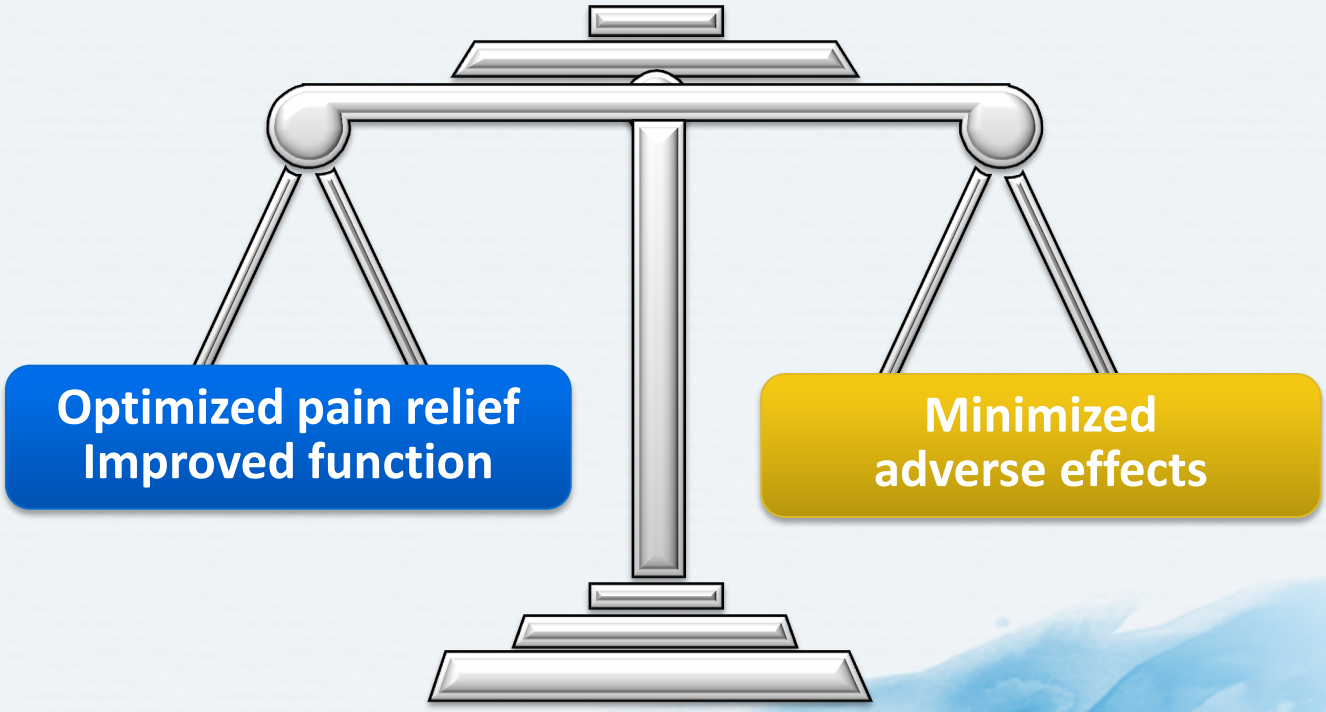
MANAGEMENT

Goals of Treatment

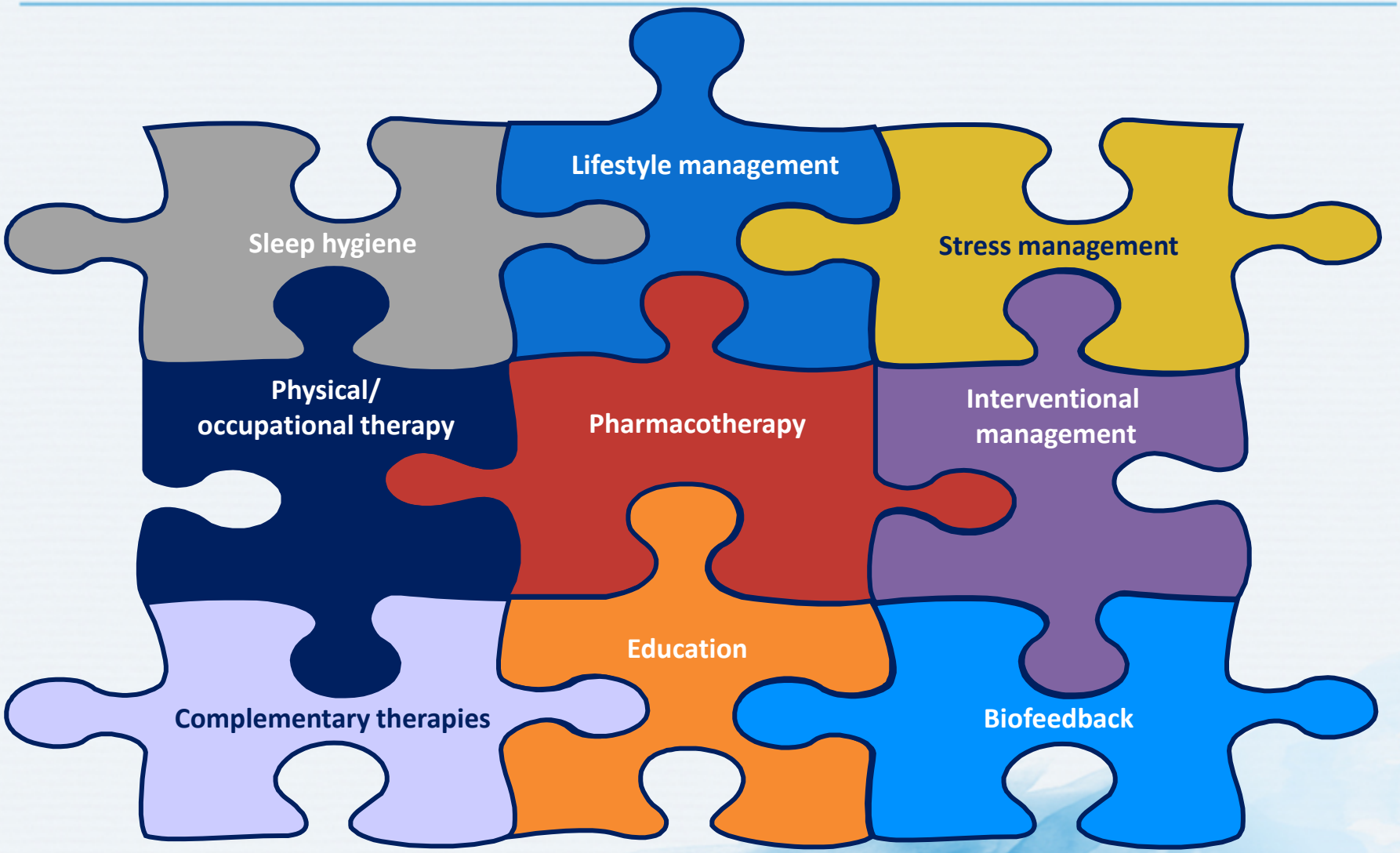
Goals in Pain Management

- Involve the patient in the decision-making process
- Agree on realistic treatment goals **before** starting a treatment plan



Farrar JT *et al. Pain* 2001; 94(2):149-58; Gilron I *et al. CMAJ* 2006; 175(3):265-75.

Multimodal Treatment of Low Back Pain



Gatchel RJ *et al. Psychol Bull* 2007; 133(4):581-624; Institute of Medicine. *Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research*; National Academies Press; Washington, DC: 2011; Mayo Foundation for Medical Education and Research. *Comprehensive Pain Rehabilitation Center Program Guide.* Mayo Clinic; Rochester, MN: 2006.

Non-pharmacological Treatment

Non-pharmacological Treatments for Low Back Pain

Moderate Evidence of Effectiveness	
Therapy and exercise	Moderately effective in pain relief and functional improvement in adults with low back pain
Cognitive-behavioral therapy	May reduce pain and disability in patients with chronic and subacute low back pain
Intensive multidisciplinary biopsychosocial rehab	
Massage	
Yoga	
Heat therapy	
Medium-firm mattres	
Transcutaneous electrical nerve stimulation	Controversial with evidence both for and against
Sufficient Evidence of Effectiveness	
Function-centered treatment	More effective than pain-centered treatment for an increase in days able to work in patients with subacute low back pain lasting more than 6 weeks
Acupuncture	More effective than conventional therapy but not more effective than sham acupuncture

Evidence suggests bed rest and traction are **NOT** useful

Chou R *et al. Spine (Phila PA 1976)* 2009; 34(10):1066-77; Dagenais S *et al. Spine J* 2008; 8(1):203-12; Gay RE, Brault JS. *Spine J* 2008; 8(1):234-42; Hagen *KB et al. Spine (Phila PA 1976)* 2005; 30(5):542-6; Oleske D *et al. Spine 2007; 3*2(19):2050-7; Pillastrini P *et al. Joint Bone Spine* 2012*;* 79(2):176-85; Ramos-Remus CR *et al. Curr Med Res Opin* 2004; 20(5):691-8; Romanò CL *et al. J Orthop Traumatol* 2009; 10(4):185-91; Sakamoto C, Soen S. *Digestion* 2011; 83(1-2):108-23; Savigny P *et al. Low Back Pain: Early Management of Persistent Non-specific Low Back Pain*. National Collaborating Centre for Primary Care and Royal College of General Practitioners; London, UK: 2009; Toward Optimized Practice. *Guidelines for the Evidence-Informed Primary Care Management of Low Back Pain.* Edmonton, AB: 2009.

Recommended Approach for Treatment of Low Back Pain

The multidisciplinary approach and combined physical and psychological interventions with cognitive behavioral therapy and exercise are highly recommended for patients with a high degree of disability and/or significant psychological distress and who have received at least one intensive treatment.

Pillastrini P *et al. Joint Bone Spine* 2012; 79:176-85.

Return to Work Recommendations for Patients with Low Back Pain

- **High Level of Evidence**
  - **Acute low back pain** (duration <6 weeks), non-specific or associated with neuropathic pain (mixed):
    - Patients should remain active
    - Patients should continue everyday occupational activities with some initial restrictions
    - Look for yellow flags, especially psychosocial occupational factors
  - **Subacute low back pain** (duration of 6–12 weeks):
    - Continue to look for yellow flags
    - Refer patient to an intensive rehabilitation program
    - Encourage patients to remain active

Costa-Black K *et al. Best Pract Res Clin Rheumatol* 2010; 24(2):227–40.

Therapeutic Recommendations for Patients with Low Back Pain

- **Manual therapy** (moderate level of evidence):
  - Techniques should be performed by trained and certified personnel
  - Techniques should never be performed if red flags are present
  - Techniques include:
- **Spinal manipulation**
  - In acute and chronic pain
  - May lead to short-term improvements
- **Massage**
- **Osteopathy**

Bronfort G *et al. Spine J* 2008; 8(1):213-25; Chou R *et al. Ann Intern Med* 2007; 147(7):478-91; Dagenais S *et al. Spine J* 2008; 8(1):142-9; Imamura M *et al. Spine J* 2008; 8(1):121-33; Pillastrini P *et al. Joint Bone Spine* 2012; 79(2):176-85; Senna MK, Machaly SA *Spine* 2011; 36(18):1427-37.

