatigue +/-** (comment box)

Severity: mild, moderate, severe; (comment box)

Duration: 3-6 months ago, more than 6 months ago, more than 1 year ago, more than 2 years ago, more than 5 years ago, more than 10 years ago; (comment box)

Quality (can be more than one): sleepiness, exhaustion, tiredness, sluggish; (comment box)

Frequency: constantly, 2 to 4 times per day, once daily, every several days, intermittently, rarely; (comment box)

Modifying factors (can be more than one): physical activity, stress, pain, sleep disturbance, weather, temperature; (comment box)

Progression since onset: unchanged, resolved, gradually improving, rapidly improving, gradually worsening, rapidly worsening, waxing and waning

**Cognitive Disturbance +/-** (comment box)

Severity: mild, moderate, severe; (comment box)

Duration: 3-6 months ago, more than 6 months ago, more than 1 year ago, more than 2 years ago, more than 5 years ago, more than 10 years ago; (comment box)

Quality (can be more than one): decreased concentration, decreased attention, forgetfulness, disorganization, slowed thinking, foggy, dulled; (comment box)

Frequency: constantly, 2 to 4 times per day, once daily, every several days, intermittently, rarely; (comment box)

Modifying factors (can be more than one): physical activity, stress, pain, fatigue, sleep disturbance, weather, temperature; (comment box)

Progression since onset: unchanged, resolved, gradually improving, rapidly improving, gradually worsening, rapidly worsening, waxing and waning

**Anxiety +/-** (comment box)

Severity: mild, moderate, severe; (comment box)

Duration: 3-6 months ago, more than 6 months ago, more than 1 year ago, more than 2 years ago, more than 5 years ago, more than 10 years ago; (comment box)

Quality (can be more than one): generalized worry, panic attacks, fears; (comment box)

Frequency: constantly, 2 to 4 times per day, once daily, every several days, intermittently, rarely; (comment box)

Modifying factors (can be more than one): physical activity, stress, pain, fatigue, sleep disturbance; (comment box)

Progression since onset: unchanged, resolved, gradually improving, rapidly improving, gradually worsening, rapidly worsening, waxing and waning

**Depression +/-** (comment box)

Severity: mild, moderate, severe; (comment box)

Duration: 3-6 months ago, more than 6 months ago, more than 1 year ago, more than 2 years ago, more than 5 years ago, more than 10 years ago; (comment box)

Quality (can be more than one): anhedonia, low mood, decreased motivation, low self esteem, pessimism, hopelessness, appetite change, suicidal ideation, history of suicide attempts; (comment box)

Frequency: constantly, 2 to 4 times per day, once daily, every several days, intermittently, rarely; (comment box)

Modifying factors (can be more than one): physical activity, stress, pain, fatigue, sleep disturbance; (comment box)

Progression since onset: unchanged, resolved, gradually improving, rapidly improving, gradually worsening, rapidly worsening, waxing and waning

**Other symptoms +/-** (comment box)