CHI goes paperless – see back for details

City Health Information

April 2012 The New York City Department of Health and Mental Hygiene Vol. 31(1):1-8

Preventing, Diagnosing, and Managing Osteoarthritis of the Hip and Knee

- **To help prevent osteoarthritis, encourage all patients to follow a healthy diet and be physically active to maintain or lose weight.**
- **To manage osteoarthritis:**
  - **Recommend appropriate weight reduction and low-impact exercise.**
  - **Prescribe nonopioid analgesics as first-line treatment.**

Osteoarthritis is the major cause of chronic musculoskeletal pain and mobility disability in the United States (US) and in New York City (NYC),[1-3] where it was the fifth leading cause of healthy years of life lost in 2005.[4] Osteoarthritis causes weakness and disability, lowers work productivity, results in joint replacement, and generates an estimated $185 billion per year in the US in medical costs.[1,5,6] Osteoarthritis has become more prevalent in recent years. In 2005, an estimated 27 million American adults suffered from symptomatic osteoarthritis of the hips, knees, and hands, up from 21 million in 1995.[7] The lifetime risk of developing knee osteoarthritis is 45% overall, but risks are higher in certain groups (see **Box 1**). People who have had a previous knee injury have a 57% risk of knee osteoarthritis, compared with 42% among those without previous knee injury. Body mass index (BMI) is strongly associated with osteoarthritis of the knee, with risks of 30% for BMI <25, 47% for BMI 25-30, and 60% for BMI>30. Body weight history also has an effect on risk for knee osteoarthritis: people who maintained a healthy weight from age 18 have the lowest lifetime risk (29%), while those who have a healthy weight at age 18 years and gain weight later in life have the highest risk (60%).[8]

BOX 1. COMMON RISK FACTORS FOR OSTEOARTHRITIS OF THE KNEE AND HIP[9,10]

- Age ≥50 years
- Obesity (knee osteoarthritis)
- Being female (especially for knee osteoarthritis)
- Family history
- History of immobilization
- Injury to the joint
- Prolonged occupational or sports stress

Osteoarthritis of the hip affects 4% of women and 6% of men aged ≥55 years in the US, and the risk of developing symptomatic hip osteoarthritis by age 85 is 1 in 4 for both sexes.[11] Obesity does not increase lifetime risk for osteoarthritis of the hip, but it is associated with increased risk for total hip replacement.[12,13]

Because the US population is aging and rates of obesity and overweight are growing, osteoarthritis is likely to affect more and more people in the coming years.[1,14,15]

Primary care providers (PCPs) should:

- Recommend that patients control their weight to reduce pressure on weight-bearing joints.[10,12,16,17]
- Promote low-impact activity, such as walking, aerobic aquatics, and biking, for all patients, including those with mild to moderate arthritis.[11,14,18,19]
- Discuss the potential benefits of physical therapy with patients who have functional limitations.[20]

DIAGNOSING OSTEOARTHRITIS

Osteoarthritis can usually be diagnosed by its symptoms (see **Box 2**), which are typically asymmetrical, unlike symptoms of rheumatoid arthritis.[9,21]

The first and predominant symptom that causes patients to visit their provider is pain. Osteoarthritis pain is intermittent and typically worse during and after weight-bearing activities. Inflammatory flares can occur during the course of the disease, making the pain more intense. Stiffness in the morning or after a period of inactivity is typical. The stiffness generally resolves in minutes, unlike the prolonged (usually >30 min) stiffness caused by rheumatoid arthritis.[2] Osteoarthritis also causes loss of movement or function and crepitus when the involved joint is moved.

BOX 2. CHARACTERISTICS OF OSTEOARTHRITIS OF THE KNEE AND HIP[22,23]

Knee

1. Knee pain for most days of the previous month
2. Crepitus on active joint motion
3. Morning stiffness lasting 30 minutes or less
4. Age ≥50
5. Bony enlargement of the knee on examination
6. Synovial fluid typical of osteoarthritis (viscous, clear, and/or white blood cell count <2,000 cells/mm^3)
7. Osteophytes at joint margins on radiographs[a]

Hip

1. Hip pain for most days of the previous month
2. Morning stiffness of the hip lasting 60 minutes or less
3. Decreased internal rotation, external rotation, and/or flexion of hip on examination
4. Pain with internal rotation of hip on examination
5. Age ≥50
6. Femoral or acetabular osteophytes on radiographs[a]
7. Hip joint space narrowing on radiographs[a]

[a] Use radiographs only if necessary to make diagnosis.