Therapeutic Recommendations for Patients with Low Back Pain (cont'd)

- **Intensive interdisciplinary rehabilitation (moderate quality of evidence)**
  - Physical activity and exercise therapy
  - Use actively in subacute and chronic low back pain
  - No one technique is better than others
  - Techniques include:
    - **Back school**
    - **Aerobics**
    - **Stretching**
    - **Hydrotherapy**
    - **Lumbar stabilization exercises**

Chou R *et al. Ann Intern Med* 2007; 147(7):478-91; May S, Donelson R. *Spine J* 2008; 8(1):134-41;
Pillastrini P *et al. Joint Bone Spine* 2012; 79(2):176-8; Standaert CJ *et al. Spine J* 2008; 8(1):114-20; Wai EK *et al. Spine J* 2008; 8(1):195-202.

Therapeutic Recommendations for Patients with Low Back Pain (cont'd)

- **Acupuncture** (moderate quality of evidence)
  - Must be prescribed as a complement and part of an interdisciplinary process
- **Yoga** (moderate quality of evidence)
- **Interdisciplinary work**
  - Teamwork (pain clinics) (convincing quality of evidence)
- **Cognitive behavioral therapy** (moderate quality of evidence)
  - Biological, psychological and social factors must be addressed simultaneously
  - Must be combined with other therapies
  - Acts on affective stress, self-sufficiency, catastrophic thinking, secondary gains

Ammendolia C *et al. Spine J* 2008; 8(1):160-72; Chou R *et al. Ann Intern Med* 2007; 147(7):478-91;
Furlan AD *et al. Cochrane Database Syst Rev* 2008; 4:CD001929; Gatchel RJ *et al. Spine J* 2008; 8(1):40-4;
Lewis K, Abdi S. *Clin J Pain* 2010; 26(1):60-9; Pillastrini P *et al. Joint Bone Spine* 2012; 79(2):176-85; Pradhan BB. *Spine J* 2008; 8(1):253-7.

Therapeutic Recommendations for Patients with Low Back Pain (cont'd)

- **Physical measures**
  - **Superficial heat (good evidence)** - only in acute low back pain
  - **Interferential currents**
  - **Muscle stimulation with electricity**
  - **Ultrasound**
  - **Cold and hot packs**
  - **Transcutaneous electrical nerve stimulation**

Little evidence to recommend

Chou R *et al. Ann Intern Med* 2007; 147(7):492-504; French SD *et al. Spine (Phila Pa 1976)* 2006; 31(9):998-1006; Poitras S, Brosseau L. *Spine J* 2008; 8(1):226-33.

Vitamins and Herbal Products for Management of Low Back Pain

- Vitamins include B1, B6, B12 and C
- Minerals include zinc and manganese
- Other products include glucosamine, devil's claw, willow bark, capsicum and bromelina
- Mechanisms of action are unknown
  - Some B vitamins may have anti-inflammatory and anti-nociceptive properties
- Evidence is insufficient to recommend any of these products for management of low back pain

Gagnier JJ. *Spine J* 2008; 8(1):70-9.

Approaches with No Therapeutic Recommendation for Management of Low Back Pain

- **Bed rest**
- **Traction** (sustained or intermittent)
- **External lumbar support**
- **Laser therapy**
- **Biofeedback**
- **Prolotherapy**
  - Sclerosing injection of 20–30 mL of a mixture of dextrose, glycerin, phenol and lidocaine to affected joints or ligaments

Dagenais S *et al. Spine J* 2008; 8(1):203-12; Gay RE, Brault JS. *Spine J* 2008; 8(1):234-42; Hagen KB *et al. Spine (Phila Pa 1976)* 2005; 30(5):542-6; Oleske DM *et al. Spine (Phila Pa 1976)* 2007; 32(19):2050-7; Pillastrini P *et al. Joint Bone Spine* 2012; 79(2):176-85.

Surgery to Relieve Low Back Pain

- Quality of evidence is weak and contradictory
  - Patients with depression, neurosis, secondary gain, lawsuits, and certain personality disorders are not candidates for surgery and must be treated conservatively
  - Establish the exact cause of chronic low back pain
  - Degenerative changes cannot be the only reasons
  - Surgery not useful in the presence of instability, serious pathology or neural compression
  - There are no differences among various elements for fusion
  - In radiculopathy, early surgery improves pain more rapidly than conservative treatment
    - Final result at 24 months is the same with or without surgery
  - In spinal stenosis, surgery provides more relief than conservative treatment

Daubs MD *et al. Spine (Phila Pa 1976)* 2011; 36(21 Suppl):S96-109; Don AS, Carragee E. *Spine J* 2008; 8(1):258-65;
Jacobs WC *et al. Eur Spine J* 2011; 20(4):513-22; Kovacs FM *et al. Spine (Phila Pa 1976)* 2011; 36(20):E1335-51;
Martin CR *et al. Spine (Phila Pa 1976)* 2007; 32(16):1791-8; Mirza SK, Deyo RA. *Spine (Phila Pa 1976)* 2007; 32(7):816-23;
Mroz TE et al. *Spine (Phila Pa 1976)* 2011; 36(21 Suppl):S75-86; Weinstein JN *et al. N Engl J Med* 2007; 356(22):2257-70;

Surgical Procedures Not Recommended

- **Quality of evidence convincing for negative recommendation**
  - **Disc arthroplasty**
    - No differences from arthrodesis (fusion)
    - Poor results in cases of non-specific lower back pain
  - **Dynamic stabilization** (dynamic or static spacers)
    - No evidence supports use in chronic low back pain
  - **Intradiscal electrotherapy (IDET)**
    - Very modest pain relief
  - **Nucleoplasty**
    - Improvement in axial pain is less than 50%

Carragee EJ. *Current Orthopaedics* 2007; 21(1):9-16; Derby R *et al. Spine J* 2008; 8(1):80-95; Derby R *et al. Spine J* 2008; 8(1):150-9; Don AS, Carragee E. *Spine J* 2008; 8(1):258-65.

Invasive/Surgical Treatment for Low Back Pain*

Procedure	Details
Spinal cord stimulation	• May reduce pain in patients for whom surgery was unsuccessful
Facet/epidural steroid injection	• NO significant differences in control of low back pain at 24 hours, 3–6 months or 1 year post-injection • No significant differences in average functional disability or need for surgery
Spinal surgery *In situ* fusion/posterior instrumentation/ anterior instrumentation	• NO significant differences compared to conservative management plus rehabilitation exercises. • Surgical procedures increase index of fusion, but do NOT improve clinical results • Surgical procedures result in more complications

***Level of evidence is moderate for all procedures listed**

Brox JI *et al. Spine (Phila Pa 1976)* 2003; 28(17):1913-21; Chou R *et al. Spine (Phila Pa 1976)* 2009 May 1;34(10):1066-77;
Manchikanti L *et al. Pain Physician* 2009; 12(4):699-802; Ramos-Remus CR *et al. Curr Med Res Opin* 2004; 20(5):691-8;
Savigny P *et al. Low Back Pain: Early Management of Persistent Non-specific Low Back Pain*. National Collaborating Centre for Primary Care and Royal College of General Practitioners; London, UK: 2009; Staal JB *et al. Spine (Phila Pa 1976)* 2009; 34(1):49-59;
Toward Optimized Practice. *Guidelines for the Evidence-Informed Primary Care Management of Low Back Pain.* Edmonton, AB: 2009.

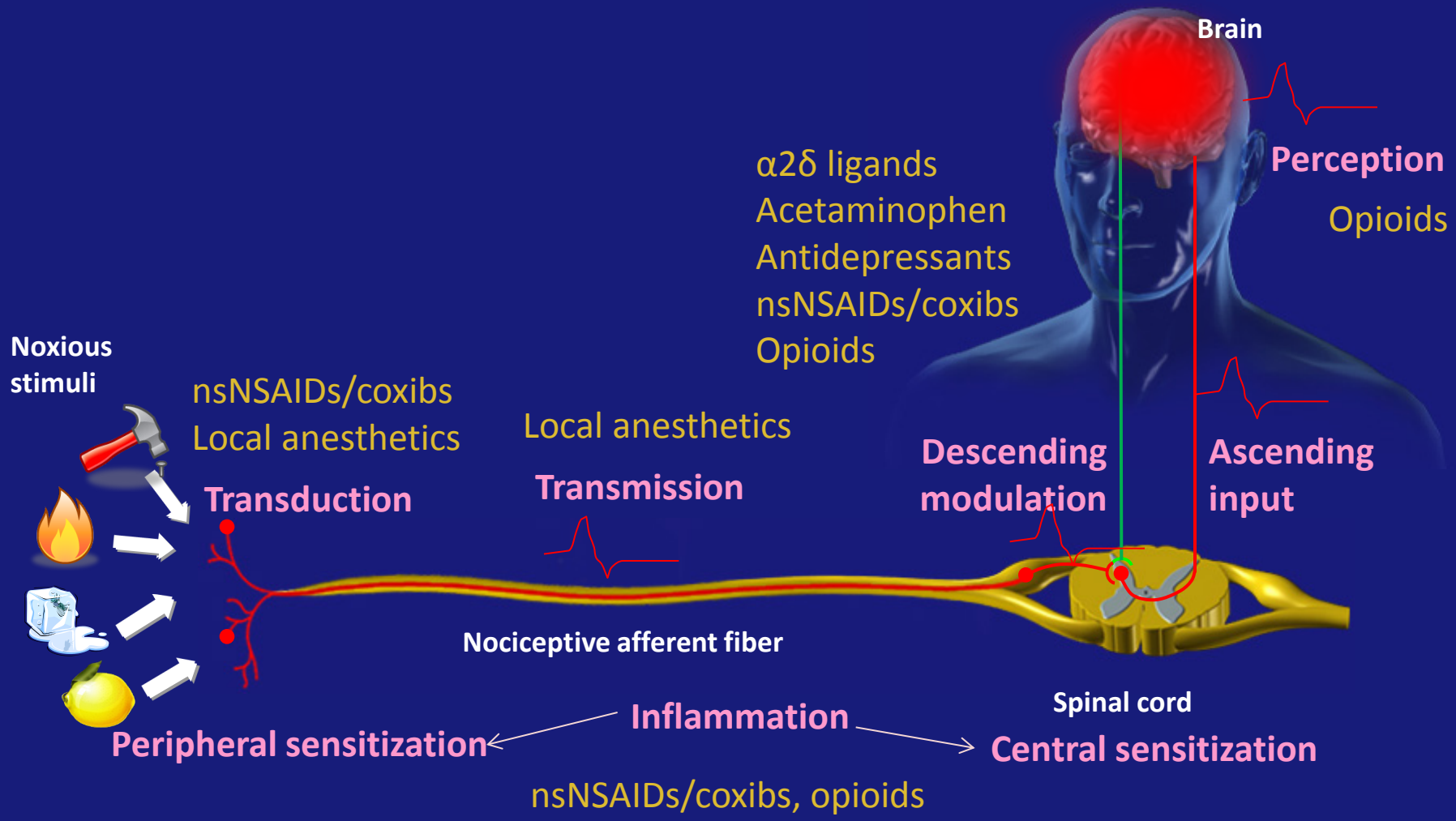
Pharmacological Treatment

Pharmacotherapy for Low Back Pain

- Treatment must balance patient expectations for pain relief and possible analgesic effect of therapy
- Patients should be educated about the medication, treatment objectives and expected results
- Psychosocial factors and emotional distress are stronger predictors of treatment outcome than physical examination findings or the duration and severity of pain

Miller S. *Prim Care* 2012; 39(3):499-510.

