

# Referring Wisely: Orthopedic Referral Guidelines at an Academic Institution

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Referral rates in the ambulatory setting doubled from 1999 to 2009,<sup>1</sup> with specialty visits now constituting over half of all ambulatory care visits and more than two-thirds of all ambulatory care expenditures in the United States.<sup>2</sup> Judicious and coordinated use of this specialty care is increasingly recognized as essential to high-value healthcare.<sup>3,4</sup> The “Patient-Centered Medical Home Neighbor” (PCMH-N), a framework conceptualized by the American College of Physicians Council of Subspecialty Societies to address the relationship between primary care offices (PCMHs) and specialty/subspecialty practices, highlights the referral process as fundamental to effective utilization and coordination of specialty care in the ambulatory setting.<sup>5</sup>

With the advent of electronic health records (EHRs) and integrated referral platforms, we now have the opportunity to provide decision support and improve specialty care coordination at the point of referral. At University of California, San Francisco (UCSF) Health, we developed condition-specific referral guidelines and electronic consultations (eConsults) to support providers at the point of referral to medicine specialty practices<sup>6,7</sup> (Figure 1). These programs incorporate PCMH-N principles by facilitating the transfer of clinical information, eliciting a clinical question, conveying recommendations about tests and treatments prior to referral, and defining expectations about management roles.<sup>5,8,9</sup> eConsults facilitate timely specialist consultation via the EHR for clinical questions that do not require an in-person evaluation.

The opportunity to embed disease-specific recommendations at the point of referral raises the need for a process to define these recommendations. Practice guidelines are rarely designed to support the referring provider at this point in the patient’s care. One of the most frequent referrals from primary care to specialist care is for a patient with a musculoskeletal problem,<sup>1,10,11</sup> and referrals to orthopedic care are an important example of this gap. Professional society practice guidelines exist for many musculoskeletal diseases,<sup>12-20</sup> but

## ABSTRACT

**Objectives:** To develop local orthopedic guidelines for use in referral decision support and electronic consultation programs at University of California, San Francisco Health.

**Study Design:** Modified Delphi method.

**Methods:** We performed a 2-phase modified Delphi study to identify consensus between primary care and orthopedic clinicians for common musculoskeletal problems.

**Results:** Clinicians agreed that confirming patient interest in an orthopedic procedure should be completed prior to referral in 81% of clinical scenarios, as well as conservative management in 80%, physical therapy in 60%, and x-ray prior to referral in 42% of scenarios. Clinicians agreed magnetic resonance imaging should not be performed prior to referral in most (58%) clinical scenarios.

**Conclusions:** In the absence of national guidelines, a process for local guideline generation is needed in order to provide nuanced and detailed decision support at the point of referral. The Delphi method proved an effective process to achieve this end.

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**Take-Away Points**

The referral process is fundamental to the effective and coordinated use of ambulatory specialty care in a high-value healthcare system. In the absence of national guidelines, a process for local guideline generation is needed in order to provide detailed decision support at the point of referral. We used the Delphi method to identify consensus between primary care and orthopedic clinicians for common musculoskeletal problems, which proved an effective process to achieve this end.

do not address diagnostic or treatment modalities to attempt prior to referral or clinical questions that might be appropriate for an eConsult with an orthopedist in lieu of a face-to-face visit.

We therefore sought to develop local standards to guide primary care providers (PCPs) when referring patients for orthopedic care. We used the Delphi method, which has been successfully applied to create guidelines in other areas of healthcare<sup>21-24</sup> and to build consensus among UCSF primary care and orthopedic clinicians. Specifically, we asked: 1) What tests and treatments should be performed in primary care prior to orthopedic consultation for specific common musculoskeletal problems? and 2) Which common musculoskeletal problems could be managed by the PCP with an eConsult by an orthopedist, in place of a face-to-face patient visit?

**METHODS**

The UCSF Health System is a multi-site academic institution with 178 PCPs, 24 orthopedists, and approximately 65,000 primary care patients with 5000 referrals to orthopedics per year. We performed a 2-phase modified Delphi study<sup>25</sup> using Web-based surveys to identify consensus between primary care and orthopedic clinicians at UCSF for common musculoskeletal problems.