Use medical history to rule out autoimmune disorders or infection.[9] When the diagnosis is not clear from clinical criteria alone,[9,15] radiographs can help distinguish osteoarthritis from other conditions such as rheumatoid arthritis, avascular osteonecrosis, Paget's disease, inflammatory arthropathies, and nontraumatic fractures. Because hip effusion cannot be assessed and crepitus cannot be heard on examination, x-rays may be more necessary to diagnose osteoarthritis of the hip than osteoarthritis of the knee. Blood tests are not routinely needed in cases of clearly defined osteoarthritis.[9] If other diseases (eg, rheumatoid arthritis, gout) are suspected, additional testing may be used to help confirm the diagnosis.

MANAGING OSTEOARTHRITIS

The goals of management are to reduce pain, maintain and/or improve joint mobility, and limit functional impairment.[19] Educating your patients and their families about osteoarthritis self-management (see **Box 3**) can improve patients' ability to manage their condition and can reduce depression and anxiety.[14]

BOX 3. WHAT YOU SHOULD TELL YOUR PATIENTS ABOUT OSTEOARTHRITIS[24,25]

- Osteoarthritis is a common joint disease that is typically seen in middle-aged to older people.
- Osteoarthritis is caused by cartilage breakdown and subsequent changes to the bones of the joints.
- There is no cure for osteoarthritis, but treatment can reduce pain and improve function.
- Pain and symptoms remain mild in some people. In others, osteoarthritis can eventually cause significant disability, but only a small number of patients will require joint replacement surgery.
- Weight loss, regular exercise, and acetaminophen or NSAIDs, such as aspirin or Advil or its generic equivalent, can help with your symptoms.
- Regular exercise will improve muscle strength. Exercises that increase the strength of the quadriceps muscles (the front thigh muscles) also can help decrease knee pain and reduce disability associated with osteoarthritis.
- Taking the medicine immediately before an activity (ie, in the morning, before exercise) may help reduce pain.
- If you begin to lose function, a physical or occupational therapist can help you learn the best exercises for your joints and choose appropriate assistive devices if you need them.
- Over-the-counter supplements such as glucosamine/chondroitin sulfate, calcium and vitamin D, and omega-3 fatty acids haven't been proven to be safe and effective.
- Depression is a common reaction to chronic illnesses such as osteoarthritis. Maintaining a positive attitude can help you manage the disease. Let me know if you begin to feel depressed.

Participants in self-management programs such as the one connected to the Arthritis Foundation (**Resources—CDC Self-Management/Arthritis Foundation**) can build generalizable skills that help limit the long-term impact of the disease.[1] Self-management for people with osteoarthritis includes maintaining a healthy weight, developing regular exercise and relaxation, learning to use medications appropriately, and communicating with health care providers.[14] Nonpharmacological approaches are the best way to manage symptoms, although pharmacological approaches may be necessary.

Weight Management. Recommend that overweight and obese patients lose weight to reduce pressure on the joints.[16] A weight loss of only 5% can significantly reduce osteoarthritis pain and disability.[26] Work with your patients to develop a realistic weight-loss plan that focuses on a reduced-calorie diet and regular exercise. Writing the plan out on a prescription pad will make the patients more likely to follow the advice.[27]

Physical Activity. Adults with arthritis are less likely to engage in leisure-time physical activity,[28] even though low-impact exercise is recommended to improve osteoarthritis symptoms.[1,2,11,15,18-20,29] Encourage your patients to engage in aerobic, muscle-strengthening, range-of-motion, and balance activities (see **Table 1**), using the SMART guidelines (see **Box 4**).[29] Free or low-cost fitness activities are available throughout NYC (**Resources—BeFitNYC**).