Mechanism-Based Pharmacological Treatment of Nociceptive/Inflammatory Pain



Coxib = COX-2 inhibitor; nsNSAID = non-specific non-steroidal anti-inflammatory drug

Scholz J, Woolf CJ. *Nat Neurosci* 2002; 5(Suppl):1062-7.

Acetaminophen for Management of Low Back Pain

Efficacy	Safety	Mechanism of Action
• Effective • Efficacy improved by addition of nsNSAIDs or coxibs	• Favorable safety profile and low cost • May cause liver damage at doses higher than 4 g/day	• Unclear

Acetaminophen is the first-line option in acute and chronic low back pain.

Coxib = COX-2-specific inhibitor; nsNSAID = non-selective non-steroidal anti-inflammatory drug

Chou R *et al. Ann Intern Med* 2007; 147(7):505-14; Lee C *et al. Arthritis Rheum* 2004; 51(5):746-54; Lee J *et al. Br J Anaesth* 2013; 111(1):112-20; Mattia A, Coluzzi F. *Minerva Anestesiol* 2009; 75(11):644-53; Watkins PB *et al. JAMA* 2006; 296(1):87-93.

nsNSAIDs/Coxibs for Management of Low Back Pain

Efficacy	Safety	Mechanism of Action
• Effective • More effective than acetaminophen alone • Improved efficacy in combination with acetaminophen	• Gastrointestinal risk • Cardiovascular risk • Renal risk	• Block action of COX-2 enzyme, which is induced by inflammatory stimuli and results in increased production of prostaglandins • Coxibs specifically inhibit COX-2, while nsNSAIDs block action of COX-2 and COX-1 enzyme, which is involved in gastrointestinal cytoprotection and platelet activity

First-line option in acute and chronic low back pain

CI = confidence intervall; coxib = COX-2-specific inhibitor;
nsNSAID = non-selective non-steroidal anti-inflammatory drug; RR = relative risk

Chou R *et al. Ann Intern Med* 2007; 147(7):505-14; Lee J *et al. Br J Anaesth* 2013; 111(1):112-20; Schnitzer TJ *et al. J Pain Symptom Manage* 2004; 28(1):72-95; van Tulder M *et al. Cochrane Database Syst Rev* 2000; 2:CD000396; Vane JR, Botting RM. *Inflamm Res* 1995;44(1):1-10.

nsNSAIDs/Coxibs for Management of Low Back Pain

General Recommendations

- An nsNSAID or coxib may be indicated when an anti--inflammatory analgesic
  is recommended
- Consider individual risk of side effects
  - Especially in older adults and individuals at increased risk for side effects
- Consider patient preference

Coxib = COX-2-specific inhibitor; nsNSAID = non-selective non-steroidal anti-inflammatory drug;

Savigny P *et al. BMJ* 2009; 338:b1805; Simon LS. *Arthritis Res Ther* 2013; 15(Suppl 3):S1l Stitham J *et al. Curr Mol Med* 2014; [Epub ahead of print].

Recommendations for the Use of nsNSAIDs and Coxibs

- For individuals over the age of 45 years, nsNSAIDs and coxibs should be co-prescribed with a PPI

Coxib = COX-2-specific inhibitor; nsNSAID = non-selective non-steroidal anti-inflammatory drug;

Savigny P *et al. Low Back Pain: Early Management of Persistent Non-specific Low Back Pain*.
National Collaborating Centre for Primary Care and Royal College of General Practitioners; London, UK: 2009.

NSAIDs Commonly Used to Manage Low Back Pain

Drug	Oral dose	Maximum Daily dose
Propionic acid derivatives		
• Ibuprofen	• 200–400 mg every 48 h	• 3200 mg
• Naproxen	• 250 mg 3 or 4 times per day	• 1250 mg
Acetic acid derivatives		
• Sulindac	• 150–200 mg every 12 h	
• Etodolac	• 200–400 mg 3 or 4 times/day	• 1000 mg
• Ketorolac	• 10 mg every 4–6 h	• 40 mg (5 days maximum)
• Diclofenac	• 50 mg every 8 h	• 150 mg
Enolic acid derivatives		
• Piroxicam	• 10–20 mg every 12 h	• 20 mg
• Meloxicam	• 7.5–15 mg/day	• 15 mg
• Nabumetone	• 500–1000 mg every 12–24 h	• 2000 mg
Coxibs		
• Celecoxib	• 100–200 mg every 12 or 24 h	

Coxib = COX-2-selective inhibitor; NSAID = non-steroidal anti-inflammatory drug

Miller SM. *Prim Care* 2012; 39(3):499-510.

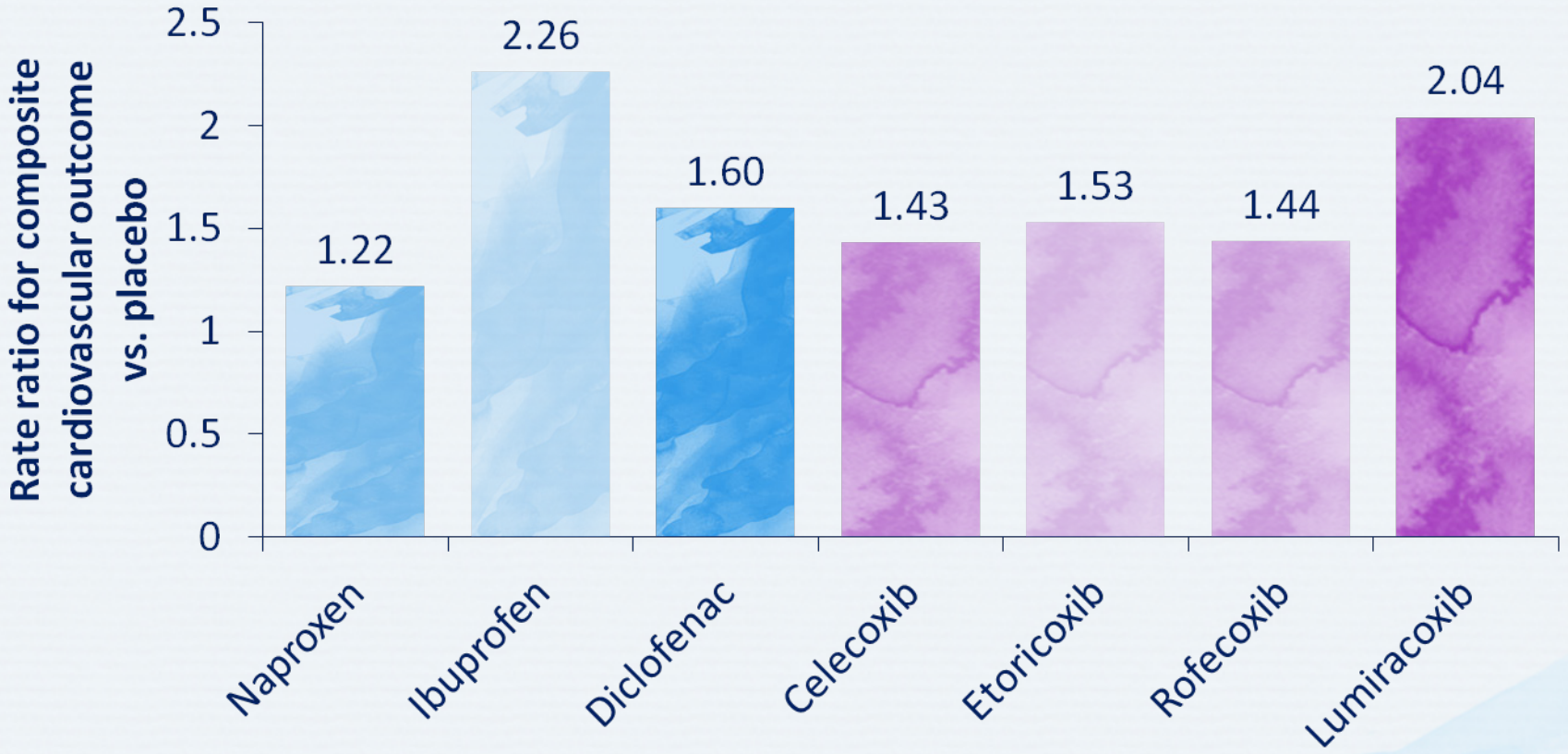
Adverse Effects of nsNSAIDs/Coxibs

- **All NSAIDs:**
  - Gastroenteropathy
    - Gastritis, bleeding, ulceration, perforation
  - Cardiovascular thrombotic events
  - Renovascular effects
    - Decreased renal blood flow
    - Fluid retention/edema
    - Hypertension
  - Hypersensitivity
- **Cox-1-mediated NSAIDs (nsNSAIDs):**
  - Decreased platelet aggregation

Coxib = COX-2-specific inhibitor; NSAID = non-steroidal anti-inflammatory drug; nsNSAID = non-selective non-steroidal anti-inflammatory drug

Clemett D, Goa KL. *Drugs* 2000; 59(4):957-80; Grosser T *et al.* In: Brunton L *et al* (eds.). *Goodman and Gilman's The Pharmacological Basis of Therapeutics*. 12th ed. (online version). McGraw-Hill; New York, NY: 2010.