**Panel Selection**

All UCSF physicians, physician assistants, and nurse practitioners that provide care to adult patients in the UCSF orthopedic clinics were asked to participate at a faculty meeting and via e-mail (n = 24). PCPs in the fields of family medicine and internal medicine volunteered in response to a recruitment e-mail sent to all UCSF adult primary care clinicians (n = 178).

**Survey Design**

We performed an administrative review of final diagnoses for referrals from UCSF adult primary care to orthopedic care in order to identify the most commonly re-

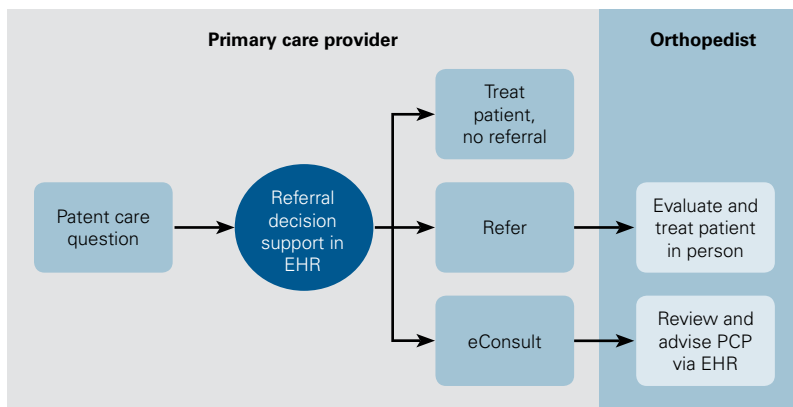
ferred musculoskeletal problems. A small team of primary care and sports medicine physicians designed a survey composed of clinical scenarios for each of these commonly referred musculoskeletal problems. When clinical characteristics such as age, duration of problem, or athletic status were likely to affect management, multiple scenarios were constructed to differ by 1 variable at a time.

Each clinical scenario was followed by the question stem: “The following should occur prior to referral to the orthopedic clinic...” A list of specific questions about pre-referral evaluation, conservative treatment in advance of referral, and the appropriateness of non-face-to-face consultation (ie, eConsult) followed. The panel members rated their agreement with each question using a 5-point Likert scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, and 5 = strongly agree). Evaluation and treatment questions were developed based on clinical practice guidelines, when available.<sup>12-20</sup> We included questions about pre-referral x-ray and magnetic resonance imaging (MRI) in all scenarios for consistency throughout the survey. A sample survey question is seen in **Figure 2** and the **eAppendix** (available at [www.ajmc.com](http://www.ajmc.com)). The clinical scenarios and survey questions were vetted with the UCSF orthopedic surgery division chiefs to ensure appropriateness and completeness prior to survey administration.

**Survey Administration**

The study was conducted between November and December 2013. Two rounds of Web-based surveys (Qualtrics, Provo, Utah) were sent to panel members as an e-mail link. Panel members were given 2 weeks to respond

**Figure 1. Referral and eConsult Work Flow**



EHR indicates electronic health record; PCP, primary care provider.

to each round, with a reminder e-mail sent at 7 days. The research team took 2 weeks after the first round to collate responses and develop the second round. Consensus was defined as at least 70% of PCPs and at least 70% of orthopedists who strongly agree/agree or strongly disagree/disagree. All answers were weighted equally.

**Round 1.** Primary care clinicians received all questions (n = 214) and received a \$25 gift card for their participation. Orthopedic clinicians received only questions relevant to their orthopedic subspecialty.

**Round 2.** The second round consisted of questions that did not reach consensus in the first round. For these remaining questions, panel members received feedback on each question in the form of a graph depicting the median PCP response and median orthopedist response from the first round. Panel members were then asked to re-answer these questions using the same 5-point Likert scale.

## RESULTS

### Characteristics of the Delphi Panel

The expert panel comprised 38 clinicians. Of the 178 PCPs invited, 21 volunteered to complete the survey. All 21 volunteers participated in round 1 of the survey and 20 participated in round 2. Of the 24 orthopedic specialists invited, 17 participated in round 1 and 16 participated in round 2 (Table 1).

### Panel Results

In total, there were 214 questions for 36 clinical scenarios. The expert panel reached consensus in 145 (68%) questions. Of these, a total of 110 (51%) questions reached consensus after round 1, and an additional 35 (16%) questions reached consensus after round 2 (Table 2). Figure 3 depicts an example in which consensus was not reached in round 1 but was reached in round 2 in response to the prompt, “A patient with chronic shoulder pain consistent with frozen shoulder (limited active AND passive range of motion (ROM). The PCP should order and review the results of an MRI prior to referral.”