Explain that soreness or aching in joints and surrounding muscles during and after exercise is normal, especially in the first 4 to 6 weeks of an exercise program, but sticking with the program will likely provide pain relief and other health benefits in the long run. Patients should contact a health care provider if they have pain that is sharp and stabbing, causes limpness, lasts more than 2 hours after exercise, or gets worse at night, or if there is a large increase in swelling or hot or red joints.[29]

Before recommending an exercise program, evaluate overweight and obese patients, especially those with diabetes, cardiovascular disease, heart murmur, or pulmonary disease,[30] and assess patients aged 65 years and older for gait and balance problems (**Resources—*City Health Information*: Falls**).

Patients with functional limitations may benefit from physical therapy, which can improve muscle strength, joint stability, and mobility.[20] Occupational therapists can help people with osteoarthritis with activities of daily living such as shopping, using transportation, or

TABLE 1. PHYSICAL ACTIVITY RECOMMENDATIONS FOR PEOPLE WITH OSTEOARTHRITIS[29]

Type of Activity	Examples	Recommended Amount per Week	Comments
Low-impact aerobics	Brisk walking Cycling Swimming Water aerobics Gardening Group exercise Dancing	2 hours and 30 minutes moderate-intensity OR 1 hour and 15 minutes vigorous-intensity OR an equivalent combination	One minute of vigorous activity = 2 minutes of moderate activity
Muscle strengthening	Calisthenics Weight training Working with resistance bands	2 or more days per week	Should work all the major muscle groups: legs, hips, back, chest, abdomen, shoulders, and arms
Balance	Standing on one foot Tai chi	3 days per week	If patient is at risk of falling

A general rule for determining whether activity is moderate or vigorous is the talk test: during moderate-intensity activity, a person can talk, but not sing. With vigorous activity, it isn't possible to say more than a few words without pausing for a breath.

toileting.[31] Patients with more advanced osteoarthritis may need canes and other assistive devices,[2,16,20] which in some cases may be paid for by Medicaid or Medicare. An occupational or physical therapist should fit the device and train the patient in its use (**Resources—*City Health Information*: Falls**).

Some patients may ask about seeking acupuncture treatment to help manage their osteoarthritis. Acupuncture is not more effective than exercise and does not result in greater improvement when added to an exercise-based physiotherapy program.[32]

Pharmacological approaches. Some patients find that taking medication before they typically feel pain (in the morning, before exercise) can help them manage their osteoarthritis more effectively. The first-line treatment for mild to moderate osteoarthritis pain is acetaminophen, because of its cost, efficacy, and few side effects.[16,20,33] The maximum daily dose has been reduced to 3000 mg/day.[34] If prescribing the maximum dose, counsel the patient to avoid all other products that contain acetaminophen, including over-the-counter cold remedies and combination products with opioid analgesics.[20] Oral NSAIDs such as ibuprofen, naproxen, and aspirin may also be used if acetaminophen is

BOX 4. *SMART* PHYSICAL ACTIVITY TIPS FOR PEOPLE WITH ARTHRITIS[29]

Start low, and go slow: for example, be active for 3 to 5 minutes 2 times a day and increase activity in small amounts.

Modify activity when arthritis symptoms increase, and try to stay active. If your symptoms increase, you can modify your activity instead of stopping completely. Decrease the frequency, duration, or intensity, or try a different activity.

Activities should be "joint friendly." Choose activities that are easy on the joints like walking, bicycling, water aerobics, or dancing. These activities have a low risk of injury and do not twist or "pound" the joints too much.

Recognize safe places and ways to be active. For example, for walking, find sidewalks or pathways that are level, free of obstructions, well-lighted, and separated from heavy traffic.

Talk to a health professional or certified exercise specialist about your activity program.

ineffective. Use oral NSAIDs with caution in patients with cardiovascular risk factors,[16] peptic ulcer disease, or renal disease.[2] Use NSAIDs at the lowest effective dose for the shortest duration necessary to control symptoms.[16] Topical NSAIDs may also be used in patients at risk for gastrointestinal adverse events and are recommended for treating osteoarthritis of the knee in patients aged ≥75 years.[20] With the exception of diclofenac, topical agents have not been proven to be as effective in controlling osteoarthritis pain as oral NSAIDs.[35] Topical NSAIDs should not be administered with oral NSAIDs due to increased risk of gastrointestinal adverse events.[36] Dietary supplements such as glucosamine, chondroitin, fish oil, and vitamin D/calcium have not proven effective against osteoarthritis pain.[37-40]

