

Disclaimer: *This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson’s specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient’s care. This algorithm should not be used to treat pregnant women.*

Note: This consensus algorithm excludes patients who are in the ICU, pre-procedural settings, perioperative, or currently receiving epidural or intrathecal analgesia.

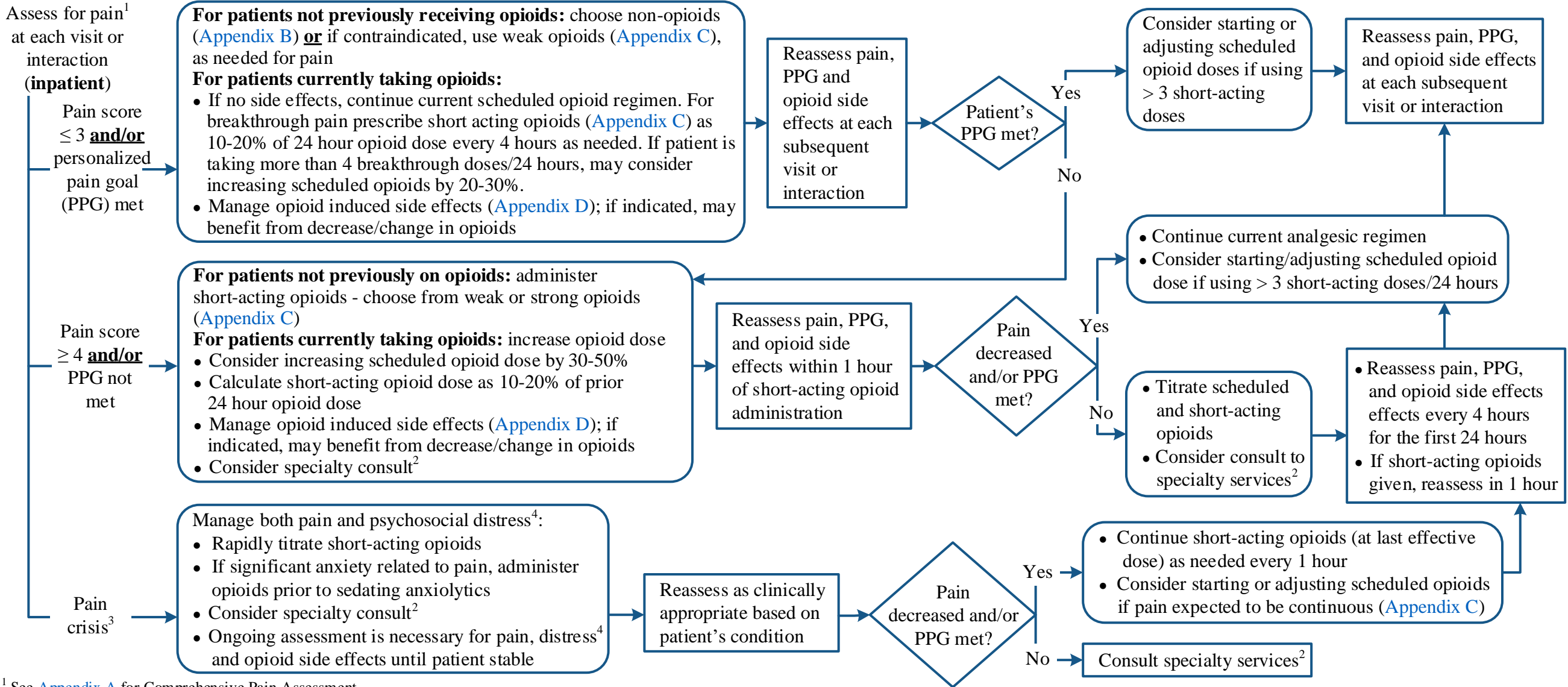
TABLE OF CONTENTS

Pain Assessment and Treatment - Inpatient	Page 2
Pain Assessment and Treatment - Outpatient	Page 3
Quick Reference Guide	Page 4
APPENDIX A: Comprehensive Pain Assessment	Page 5
APPENDIX B: Non-opioids	Page 6
APPENDIX C: Opioid Dose Consideration	Page 7-8
APPENDIX D: Opioid Side Effects – Prevention and Management	Pages 9-10
APPENDIX E: Specialty Services Consultation Guidelines	Page 11
APPENDIX F: Adjuvant “Co-analgesics” for Neuropathic Pain Syndromes and Chronic Pain	Pages 12-13
APPENDIX G: Pain Management Education for Patient and Family Prior to Discharge	Pages 14-15
APPENDIX H: Equianalgesic Opioid Dose Conversion	Pages 16-17
APPENDIX I: Treatment Services	Page 18
APPENDIX J: Fentanyl	Pages 19-20
APPENDIX K: Patient Controlled Analgesia (PCA)	Page 21
Suggested Readings	Pages 22-23
Development Credits	Page 24

Cancer Pain – Adult (Inpatient)

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

Note: This consensus algorithm excludes patients who are in the ICU, pre-procedural settings, perioperative, or currently receiving epidural or intrathecal analgesia.