### Figure 2 Sample Survey Questions

**A <65 year old patient with acute knee pain after a fall concerning for ligamentous injury and/or meniscal tear (knee effusion, joint line tenderness, decreased flexion and extension of the knee).**

The following should occur prior to referral to the orthopaedic clinic:

	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1. Plain films	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. MRI	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. Conservative management by the PCP, with written guidance embedded in the referral interface (including activity modification, ice, elevation, NSAIDs)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. Physical therapy for 6 weeks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. Confirmation that the patient is amenable to orthopaedic intervention (e.g. injection, bracing, surgery)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. Management by PCP with electronic consultation by an orthopaedist, in place of a patient visit, could be appropriate for this patient.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

MRI indicates magnetic resonance imaging; NSAIDs, nonsteroidal anti-inflammatory drugs; PCP, primary care provider.

### Table 1. Panel Demographics

	Total, n	Resident, n	PA/NP, n	Attending, n	In Practice >5 Years, n
<b>Round 1 (n = 38)</b>					
Primary care	21	4	1	16	11
Family medicine	2	0	0	2	2
Internal medicine	19	4	1	14	9
Orthopedic	17	0	4	13	13
Foot and ankle	1	0	1	0	0
Hand/upper extremity	2	0	0	2	2
Sports medicine	5	0	0	5	5
Arthroplasty	5	0	2	3	2
Spine	4	0	1	3	4
<b>Round 2 (n = 36)</b>					
Primary care	20	4	1	16	11
Family medicine	2	0	0	2	2
Internal medicine	18	3	1	14	9
Orthopedic	16	0	4	12	11
Foot and ankle	1	0	1	0	0
Hand/upper extremity	2	0	0	2	2
Sports medicine	4	0	0	4	4
Arthroplasty	6	0	3	3	2
Spine	3	0	0	3	3

NP indicates nurse practitioner; PA, physician assistant.

Clinicians agreed that “confirming patient interest in an orthopedic procedure” should be completed prior to referral in 81% of clinical scenarios, as well as specific conservative management steps in 80%, physical therapy in 60%, and x-ray prior to referral in 42% of scenarios. Clinicians agreed an MRI should be completed prior to refer-

**Table 2.** Number of Questions That Reached Consensus

	Number of Questions, n	Consensus Round 1, n	Consensus Round 2, n	Total Consensus n (%)
Total	214	110	35	145 (68%)
Foot and ankle	38	24	5	29 (76%)
Hand and upper extremity	57	36	6	42 (74%)
Hip	18	11	2	13 (68%)
Knee	23	13	3	16 (70%)
Shoulder	36	7	11	18 (50%)
Spine	42	19	8	27 (64%)

ral in only a handful (14%) of clinical scenarios, including acute knee ligament or meniscal tear, acute and chronic full thickness rotator cuff tear, spinal stenosis, and chronic neck pain with radiating arm pain. Clinicians agreed that prior to referral (negative consensus), an x-ray should not be performed in 27% of clinical scenarios and an MRI should not be performed in 58% of clinical scenarios. The panel agreed that “non–face-to-face electronic consultation (eConsult)” could be appropriate in 39% of clinical scenarios and inappropriate in 1 of 36 (3%) clinical scenarios. The Delphi survey results, organized by clinical scenario, are presented in **Table 3**.

Of the questions in which no consensus was reached (n = 69), 36% lacked consensus within both the PCP and orthopedist groups. For clinical scenarios in which no consensus was reached for x-ray (n = 10), orthopedists agreed that an x-ray should be performed prior to referral in 6 scenarios. For clinical scenarios in which no consensus was reached about “confirming patient interest in an orthopedic procedure” (n = 7), PCPs agreed that confirmation should be performed prior to referral in 5 scenarios. The results of the remaining questions were mixed.