Do not prescribe opioids for osteoarthritis unless other pain management approaches have been ineffective. Opioids have not proven to be effective for chronic noncancer pain and their use carries serious risks.[41]

Reassess medication dosages at every visit and review all medications patients are taking, including over-the-counter drugs and supplements. Nearly 1 in 25 older adults may be at risk for major drug-drug interactions,[42] so it is important to review all medications patients are taking, considering side effects, age-associated drug metabolism changes, and drug-drug interactions to determine which medications are necessary and appropriate.[43,44]

If pain persists despite medication, intra-articular (IA) corticosteroids may be used for short-term pain relief, but these are unlikely to provide pain relief after 1 year, even with injections every 3 months.[40] Injections of IA hyaluronic acid are as effective as IA corticosteroid injections.[40] Arthroscopic lavage/debridement is not an effective surgical treatment.[40,45]

If osteoarthritis pain and functional limitations persist or worsen despite conservative medical interventions including physical therapy, refer patient to an orthopedist for possible joint arthroplasty.[20]

DEPRESSION

Depression rates are higher among people with chronic illness.[46] Interventions that also treat depression improve arthritis-associated outcomes such as pain severity and activities of daily living.[47] Screen all patients with osteoarthritis for depression using the PHQ-2 (see **Box 5**), and treat them for depression as needed (**Resources—*City Health Information*: Depression**).

BOX 5. PATIENT HEALTH QUESTIONNAIRE (PHQ-2)

Over the past 2 weeks, have you been bothered by:

- Little interest or pleasure in doing things?
- Feeling down, depressed, or hopeless?

A "yes" to either question requires further evaluation with the Patient Health Questionnaire-9 (PHQ-9) (**Resources—*City Health Information*: Depression**).

SUMMARY

Osteoarthritis is a serious public health problem that causes pain and loss of mobility disability for millions of Americans and is likely to increase in prevalence because of the aging population and higher rates of obesity. There is no cure for osteoarthritis, but maintaining a healthy weight, physical activity, and, if necessary, pharmacological treatments can reduce pain, maintain or improve joint mobility, and limit functional impairment. ◆

RESOURCES

For Providers

New York City Department of Health and Mental Hygiene, *City Health Information*:

- Preventing and Managing Overweight and Obesity in Adults: www.nyc.gov/html/doh/downloads/pdf/chi/chi26-4.pdf
- Age-Friendly Primary Care: www.nyc.gov/html/doh/downloads/pdf/chi/chi28-8.pdf
- Preventing Falls in Older Adults in the Community: www.nyc.gov/html/doh/downloads/pdf/chi/chi29-4.pdf
- Detecting and Treating Depression in Adults: www.nyc.gov/html/doh/downloads/pdf/chi/chi26-9.pdf

Centers for Disease Control and Prevention

- Arthritis Program: www.cdc.gov/arthritis/index.htm

American College of Rheumatology

- 2012 Recommendations for the Use of Nonpharmacologic and Pharmacologic Therapies in Osteoarthritis of the Hand, Hip, and Knee: www.rheumatology.org/practice/clinical/guidelines/oa-mgmt.asp

For Patients

Information

- New York City Department of Health and Mental Hygiene. Physical Activity and Nutrition: www.nyc.gov/html/doh/html/cdp/cdp_pan.shtml
- US Department of Health and Human Services/US Department of Agriculture. Finding Your Way to a Healthier You: www.health.gov/dietaryguidelines/dga2005/document/pdf/brochure.pdf
- Centers for Disease Control and Prevention. Physical Activity for Arthritis: www.cdc.gov/arthritis/pa_factsheet.htm
- Arthritis Foundation. Managing Your Pain: To request a free brochure, go to www.afstore.org/Products-By-Type/Pain_6/MANAGING-YOUR-PAIN-FREE-PDF
- American College of Rheumatology. Osteoarthritis: www.rheumatology.org/practice/clinical/patients/diseases_and_conditions/osteoarthritis.asp
  Spanish version: www.rheumatology.org/practice/clinical/patients/diseases_and_conditions/osteoarthritis-esp.asp
- National Institutes of Health. What is Osteoarthritis? www.niams.nih.gov/Health_Info/Osteoarthritis/osteoarthritis_ff.asp
- Agency for Health Care Quality and Research. Osteoarthritis of the Knee: A Guide for Adults: http://effectivehealthcare.ahrq.gov/ehc/products/89/132/04082009_OsteoKneeConsumer.pdf
  or call 800-358-9295
  Spanish version: http://effectivehealthcare.ahrq.gov/ehc/products/89/513/Osteo%20spanish.pdf
- Arthritis Foundation. Practice Relaxation: www.arthritis.org/practice-relaxation.php