nsNSAIDs/Coxibs and Cardiovascular Risk

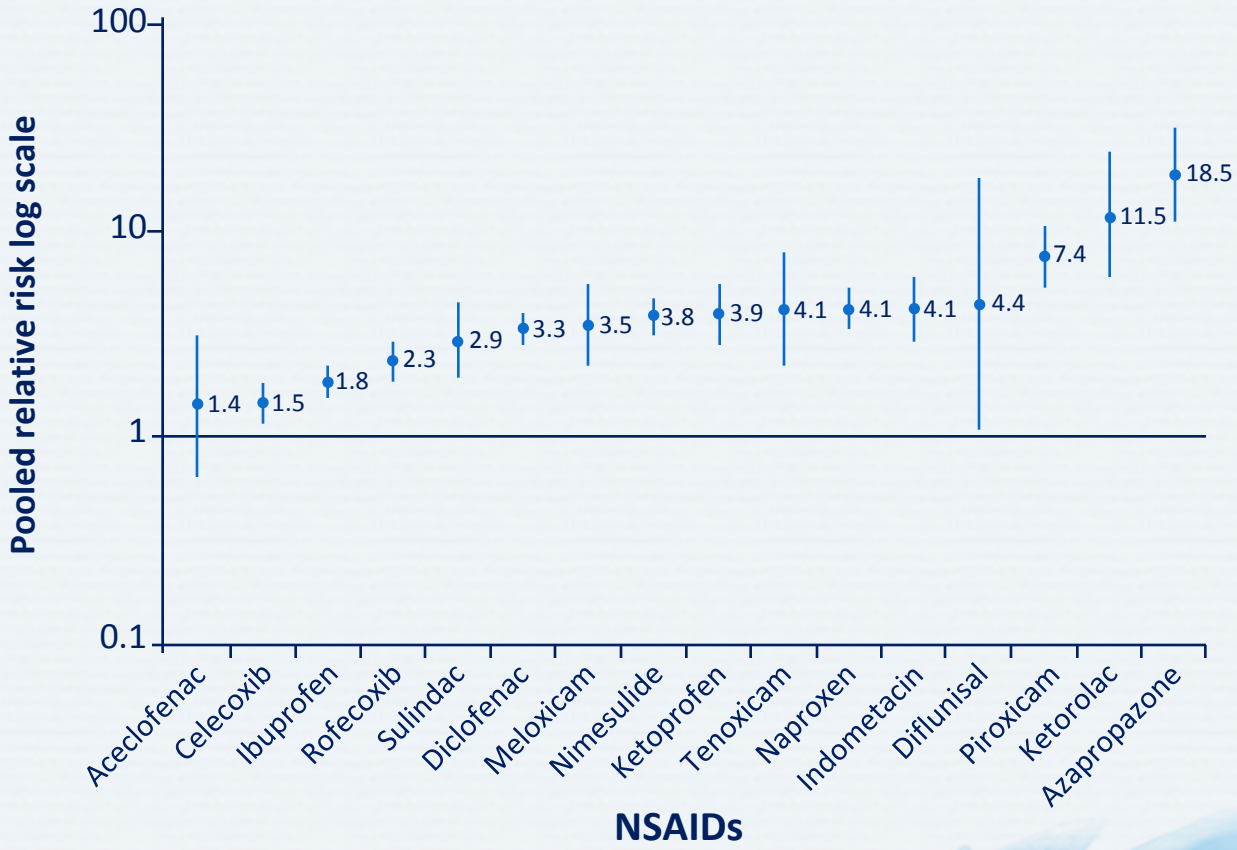


Composite includes non-fatal myocardial infarction, non-fatal stroke, or cardiovascular death compared with placebo; chart based on network meta-analysis involving 30 trials and over 100,000 patients.
Coxib = COX-2 inhibitor; nsNSAID = non-selective non-steroidal anti-inflammatory drug

Trelle S *et al. BMJ* 2011; 342:c7086.

Gastrointestinal Risk with nsNSAIDs/Coxibs

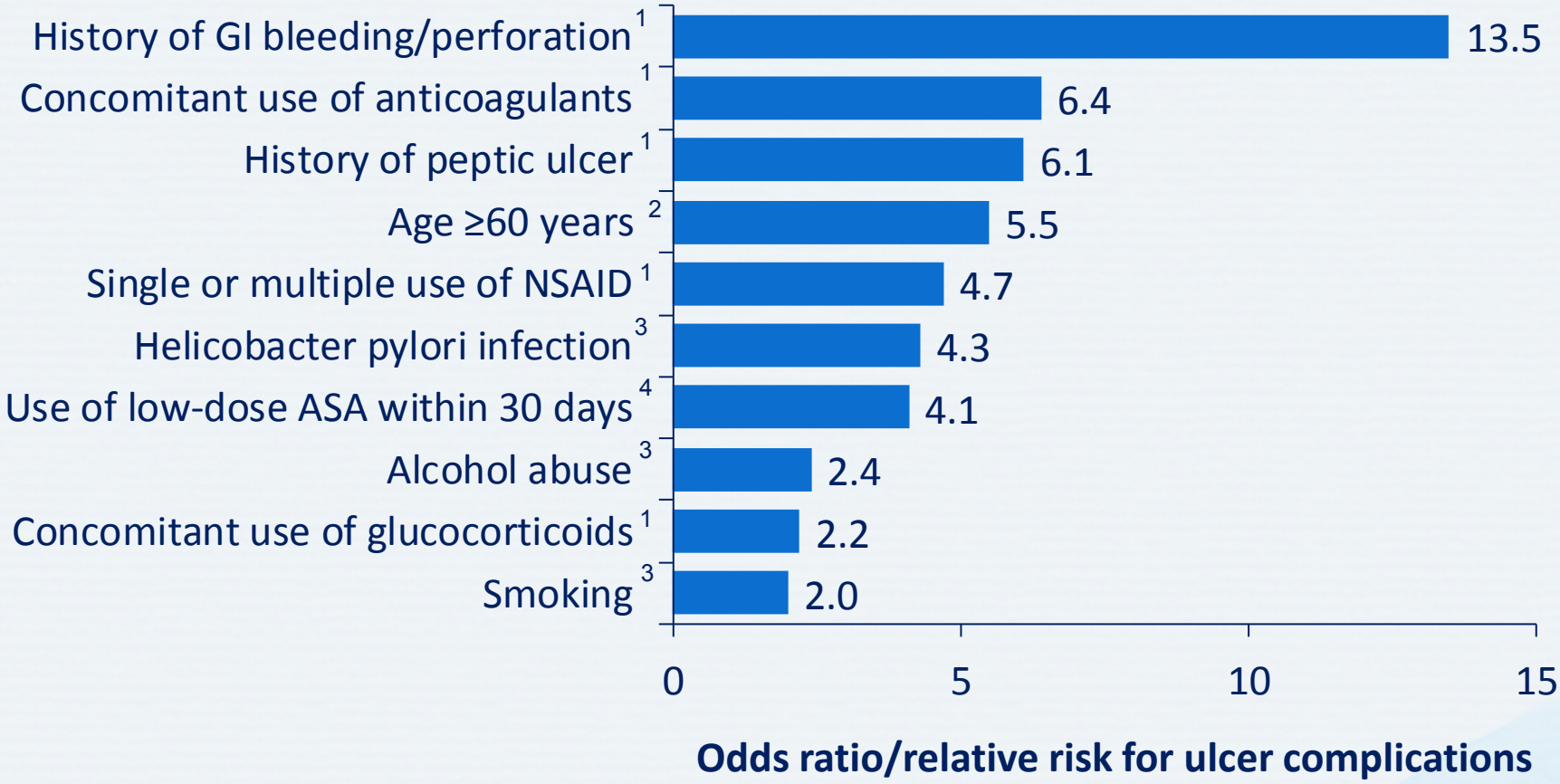
Pooled Relative Risks and 95% CIs of Upper Gastrointestinal Complications



CI = confidence interval; coxib = COX-2 inhibitor; NSAID = non-steroidal anti-inflammatory drug; nsNSAID = non-selective non-steroidal anti-inflammatory drug

Castellsague J *et al. Drug Saf* 2012; 35(12):1127-46.

Risk Factors for Gastrointestinal Complications Associated with nsNSAIDs/Coxibs



ASA = acetylsalicylic acid; coxib = COX-2-specific inhibitor; GI = gastrointestinal; NSAID = non-steroidal anti-inflammatory drug; nsNSAID = non-selective non-steroidal anti-inflammatory drug; SSRI = selective serotonin reuptake inhibitor

1. Garcia Rodriguez LA, Jick H. *Lancet* 1994; 343(8900):769-72; 2. Gabriel SE *et al*. *Ann Intern Med* 1991; 115(10):787-96;
3. Bardou M. Barkun AN. *Joint Bone Spine* 2010; 77(1):6-12; 4. Garcia Rodríguez LA, Hernández-Díaz S. *Arthritis Res* 2001; 3(2):98-101.

Gastrointestinal Effects of nsNSAIDs/Coxibs Beyond the Upper Gastrointestinal Tract

- There is strong evidence to suggest potentially clinically relevant adverse gastrointestinal events are not limited to the upper gastrointestinal tract
- Studies suggest NSAIDs increase the risk for **lower*** gastrointestinal clinical events

***Lower gastrointestinal means distal to the ligament of Treitz or fourth segment of the duodenum**
Coxib = COX-2-specific inhibitor; GI = gastrointestinal; nsNSAID = non-selective non-steroidal anti-inflammatory drug

Ilison MC *et al. N Engl J Med* 1992; 327(11):749-54; Lanas A, Sopeña F. *Gastroenterol Clin N Am* 2009; 38(2):333-53; Fujimori S *et al. Gastro Endoscopy* 2009; 69(7):1339-46; Laine L *et al. Gastroenterology* 2003; 124(2):288-92; Chan FK *et al. N Engl J Med* 2002; 347(26):2104-10.

Guidelines for nsNSAIDs/Coxibs Use Based on Gastrointestinal Risk and ASA Use

	Gastrointestinal risk	
	Not elevated	**Elevated**
Not on ASA	nsNSAID alone	Coxib nsNSAID + PPI
On ASA	Coxib + PPI nsNSAID + PPI	Coxib + PPI nsNSAID + PPI

ASA = acetylsalicylic acid; coxib = COX-2-specific inhibitor;
nsNSAID = non-selective non-steroidal anti-inflammatory drug; PPI = proton pump inhibitor

Tannenbaum H *et al*. *J Rheumatol* 2006; 33(1):140-57.

Opioids for the Management of Low Back Pain

Acute or chronic severe low back pain for short periods of time

Efficacy	Safety	Mechanism of Action
• Effective • Evidence insufficient to recommend one opioid over another • Efficacy enhanced by addition of acetaminophen and/or nsNSAIDs/coxibs	• Multiple side effects • Potential for **abuse** or **addiction**	• Alter limbic system activity • Modify sensory and affective pain aspects • Activate descending pathways that modulate transmission in spinal cord • Affect transduction of pain stimuli to nerve impulses

Coxib = COX-2-specific inhibitor; nsNSAID = non-specific non-steroidal anti-inflammatory drug

Chou R *et al. J Pain Symptom Manage* 2003; 26(5):1026-48; Chou R et al. *J Pain* 2009; 10(2):113-30; Furlan AD *et al. CMAJ* 2006; 174(11):1589-94; Kalso E *et al. Pain* 2004; 112(3):372-80; Lee J *et al. Br J Anaesth* 2013; 111(1):112-20; Martell BA *et al. Ann Intern Med* 2007; 146(2):116-27; Rauck RL *et al. J Opioid Manag* 2006; 2(3):155-66; Reisine T, Pasternak G. In: Hardman JG *et al* (eds). *Goodman and Gilman's: The Pharmacological Basics of Therapeutics.* 9th ed. McGraw-Hill; New York, NY: 1996; Scholz J, Woolf CJ. *Nat Neurosci* 2002; 5(Suppl):1062-7; Trescot AM *et al. Opioid Pharmacol Pain Phys* 2008; 11(2 Suppl):S133-53.