## DISCUSSION

Using the modified Delphi method, we characterized expectations of primary care and orthopedic clinicians at our institution in the management of common musculoskeletal problems at a specific moment in patient care—the point at which the PCP considers referral to a specialist. In the absence of national guidelines delineating which diagnostic or treatment modalities should be completed by the PCP prior to referral, a process for local guideline generation is needed in order to provide nuanced and detailed decision support at the point of referral; the Delphi method proved an effective process to achieve this end. Further, the Delphi method facilitated

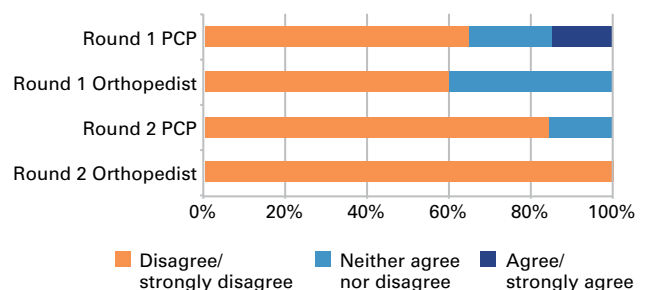
an assessment of PCP and specialist support for using eConsult—a new model of care—for specific clinical conditions in a field that relies heavily on expertise in physical examination.

In its application at UCSF, consensus was identified for imaging and treatment modalities that should be performed in primary care prior to orthopedic consultation in two-thirds of the items examined in the survey. PCPs and orthopedists agreed that specific conservative management measures and physical therapy should

be performed prior to referral for most musculoskeletal problems, an x-ray should be completed prior to referral in less than half of clinical scenarios, and an MRI should be completed prior to referral in only a small number of clinical scenarios. The x-ray and MRI-related findings may help reduce overutilization of expensive tests and reduce unnecessary radiation exposure for patients, as well as identify those clinical cases for which imaging is essential for a successful initial visit with the orthopedist.

Incorporating these findings—along with the specific x-ray views recommended by orthopedists—into guidelines at the point of referral may further reduce unnecessary re-imaging. The near-universal consensus that PCPs should obtain “confirmation that the patient is amenable to orthopedic intervention prior to referral” is striking, and suggests an opportunity to better synchronize expectations. Finally, PCPs and orthopedists at our institution also agreed that “electronic consultation [eConsults]” with an orthopedist may be an appropriate next step for many of the commonly referred musculoskeletal problems.

**Figure 3.** Sample Survey Response\*



MRI indicates magnetic resonance imaging; PCP, primary care provider; ROM, range of motion.  
 \*Survey response to the prompt, “A patient with chronic shoulder pain consistent with frozen shoulder (limited active AND passive ROM): The PCP should order and review the results of an MRI prior to referral.” Consensus was not reached in round 1 and was reached after round 2.

**Table 3. Procedures Endorsed by Consensus for Each Clinical Scenario**

	Procedures Endorsed by Consensus					
	X-Ray	MRI	Conserv Tx	PT	Assess Interest <sup>a</sup>	eConsult
Foot and ankle						
Stable ankle sprain	NC		(+)	NC	(+)	(+)
Chronic pain after ankle sprain	(+)		N/A	N/A	(+)	(+)
Achilles tendinitis			(+)	(+)	(+)	(+)
Plantar fasciitis			(+)	(+)	(+)	(+)
Lisfranc sprain	(+)	NC	NC	NC	(+)	NC
Low-risk foot fracture	N/A		(+)	NC	(+)	(+)
Low-risk toe fracture	N/A		(+)	NC	NC	(+)
Hand and upper extremity						
Hand osteoarthritis	(+)		(+)	(+)	(+)	NC
Dupuytren's contracture			(+)	NC	(+)	NC
Lateral epicondylitis			(+)	(+)	(+)	(+)
Medial epicondylitis			(+)	(+)	(+)	(+)
Trigger finger			(+)	NC	(+)	NC
Carpal tunnel without persistent numbness or atrophy <sup>b</sup>			(+)	NC	(+)	NC
Carpal tunnel with persistent numbness or atrophy <sup>c</sup>				NC	(+)	
Ganglion cyst <sup>d</sup>	NC		(+)	NC	(+)	NC
De Quervain's tenosynovitis			(+)	NC	(+)	NC
Hip						
Hip osteoarthritis	(+)		(+)	NC	(+)	(+)
Labral tear or impingement	(+)	NC	(+)	(+)	(+)	NC
Trochanteric bursitis	NC		(+)	(+)	NC	(+)
Knee						
Knee osteoarthritis	(+)		(+)	(+)	(+)	(+)
Chronic meniscus tear	N/A	NC	(+)	(+)	(+)	NC
Acute ligament or meniscus tear	(+)	(+)	NC	NC	(+)	NC
Patellofemoral pain syndrome	NC		(+)	(+)	NC	(+)
Shoulder						
Chronic partial tear/impingement	NC	NC	(+)	(+)	NC	NC
Chronic full thickness tear	NC	(+)	(+)	NC	NC	NC
Acute partial tear/impingement	(+)	NC	NC	(+)	(+)	NC
Acute full thickness tear	(+)	(+)	NC		(+)	NC
Glenohumeral osteoarthritis	(+)		(+)	(+)	NC	NC
Frozen shoulder	NC		(+)	(+)	NC	NC
Spine						
Chronic low back pain	NC	NC	(+)	(+)	(+)	NC
Chronic low back pain with radiating leg pain	(+)	NC	(+)	(+)	(+)	(+)
Spinal stenosis	(+)	(+)	(+)	(+)	(+)	NC
Acute intractable low back pain with radiating leg pain	NC	NC	NC	(+)	(+)	NC
Chronic neck pain	(+)	NC	(+)	(+)	(+)	NC
Chronic neck pain with radiating arm pain	NC	(+)	(+)	(+)	(+)	(+)
Acute intractable neck pain with radiating arm pain	(+)	NC	NC	(+)	(+)	NC