Programs

- Centers for Disease Control and Prevention. Arthritis Self-Management Education: www.cdc.gov/arthritis/interventions/self_manage.htm
- New York City Department of Health and Mental Hygiene. BeFitNYC: www.nycgovparks.org/befitnyc
  Searchable listings of free or low-cost fitness activities
- Arthritis Foundation New York Chapter. Programs for Better Living: www.arthritis.org/new-york/newyorkchapter.phpl
  (212) 984-8730
  info.ny@arthritis.org
  Directory of aquatic, exercise, and tai chi programs. Contact individual program site for days/times and information.
- New York City Department for the Aging Senior Centers: www.nyc.gov/html/dfta/html/services/centers.shtml
  Locate senior centers offering health promotion programs such as exercise classes, walking clubs, and discussion groups.

REFERENCES

1. Centers for Disease Control and Prevention and the Arthritis Foundation. *A National Public Health Agenda for Osteoarthritis 2010*. www.cdc.gov/arthritis/docs/OAagenda.pdf. Accessed February 8, 2012.
2. Manek NJ, Lane NE. Osteoarthritis: Current concepts in diagnosis and management. *Am Fam Physician*. 2000;61(6):1795-1804.
3. Peat G, McCarney R, Croft P. Knee pain and osteoarthritis in older adults: a review of community burden and current use of primary health care. *Ann Rheum Dis*. 2001;60(2):91-97.
4. New York City Department of Health and Mental Hygiene. Disability-adjusted life years (DALYs) in New York City. Epi Data Tables. October 2011. No. 11. www.nyc.gov/html/doh/downloads/pdf/epi/datatable11.pdf. Accessed February 8, 2012.
5. DiBonaventura MC, Gupta S, McDonald M, Sadosky A. Evaluating the health and economic impact of osteoarthritis pain in the workforce: results from the National Health and Wellness Survey. *BMC Musculoskel Disord*. 2011;12:83. www.biomedcentral.com/1471-2474/12/83. Accessed March 29, 2012.
6. Kotlarz H, Gunnarsson CL, Fang H, Rizzo JA. Insurer and out-of-pocket costs of osteoarthritis in the US: evidence from national survey data. *Arthritis Rheum*. 2009;600(12):3546-3543.
7. Lawrence RC, Felson DT, Helmick CG, et al. Estimates of the prevalence of arthritis and other rheumatic conditions in the United States. Part II. *Arthritis Rheum*. 2008;58(1):26-35.