Tramadol for the Management of Low Back Pain

- "Atypical" opioid analgesic
- Unique mechanism of action
  - Noradrenergic and serotoninergic pathways
  - Opioid effect depends on conversion to active O-demethylated metabolite M1
- Weak binding affinity to mu opioid receptor
- Clinical studies of efficacy in low back pain
- Consider avoiding use in patients with diabetes due to potential for hypoglycemia

Baer P *et al. Can J Diagnosis* 2010; 27(10):43-50; Deshpande A et al. *Cochrane Database Syst Rev* 2007; 3:CD004959; Janssen Pharmaceuticals Inc. *Tramadol Hydrochloride Tablets Full Prescribing Information.* Titusville, NJ: 2013; Jonville-Bera A *et al. Therapie* 2010; 65(5):499-500;.Schofferman J, Mazanec D. *Spine J* 2008; 8(1):185-94; Taugourdeau S *et al. Rev Med Interne* 2011; 32(11):703-5; Vorsanger GJ *et al. J Opioid Manag* 2008; 4(2):87-97.

Adverse Effects of Opioids

System	Adverse effects
Gastrointestinal	Nausea, vomiting, constipation
CNS	Cognitive impairment, sedation, lightheadedness, dizziness
Respiratory	Respiratory depression
Cardiovascular	Orthostatic hypotension, fainting
Other	Urticaria, miosis, sweating, urinary retention

CNS = central nervous system

Moreland LW, St Clair EW. *Rheum Dis Clin North Am* 1999; 25(1):153-91; Yaksh TL, Wallace MS. In: Brunton L *et al* (eds). *Goodman and Gilman's The Pharmacological Basis of Therapeutics*. 12th ed. (online version). McGraw-Hill; New York, NY: 2010.

APS and AAPM Treatment Guidelines for Non-cancer Pain: Recommendations for Clinicians

- Stratify risks when selecting patients for long-term opiate
- Advise patients of risks and benefits of chronic opioid use
- Provide patients with the schema for pain treatment
- Consider initial use of opioid therapy as a trial treatment
  - Individualize selection, initial dosage and titration
- **Exercise caution if methadone is used during the initial period and titration because of its unique properties**
- **Provide follow-up for efficacy, adverse effects and possible deviations**
- **Patients with a history of drug abuse or psychiatric problems should have frequent monitoring and consultation with a mental health specialist**

AAPM = American Academy of Pain Medicine; APS = American Pain Society;

Miller SM. *Prim Care* 2012; 39(3):499-510.

APS and AAPM Treatment Guidelines for Non-cancer Pain: Recommendations for Clinicians (cont'd)

- Re-evaluate risks and benefits of opioid therapy
- Consider rotation if patient does not obtain adequate efficacy or if adverse events are intolerable during the titration period
- Anticipate and treat adverse events associated with opiates
- Include interdisciplinary psychotherapeutic interventions and complementary non-opioid therapies
- Advise patients about possible cognitive impairment in daily activities (e.g., driving)
- Help patients find a medical care facility for their general care
- Consider rescue opioid therapy for incidental pain
- Advise patients about the risks and benefits of chronic opioid therapy

AAPM = American Academy of Pain Medicine; APS = American Pain Society;

Miller SM. *Prim Care* 2012; 39(3):499-510.

Tools for Detecting Risks Associated with Opioids

- **Patient self-reporting questionnaires to assess risk of aberrant behavior**
  - **SOAPP** (**S**creener and **O**pioid **A**ssessment for **P**atients with Pain) (Version 1 and SOAPP-Revised)
  - **CAGE-AID** (CAGE* **A**dapted to **I**nclude **D**rugs)
  - **SISAP** (**S**creening **I**nstrument for **S**ubstance **A**buse **P**otential)
  - **ORT** (**O**pioid **R**isk **T**ool)
- **Questionnaire administered by physician to assess risks and benefits**
  - **DIRE** (**D**iagnosis, **I**ntractability, **R**isk, **E**fficacy)

***The CAGE questionnaire comprises 4 simple questions to detect alcohol abuse: Have you ever: (1) felt the need to cut down your drinking; (2) felt annoyed by criticism of your drinking; (3) had guilty feelings about drinking; and (4) taken a morning eye opener?**

Chou R *et al. J Pain* 2009; 10(2):113-30; Gardner-Nix J. *CMAJ* 2003; 169(1): 38-43; O'Brien CP. *JAMA* 2008; 300(17):2054-6.

Recommendations for the Use of Opioids

Clinical query	Summary of the evidence
Relevant selection from the opioid guidelines	• Evidence shows tapentadol and the buprenorphine transdermal system are clinically effective • Current opioid guidelines recommend the use of weak and strong opioids taking into account patient preferences and requirements…

Savigny P *Back Pain: Early Management of Persistent Non-specific Low Back Pain*.
National Collaborating Centre for Primary Care and Royal College of General Practitioners; London, UK: 2009. *et al. Low*

Muscle Relaxants for Management of Low Back Pain

- Diverse group of drugs
- Mechanisms of action not clarified
- Use is controversial, mainly due to side effects and potential for abuse and dependency
- Guidelines do not universally recommend use of muscle relaxants in management of low back pain
- Provide short-term relief of low back pain
  - No differences in efficacy and safety
  - Very few short-term studies
  - No evidence supports long-term use or recommends one over the other

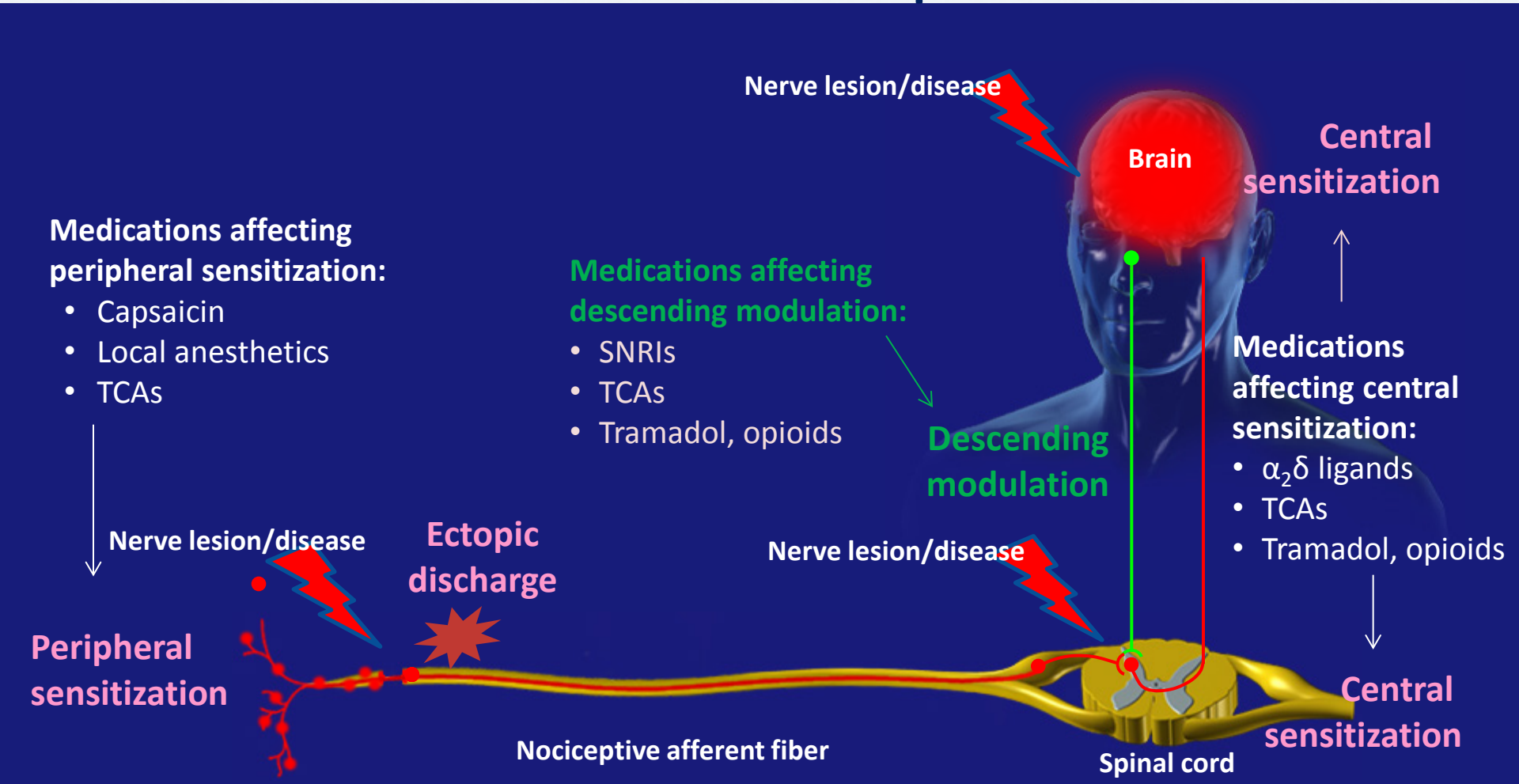
Chou R *et al. J Pain Symptom Manage* 2004; 28(2):140-75; van Tulder MW *et al. Spine (Phila PA 1976)* 2003; 28(17):1978-92.

Muscle Relaxants

Classification	Drug	Comments
Antispastic	• Baclofen • Tizanidine • Dantrolene • Diazepam	• Indicated in spasticity associated with central nervous system injury • Not recommended for management of low back pain
Antispasmodic	• Cyclobenzaprine • Metocarbamol • Carisoprodol • Metaxalone	

Miller SM. *Prim Care* 2012; 39(3):499-510; Lee TJ. *Phys Med Rehabil Clin N Am* 2010; 21(4):793-800.

Mechanism-Based Pharmacological Treatment of Neuropathic Pain



SNRI = serotonin-norepinephrine reuptake inhibitor; TCA = tricyclic antidepressant

Adapted from: Attal N *et al. Eur J Neurol* 2010; 17(9):1113-e88; Beydoun A, Backonja MM. *J Pain Symptom Manage* 2003; 25(5 Suppl):S18-30; Jarvis MF, Boyce-Rustay JM. *Curr Pharm Des* 2009; 15(15):1711-6; Gilron I *et al. CMAJ* 2006; 175(3):265-75; Moisset X, Bouhassira D. NeuroImage 2007; 37(Suppl 1):S80-8; Morlion B. Curr Med Res Opin 2011; 27(1):11-33; Scholz J, Woolf CJ. Nat Neurosci 2002; 5(Suppl):1062-7.