(+) indicates endorsed by consensus; Conserv, conservative management (specifics vary by clinical scenario); N/A, not applicable (question stem included these interventions as already completed); NC, no consensus; PT, physical therapy; Tx, treatment.

<sup>a</sup>Assess interest = confirmation that the patient is open to orthopedic procedure/surgery.

<sup>b</sup>There was NC for nerve conduction study prior to referral.

<sup>c</sup>There was positive (+) consensus for nerve conduction study prior to referral.

<sup>d</sup>There was NC for ultrasound prior to referral.

Blank cells indicate consensus that the procedure should NOT be completed prior to referral.

## Limitations

The Delphi method is not without limitations. In addition to being time-consuming, study designers may impose preconceptions through the Delphi questions that prevent other perspectives from surfacing. Consensus may represent a middle-of-the-road compromise, eliminating extreme positions and potentially obscuring the best judgment<sup>26</sup>—where consensus is not reached, no guideline results. Furthermore, panel members may have a conflict of interest or not be generally representative. In our study, we sought to ensure the representativeness of the panel by inviting all PCPs and orthopedists at UCSF to participate; among the PCP panel, a broad range of experience is represented, although internists were disproportionately represented over family practice providers. The small number of orthopedists available to participate in the survey for some of the joint-specific questions, due to the subspecialized nature of orthopedic care, is also a limitation.

The specific findings in our health system are local and not necessarily generalizable. Reproduction of the process by individual institutions may have a greater impact than implementation of referral guidelines based on these specific clinical findings. Local implementation of the process has the advantage of engagement of local clinicians in the care delivery improvement effort, as well.

## CONCLUSIONS

The referral process is fundamental to the thoughtful and appropriate use of specialty care in an integrated high-value healthcare system. With the advent of the EHR, we have the opportunity to provide decision support at the moment of referral. Existing guidelines do not typically address this point in the care of a patient and are difficult to create at a national level due to variation in practice patterns. The Delphi method proved to be a feasible and robust way to identify local guidelines for referral appropriateness.

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## eAppendix

Additional sample scenarios:

- A **<65-year-old** patient with **chronic** knee pain consistent with **patellofemoral pain syndrome** (history of overuse, anterior knee pain, tender patellar facets, no effusion, no meniscus or ligamentous exam findings).
- A patient with **acute** ankle pain after a fall consistent with a **grade I (stable) ankle sprain** (negative anterior drawer and talar tilt tests) without evidence of syndesmotic sprain (negative squeeze and external rotation tests) or neurovascular compromise. The patient does NOT meet Ottawa criteria.
- A patient with **acute** shoulder pain after a fall, consistent with **impingement syndrome** due to either partial rotator cuff tear or tendinopathy (limited active range of motion, full passive range of motion, +impingement signs, full rotator cuff strength).
- A patient with **chronic** buttock pain on walking or standing, relieved by sitting or spinal flexion, consistent with **spinal stenosis**. No red flags.
- A **≥65-year-old** patient with **chronic** hip pain localizing to the groin, consistent with **osteoarthritis** (pain and tenderness to palpation with limited range of motion on internal and external rotation).