8. Murphy L, Schwartz TA, Helmick CG, et al. Lifetime risk of symptomatic knee osteoarthritis. *Arthritis Rheum*. 2008;59(9): 1207-1013.
9. Bijslma JW, Berenbaum F, Lafeber FP. Osteoarthritis: an update with relevance for clinical practice. *Lancet*. 2011;377(9783): 2115-2126.
10. Hinton R, Moody RL, Davis AW. Osteoarthritis: diagnosis and therapeutic considerations. *Am Fam Physician*. 2002;65(5): 841-848.
11. Centers for Disease Control and Prevention. Arthritis Spotlight. www.cdc.gov/arthritis/resources/spotlights/lifetime-risk.htm. Accessed March 19, 2012.
12. Apold H, Meyer HE, Espehaug B, Nordsletten L, Havelin LI, Flugsrud GB. Weight gain and the risk of total hip replacement: a population-based prospective cohort study of 265,725 individuals. *Osteoarthritis Cartilage*. 2011;19(7):809-815.
13. Harms S, Larson R, Sahmoun AE, Bea JR. Obesity increases the likelihood of total joint replacement surgery among younger adults. *Int Orthopaedics*. 2007;31(1):23-26.
14. Hootman JM, Helmick CG, Brady TJ. A public health approach to addressing arthritis in older adults: the most common cause of disability. *Am J Public Health*. 2012;102(3):426-433.
15. Hunter DJ, Neogi T, Hochberg MC. Quality of osteoarthritis management and the need for reform in the US. *Arthritis Care Res (Hoboken)*. 2011;63(1):31-38.
16. Zhang W, Moskowitz RW, Nuki G, et al. OARSI recommendations for the management of hip and knee osteoarthritis, Part II: OARSI evidence-based, expert consensus guidelines. *Osteoarthritis Cartilage*. 2008;16(2):137-162.
17. Felson DT, Zhang Y, Anthony JM, Naimark A, Anderson JJ. Weight loss reduces the risk for symptomatic osteoarthritis in women. The Framingham Study. *Ann Intern Med*. 1992;116(5):35-39.
18. Hochberg MC, Altman RD, Brandt KD, et al. Guidelines for the medical management of osteoarthritis. Part I. Osteoarthritis of the hip. *Arthritis Rheum*. 1995;38(11):1535-1540.
19. Hochberg MC, Altman RD, Brandt KD, et al. Guidelines for the medical management of osteoarthritis. Part II. Osteoarthritis of the knee. *Arthritis Rheum*. 1995;38(11):1541-1546.
20. Hochberg MC, Altman RD, April KT, et al. American College of Rheumatology 2012 recommendations for the use of nonpharmacologic and pharmacologic therapies in osteoarthritis of the hand, hip, and knee. *Arthritis Care Res*. 2012;64(4):465-474.
21. Markerson JA. An in-depth overview of osteoarthritis. www.hss.edu/professional-conditions_an-in-depth-overview-of-osteoarthritis.asp#Clinical_Presentation. Accessed February 8, 2012.
22. Altman R, Asch E, Bloch D, et al. Development of criteria for the classification and reporting of osteoarthritis. Classification of osteoarthritis of the knee. Diagnostic and Therapeutic Criteria Committee of the American Rheumatism Association. *Arthritis Rheum*. 1986;29(8):1039-1049.
23. Altman R, Alarcón G, Applerouth D, et al. The American College of Rheumatology criteria for the classification and reporting of osteoarthritis of the hip. *Arthritis Rheum*. 1991;34(5):505-514.
24. Roddy E, Zhang W, Doherty M. Aerobic walking or strengthening exercise for osteoarthritis of the knee? A systematic review. *Ann Rheum Dis*. 2005;64(4):544-548.
25. American College of Rheumatology. Patient education: osteoarthritis. www.rheumatology.org/practice/clinical/patients/diseases_and_conditions/osteoarthritis.asp. Accessed March 30, 2012.
26. Messier SP, Loeser RF, Miller GD, et al. Exercise and dietary weight loss in overweight and obese older adults with knee osteoarthritis: the Arthritis, Diet, and Activity Promotion Trial. *Arthritis Rheum*. 2004;50(5):1501-1510.
27. Swinburn BA, Walter LG, Arroll B, Tilyard MW, Russell DG. The green prescription study: a randomized controlled trial of written exercise advice provided by general practitioners. *Am J Public Health*. 1998;88(2):288-291.
28. Centers for Disease Control and Prevention. State-specific prevalence of no leisure-time physical activity among adults with and without doctor-diagnosed arthritis—United States, 2009. *MMWR Morb Mortal Wkly Rep*. 2011;60(48):1641-1645.
29. Centers for Disease Control and Prevention. Physical Activity for Arthritis. www.cdc.gov/arthritis/pa_factsheet.htm?s_cid= arthritis-bb-003. Accessed March 9, 2012.