α2δ Ligands* for Management of Low Back Pain

Useful in combination with other treatments for low back pain with a neuropathic component

Efficacy	Safety	Mechanism of Action
• Pregabalin + coxib combination is more effective than each drug used alone for management of chronic low back pain	• Most common side effects are dizziness and somnolence	• Bind to $\alpha_2\delta$ subunit of calcium channel, which is upregulated in neuropathic pain • Binding reduces neurotransmitter release and pain sensitization

***Gabapentin and pregabalin are $\alpha_2\delta$ ligands**
Coxib = COX-2-specific inhibitor

Attal N, Finnerup NB. *Pain Clinical Updates* 2010; 18(9):1-8; Bauer CS *et al. J Neurosci* 2009; 29(13):4076-88;
Chou R *et al. Ann Intern Med* 2007; 147(7):505-14; Lee J *et al. Br J Anaesth* 2013; 111(1):112-20; Romanó C *et al. J Orthop Traumatol* 2009; 10(4):185.

Antidepressants for Management of Low Back Pain

Useful in combination with other treatments for low back pain with a neuropathic component

Efficacy	Safety	Mechanism of Action
• Not recommended for non-specific acute low back pain • May be considered for low back pain with a neuropathic component	• TCAs can cause cognitive disorders, confusion, gait disturbance and falls • SNRIs are contraindicated in severe hepatic dysfunction or unstable arterial hypertension	• Inhibit reuptake of serotonin and norepinephrine, enhancing descending modulation

TCA = tricyclic antidepressant; SNRI = serotonin norepinephrine reuptake inhibitor

Attal N, Finnerup NB. *Pain Clinical Updates* 2010; 18(9):1-8; Lee J *et al. Br J Anaesth* 2013; 111(1):112-2; Skljarevski V *et al. Eur J Neurol* 2009; 16(9):1041-8; Verdu B *et al. Drugs* 2008; 68(18):2611-32.

Analgesic Intervention for Management of Low Back Pain

- **Epidural block with steroids** (high quality of evidence)
  - Reasonable alternative to surgery
  - Recommend only for radiculopathy
  - Transforaminal route is preferred
  - Always image-guided
  - Use small-particle steroids
    - Dexamethasone 4 mg is sufficient

Ackerman WE, Ahmad M. *Anesth Analg* 2007; 104(5):1217-22; Ahadian FM *et al. Reg Anesth Pain Med* 2011; 36(6):572-8; Benzon HT *et al. Anesthesiology* 2007; 106(2):331-8; Chou R *et al. Ann Intern Med* 2007; 147(7):478-91; DePalma MJ, Slipman CW. *Spine J* 2008; 8(1):45-55; McLain RF *et al. Spine J* 2005; 5(2):191-201; Sasso RC *et al. J Spinal Disord Tech* 2005; 18(6):471-8.

Analgesic Intervention for Management of Low Back Pain (cont'd)

- **Facet block** (moderate quality of evidence)
  - Many false positive results
  - Significant placebo effect
  - At least 2 blocks must be performed before a more advanced form of therapy is recommended
  - Pericapsular or medial branch are equally effective

- **Radiofrequency lysis** (low quality of evidence)
  - Root and facet
    - More prolonged relief
    - Ineffective for failed spinal surgery syndrome

Abejón D et al. *Pain Pract* 2007; 7(1):21-6; Birkenmaier C *et al. Reg Anesth Pain Med* 2007; 32(1):27-33; Bogduk N. *Spine J* 2008: 8(1):56-64; Pampati S *et al. Pain Physician* 2009; 12(5):855-66.

Combined Therapy for Management of Low Back Pain

- Type of therapy used by many physicians
- Muscle relaxers + analgesic or NSAID
- Opioids + NSAID
- Insufficient evidence to support a recommendation about its use in low back pain

NSAID = non-steroidal anti-inflammatory drug

Chou R *et al. Ann Intern Med* 2007; 147(7):505-14; Jamison RN *et al. Spine (Phila Pa 1976)* 1998; 23(23):2591-600
van Tulder MW *et al. Cochrane Database Syst Rev* 2000; 2:CD000396.

Therapies Not Recommended for Low Back Pain

ASA	Benzodiazepines	Systemic Corticosteroids
• Insufficient evidence to permit recommendation of its use as an analgesic in patients with low back pain	• Risk of abuse, addiction and tolerance	• Oral or parenteral • No more effective than placebo

ASA = acetylsalicylic acid

Arbus L *et al. Clin Trials J* 1990; 27:258-67; Chou R *et al. Ann Intern Med* 2007; 147(7):505-14; Derry S *et al. BMJ* 2000; 321(7270):1183-7; Evans DP *et al. Curr Med Res Opin* 1980; 6(8):540-7; Finckh A *et al. Spine (Phila PA 1976).* 2006; 31(4):377-81; Friedman BW *et al. J Emerg Med* 2006; 31(4):365-70; Haimovic IC, Beresford HR. *Neurology* 1986; 36(12):1593-4; Medina Santillán R *et al. Proc West Pharmacol Soc* 2000; 43:69-70.

Pharmacological Treatment of Low Back Pain

Drug	Details	Level of evidence
nsNSAIDs	• Can reduce pain in chronic low back pain	Moderate
Coxibs	• Superior analgesia vs. nsNSAIDs • Reduced consumption of concurrent therapy	Moderate
Benzodiazepines	• Can reduce pain in the short term in non-specific low back pain • Risk of adverse effects is unclear	Moderate
Acetaminophen	• Can reduce pain in the short term in non-specific low back pain • Risk of adverse effects is unclear	Low

Coxib = COX-2-specific inhibitor; nsNSAID = non-selective non-steroidal anti-inflammatory drug

Chou R *et al. Spine (Phila Pa 1976)* 2009; 34(10):1066-77; Manchikanti L *et al. Pain Physician* 2009; 12(4):699-802; Ramos-Remus CR *et al. Curr Med Res Opin* 2004; 20(5):691-8; Romanò CL *et al. J Orthop Traumatol* 2009; 10(4):185-91; Sakamoto C, Soen S. *Digestion* 2011; 83(1-2):108-23; Savigny P *et al. Low Back Pain: Early Management of Persistent Non-specific Low Back Pain.* National Collaborating Centre for Primary Care and Royal College of General Practitioners; London, UK: 2009; Toward Optimized Practice. *Guidelines for the Evidence-Informed Primary Care Management of Low Back Pain.* Edmonton, AB: 2009.

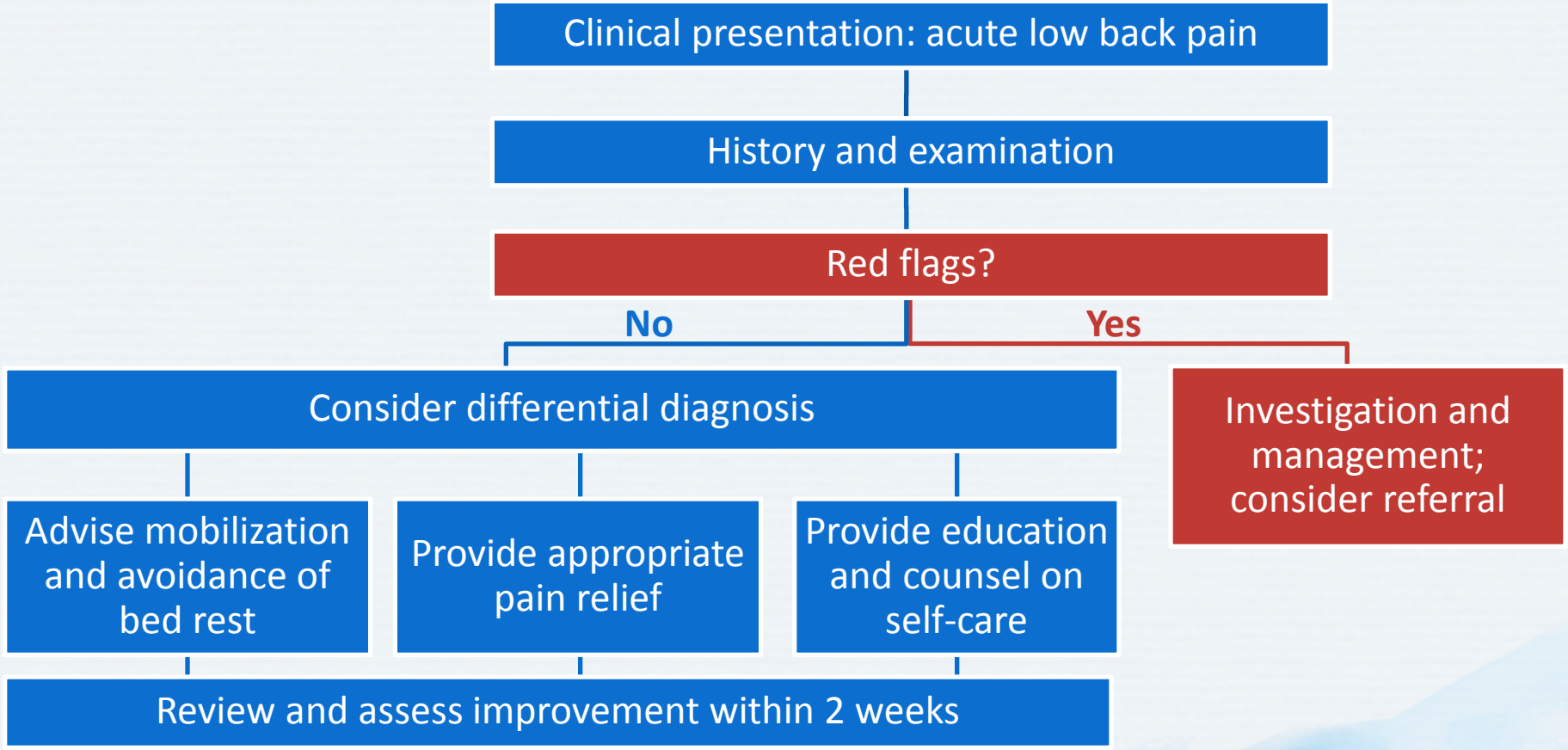
Pharmacological Treatment of Low Back Pain (cont'd)

Drug	Details	Level of evidence
Non-benzodiazepine muscle relaxers	• No clear data on effectiveness on non-specific low back pain • Risk of adverse effects is unclear	Low
Neuromodulators (e.g., pregabalin)	• In combination with a coxib can reduce low back pain severity within 4 weeks	Low
Antidepressants (duloxetine)	• Can improve chronic low back pain but extent of benefit is unclear	Moderate
TCAs	• Reduce pain in non-specific low back pain	Moderate
Opioids	• May have short-term efficacy in low back pain	Moderate
Opioids	• Long-term data are lacking	Low
Glucosamine	• **Does not** reduce low back pain from lumbar osteoarthritis at 6 months or 1 year	1A sufficient

Coxib = COX-2-specific inhibitor; TCA = tricyclic antidepressant

Chou R *et al. Spine (Phila Pa 1976)* 2009; 34(10):1066-77; Manchikanti L *et al. Pain Physician* 2009; 12(4):699-802;
Ramos-Remus CR *et al. Curr Med Res Opin* 2004; 20(5):691-8; Romanò CL *et al. J Orthop Traumatol* 2009; 10(4):185-91;
Sakamoto C, Soen S. *Digestion* 2011; 83(1-2):108-23; Savigny P *et al. Low Back Pain: Early Management of Persistent Non-specific Low Back Pain.* National Collaborating Centre for Primary Care and Royal College of General Practitioners; London, UK: 2009;
Toward Optimized Practice. *Guidelines for the Evidence-Informed Primary Care Management of Low Back Pain.* Edmonton, AB: 2009.

Management of Acute Low Back Pain



Adapted from: Lee J *et al. Br J Anaesth* 2013; 111(1):112-20.

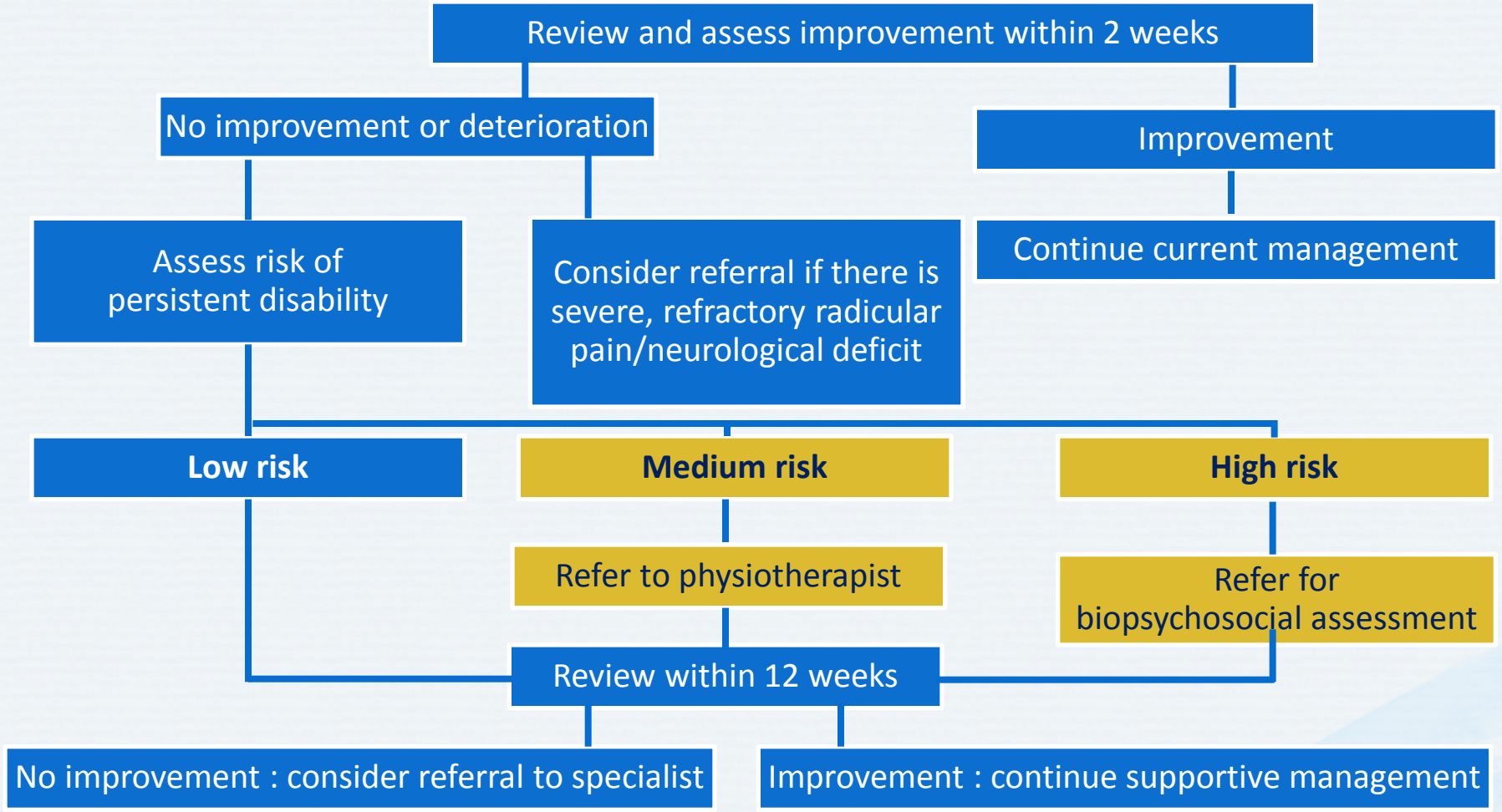
Recommendations for Follow-Up of Patients with Acute Low Back Pain

Patient Population	Frequency of Follow-up
All	• 2 weeks following initial visit • Follow-up options: telephone, e-mail or visit • Additional follow-up is indicated
Patients considered at high risk for chronic pain*	• Earlier and more frequent visits may be appropriate
Older patients or patients with: • Progression of symptoms or lack of significant improvement • Severe pain or functional deficit • Signs of nerve root disease or lumbar spinal stenosis	• Earlier and more frequent reassessment may be appropriate
Patients referred for spinal manipulation, acupuncture or massage	• After 4 visits, refer patient to a specialist to determine if functionality has improved

***See yellow flags; may also want to consider populations at risk if pain persists in the presence of adequate treatment: children and adolescents, women <30 years, men >60 years, patients with specific comorbidities (e.g., diabetes) and immunocompromised or immunosuppressed patients**

Ochoa G. In: Díaz Barriga JS, Gamarra AI (eds). *Libro Dolor Musculoesquelético*. Asociacion Colombiana para el Estudio del Dolor, ACED; Bogotá, Colombia: 2010; Savigny P *et al. Low Back Pain: Early Management of Persistent Non-specific Low Back Pain.* National Collaborating Centre for Primary Care and Royal College of General Practitioners; London, UK: 2009.

Follow-Up of Patients with Acute Low Back Pain



Adapted from: Lee J *et al. Br J Anaesth* 2013; 111(1):112-20.

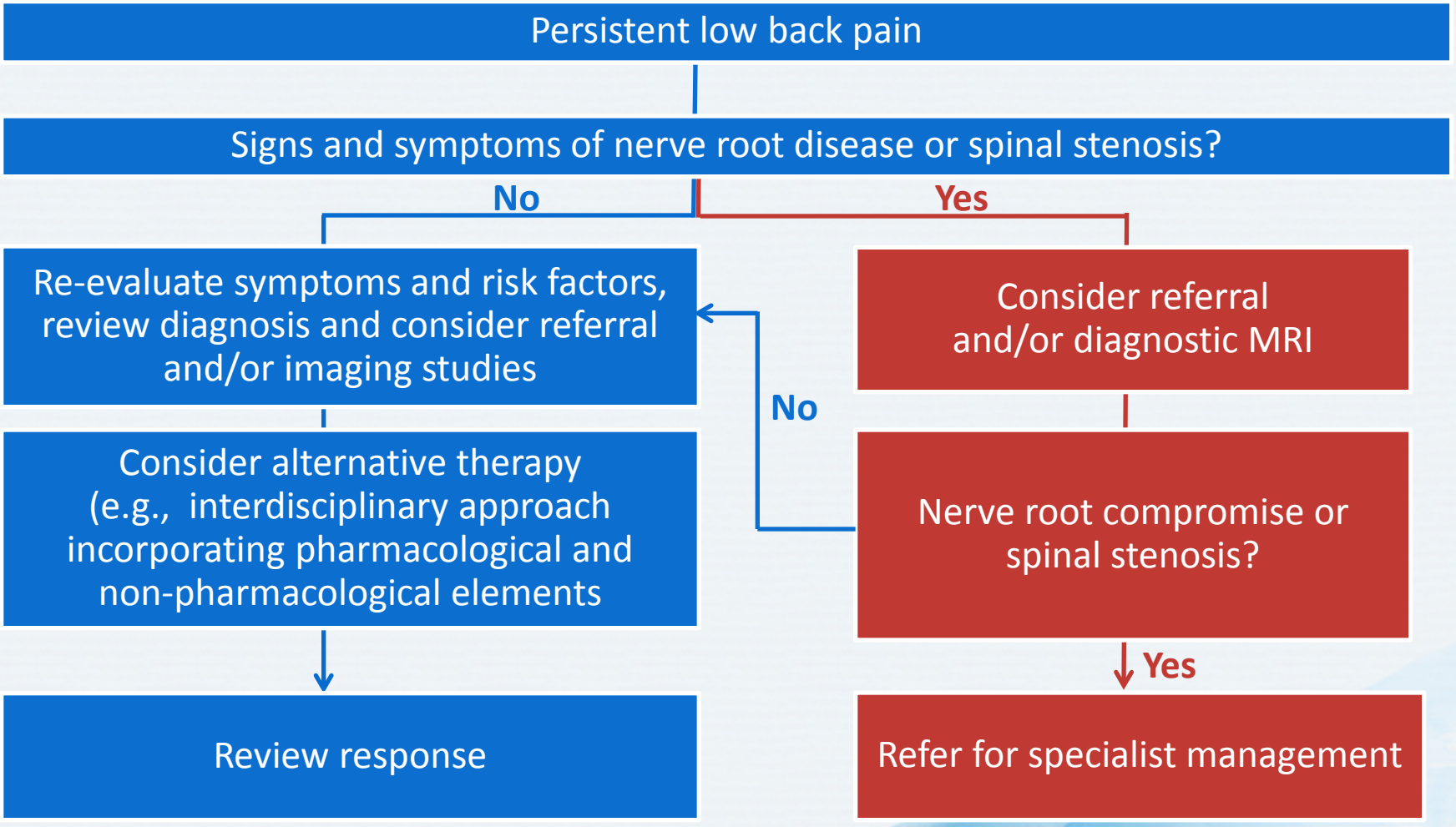
Key Recommendations for Management of Acute Low Back Pain

Level A (Consistent Evidence)	Level B (Inconsistent Evidence)	Level C (Consensus)
• Bed rest is **not recommended** • nsNSAIDs/coxibs, acetaminophen and muscle relaxants are effective treatments for **non-specific** acute low back pain	• Patient education is beneficial • Spine stabilization may reduce recurrence and need for health care services • Spinal manipulation and chiropractic techniques are **not recommended**	• Red flags are common but do not necessarily indicate serious pathology • Imaging is not indicated without findings suggestive of serious pathology

Coxib = COX-2 inhibitor; nsNSAID = non-steroidal anti-inflammatory drug

Casazza BA. *Am Fam Physician* 2012; 85(4):343-50.