30. Berger DK, Lee KK, Silver LD. Preventing and managing overweight and obesity in adults. *City Health Information*. 2007;26(4):23-30.
31. Agency for Healthcare Research and Quality. Managing osteoarthritis: helping the elderly maintain function and mobility. *Research in Action*. 2002; issue 4. www.ahrq.gov/research/osteoria/osteoria.htm#self-manage. Accessed April 4, 2012.
32. Manheimer E, Cheng K, Linde K, et al. Acupuncture for peripheral joint osteoarthritis (review). *Cochrane Database Syst Rev*. 2010;1:CD001977.
33. Holzer SS, Cuerdon T. Development of an economic model comparing acetaminophen to NSAIDs in the treatment of mild-to-moderate osteoarthritis. *Am J Manag Care*. 1996;2(6 suppl): S15-S26.
34. McNeil Consumer Health Care announces plans for new dosing instructions for Tylenol® products. Fort Washington, PA: McNeil Consumer Health Care; July 28, 2011. www.jnj.com/connect/news/all/mcneil-consumer-healthcare-announces-plans-for-new-dosing-instructions-for-tylenol-products. Accessed April 16, 2012.
35. Voltaren® Gel prescribing information. www.voltarengel.com/common/pdf/Voltaren-PI-10-19.pdf. Accessed April 16, 2012.
36. Chou R, McDonagh MS, Nakamoto E, Griffin J; Oregon Evidence-based Practice Center. *Analgesics for Osteoarthritis: An Update of the 2006 Comparative Effectiveness Review*. AHRQ Publication No. 11(12)-EHC076-EF. Rockville, MD: Agency for Healthcare Research and Quality. Published October 2011. www.effectivehealthcare.ahrq.gov/reports/final.cfm. Accessed March 29, 2012.
37. Clegg DO, Reda DJ, Harris CL, et al. Glucosamine, chondroitin sulfate, and the two in combination for painful knee osteoarthritis. *N Engl J Med*. 2006;354(8):795-808.
38. Hochberg MC. Nutritional supplements for knee osteoarthritis—still no resolution. *N Engl J Med*. 2006;354(8):858-860.
39. Towheed T, Maxwell L, Anastassiades TP, et al. Glucosamine therapy for treating osteoarthritis (review). *Cochrane Database Syst Rev*. 2005;2:CD002946.
40. Zhang W, Nuki G, Moskowitz RW, et al. OARSI recommendations for the management of hip and knee osteoarthritis, Part III: changes in evidence following systematic cumulative update of research published through January 2009. *Osteoarthritis Cartilage*. 2010;18(4):476-499.
41. Paone D, Dowell D, Heller D. Preventing misuse of prescription opioid drugs. *City Health Information*. 2011;30(4):23-30.
42. Qato DM, Alexander CG, Conti RM, Johnson M, Schumm P, Lindau ST. Use of prescription and over-the-counter medications and dietary supplements among older adults in the United States. *JAMA*. 2008;300(24):2867-2878.
43. Reuben DB, Herr KA, Pacala JT, et al. *Geriatrics at Your Fingertips: 2007-2008*. 9th ed. New York, NY: The American Geriatrics Society; 2007.
44. Fick DM, Cooper JW, Wade WE, Waller JL, Maclean JR, Beers MH. Updating the Beers criteria for potentially inappropriate medication use in older adults; results of a US consensus panel of experts. *Arch Intern Med*. 2003;163(22):2716-2724.
45. Moseley JB, O'Malley K, Petersen NJ, et al. A controlled trial of arthroscopic surgery for osteoarthritis of the knee. *N Engl J Med*. 2002;347(2):81-88.
46. US Department of Health and Human Services. Mental Health: A Report of the Surgeon General. www.surgeongeneral.gov/library/mentalhealth/chapter5/sec3.html. Accessed February 8, 2012.
47. Lin EH. Depression and osteoarthritis. *Am J Med*. 2008;121(11 suppl 2):S16-S19.

City Health Information

NYC Health
nyc.gov/health

April 2012 The New York City Department of Health and Mental Hygiene Vol. 31(1):1-8

42-09 28th Street, Long Island City, NY 11101 (347) 396-2914

E-mail *City Health Information* at: nycdohrp@health.nyc.gov
Suggested citation: Morrison J, Kang J, Ephross P. Preventing, diagnosing, and managing osteoarthritis of the hip and knee. *City Health Information*. 2012;31(1):1-8.

CHI Goes Paperless:

The New York City Department of Health and Mental Hygiene is pleased to announce that *City Health Information* is now a paperless publication, reformatted for electronic distribution and available only by subscription or at www.nyc.gov/health. If you have not already subscribed, subscribe today at www.nyc.gov/health/chi.