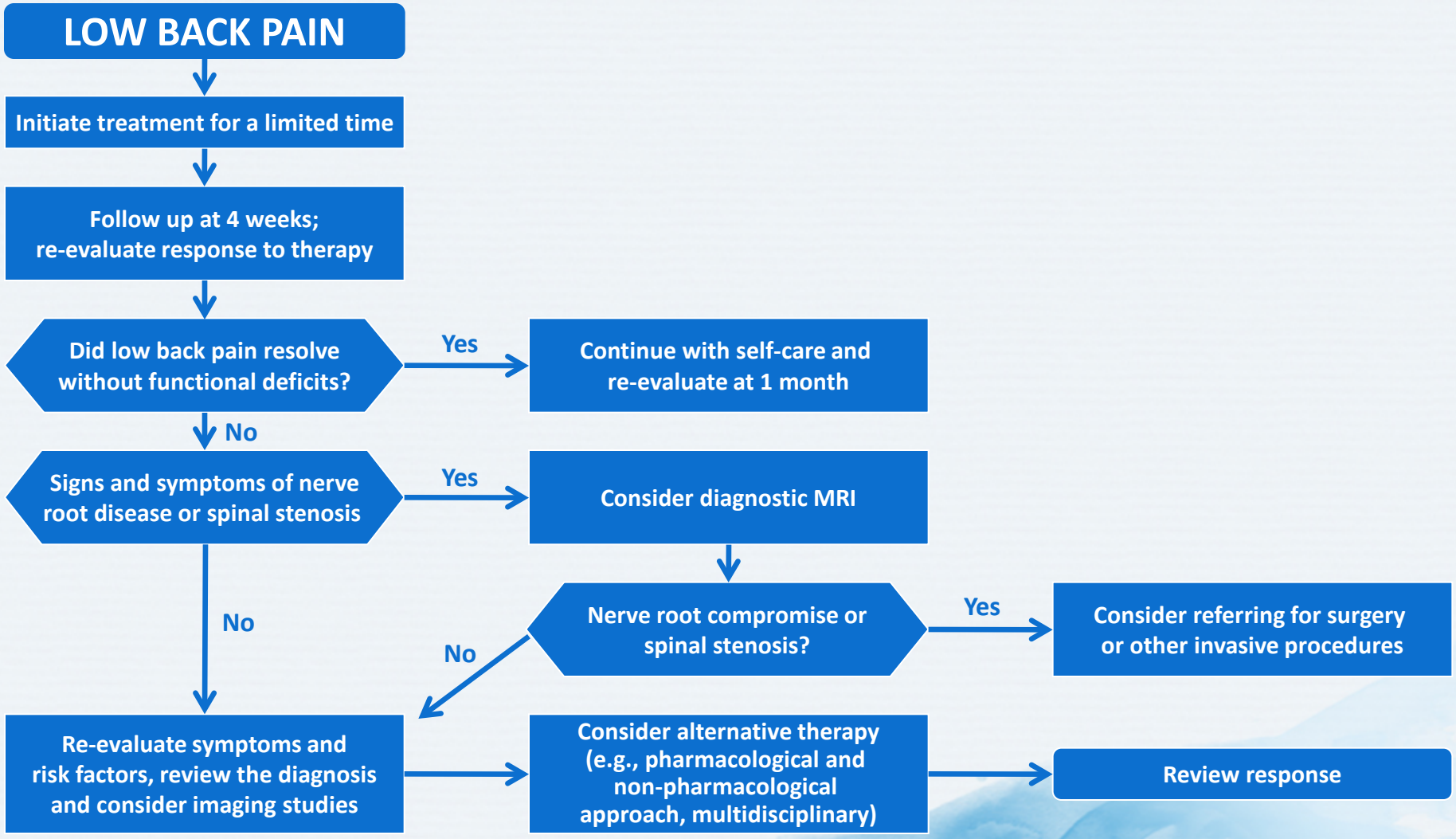
Management of Persistent Low Back Pain*



***American College of Physicians and the American Pain Society**

Adapted from: Chou R *et al. Ann Intern Med* 2007; 147(7): 478-91.

Management of Low Back Pain*



***American College of Physicians and the American Pain Society; MRI = magnetic resonance imaging**

Adapted from: Chou R *et al. Ann Intern Med* 2007; 147(7):478-91.

Recommended Interventions for Management of Low Back Pain*

Recommended treatment	Details	Duration of pain	
		Acute (<4 weeks)	Subacute or chronic (≥4 weeks)
Self-care	• Advise patient to remain active • Provide patients with books or pamphlets on back care • Advise patients to apply heat	+ + +	+ +
Pharmacological		+	+
Non-pharmacological		+	+

***American College of Physicians and the American Pain Society**

Adapted from: Chou R *et al. Ann Intern Med* 2007; 147(7):478-91.

Recommended Interventions for Management of Low Back Pain*

Pharmacological treatment	Duration of pain	
	Acute (<4 weeks)	Subacute or chronic (>4 weeks)
Acetaminophen	+	+
NSAIDs	+	+
Muscle relaxants	+	
TCAs		+
Benzodiazepines	+	+
Tramadol, opioids	+	+

***American College of Physicians and the American Pain Society**
NSAID = non-steroidal anti-inflammatory drug; TCA = tricyclic antidepressant
Adapted from: Chou R *et al. Ann Intern Med* 2007; 147(7):478-91.

Recommended Interventions for Management of Low Back Pain*

Non-pharmacological treatment	Duration of pain	
	Acute (<4 weeks)	Subacute or chronic (>4 weeks)
Spinal manipulation	+	+
Therapy with exercise		+
Massage		+
Acupuncture		+
Yoga		+
Cognitive behavioral therapy		+
Progressive relaxation		+
Intensive interdisciplinary rehabilitation		+

***American College of Physicians and the American Pain Society**

Adapted from: Chou R I*Ann Intern Med* 2007; 147(7):478-91.

Follow-up/Monitoring of Patients with Acute or Chronic Low Back Pain

Patient population	Frequency of follow-up
Stable	As needed
Fluctuating pain	Periodically
On pharmacological treatment	Periodically

Savigny P *et al. Low Back Pain: Early Management of Persistent Non-specific Low Back Pain.* National Collaborating Centre for Primary Care and Royal College of General Practitioners; London, UK: 2009.

Therapeutic Recommendations for Management of Low Back Pain

	Non-specific Low Back Pain	Radicular Pain
Acute	• Acetaminophen • nsNSAIDs/coxibs • Co-prescribe PPI for patients aged >45 years • Weak opioids • Muscle relaxants	If radicular pain is prominent consider addition of: • $\alpha^2\delta$ ligands • TCAs
Chronic	Refer to specialist for: • Cognitive behavioral therapy • Complex pharmacological management, including opioids and neuropathic pain medications • Consider interventional pain therapies • Consider surgery	

Coxib = COX-2-specific inhibitor; nsNSAID = non-selective non-steroidal anti-inflammatory drug; PPI = proton pump inhibitor; TCA = tricyclic antidepressant

Adapted from: Lee J *et al. Br J Anaesth* 2013; 111(1):112-20.

Adherence

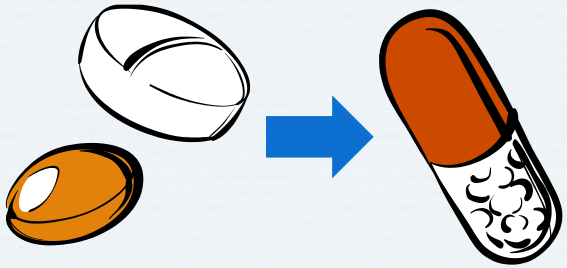
Strategies to Improve Adherence

- **S**implify regimen
- **I**mpart knowledge
- **M**odify patient beliefs and human behavior
- **P**rovide communication and trust
- **L**eave the bias
- **E**valuate adherence

Atreja A *et al*. *Medacapt Gen Med* 2005; 7(1):4.

Simplifying Medication Regimen

- If possible, adjust regimen to minimize:
  - Number of pills taken
  - Number of doses per day
  - Special requirements (e.g, bedtime dosing, avoiding taking medication with food, etc.)



- Recommend all medications be taken at the same time of day (if possible)
- Link taking medication to daily activities, such as brushing teeth or eating
- Encourage use of adherence aids such as medication organizers and alarms

American College of Preventive Medicine. *Medication Adherence Clinical Reference.* Available at: http://www.acpm.org/?MedAdherTT_ClinRef. Accessed: October 8, 2013; van Dulmen S *et al. BMC Health Serv Res* 2008; 8:47.

Imparting Knowledge

- Provide clear, concise instructions (written and verbal) for each prescription
- Be sure to provide information at a level the patient can understand
- Involve family members if possible
- Provide handouts and/or reliable websites for patients to access information on their condition
- Provide concrete advice on how to cope with medication costs

American College of Preventive Medicine. *Medication Adherence Clinical Reference.* Available at: http://www.acpm.org/?MedAdherTT_ClinRef. Accessed: October 8, 2013.

Modifying Patient Beliefs and Behaviors: Motivational Interviewing Technique

Techniques	Examples
• Express empathy	• "It's normal to worry about medication side effects"
• Develop discrepancy	• "You obviously care about your health; how do you think not taking your pills is affecting it?"
• Roll with resistance	• "I understand that you have a lot of other things besides taking pills to worry about"
• Support self efficacy	• "It sounds like you have made impressive efforts to work your new medication into your daily routine"

Bisono A *et al.* In: O'Donoghue WT, Levensky ER (eds). *Promoting Treatment Adherence: A Practical Handbook for Health Care Providers.* SAGE Publications, Inc.; London, UK: 2006.

Providing Communication and Trust: Communication Tips

- Be an active listener
  - Focus on the patient
  - Nod and smile to show you understand
- Make eye contact

- Be aware of your own body language
  - Face the patient
  - Keep arms uncrossed
  - Remove hands from pockets
- Recognize and interpret non-verbal cues

McDonough RP, Bennett MS. *Am J Pharm Educ* 2006; 70(3):58;
Srnka QM, Ryan MR. *Am Pharm* 1993; NS33(9):43-6.

Leaving the Bias

Acknowledge biases

Learn more about how low health literacy can affect patient outcomes

Specifically ask about attitudes, beliefs and cultural norms with regards to medication

Tailor communication to patient's beliefs and level of understanding

American College of Preventive Medicine. *Medication Adherence Clinical Reference.* Available at: http://www.acpm.org/?MedAdherTT_ClinRef. Accessed: October 8, 2013.

Evaluating Adherence: 4-Step Strategy for Detecting Non-adherence

1. Ask an open-ended question about taking medicine
2. Normalize and universalize non-adherence to reverse the judgmental environment
3. Make the role of accurate information about adherence in medical decision-making explicit
4. Don’t ask about “forgetting” or “missed” doses until the first 3 steps have set the stage

Hahn S, Budenz DL. *Adv Stud Ophthalmol* 2008; 5(2):44-9.

Summary

Management of Low Back Pain: Summary

- An interdisciplinary approach should be used to address pain
  - Include patient education and non-pharmacological therapies
- Patients with acute low back pain should return to activity promptly and gradually
  - Bed rest is discouraged
- Supervised exercise and cognitive behavioral therapy may be useful for chronic low back pain
- Pharmacotherapy for acute low back pain may include acetaminophen, nsNSAIDs/coxibs, weak opioids and/or muscle relaxants
  - Addition of α2δ ligands or TCAs should be considered if radicular pain is present
- Patients with longer duration of low back pain should be assessed for neuropathic and central sensitization/dysfunctional pain
  - These patients may require referral to a specialist

Coxib = COX-2-specific inhibitor; nsNSAID = non-steroidal anti-inflammatory drug; TCA = tricyclic antidepressant