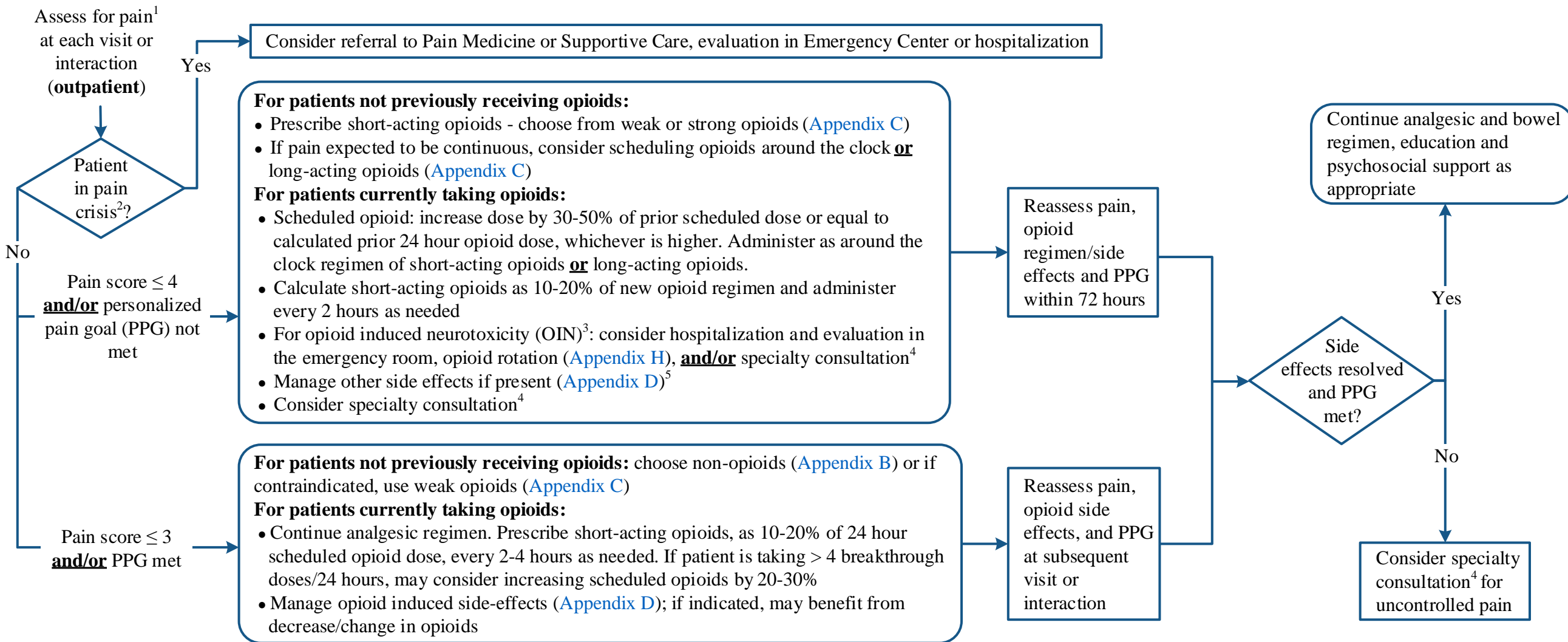


NOTE: For all patients: Consider using appropriate adjuvants (Appendix F) and/or complementary therapies, bowel regimen (Appendix D), patient education (Appendix G), and psychosocial support (Appendix E) as appropriate

¹ See Appendix A for Comprehensive Pain Assessment
² Specialty consultation services that specialize in pain management: Acute Pain, Pain Medicine, Palliative/Supportive Care, and Integrative Medicine; see Appendix E for description of services
³ Pain crisis or emergency is defined as severe pain, new onset or exacerbation of previously stabilized pain, accompanied by significant distress or if present for > 24 hours
⁴ For additional information see the Distress Screening and Psychosocial Management algorithm
 Copyright 2020 The University of Texas MD Anderson Cancer Center

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

Note: This consensus algorithm excludes patients who are in the ICU, pre-procedural settings, perioperative, or currently receiving epidural or intrathecal analgesia.



¹ See [Appendix A](#) for Comprehensive Pain Assessment

² Pain crisis or emergency is defined as severe pain, new onset or exacerbation of previously stabilized pain, accompanied by significant distress or if present > 24 hours

³ Opioid induced neurotoxicity (OIN) symptoms include drowsiness, cognitive impairment, confusion, hallucinations, myoclonic jerks

⁴ Specialty consultation services that specialize in pain management: Acute Pain, Pain Medicine, Palliative/Supportive Care, and Integrative Medicine (see [Appendix E](#) for description of services)

⁵ Opioid induced gastrointestinal side effects: constipation, nausea, emesis (see [Appendix D](#))

Note: For all patients: Consider using appropriate adjuvants ([Appendix F](#)) and/or complementary therapies, bowel regimen ([Appendix D](#)), patient education ([Appendix G](#)), and psychosocial support ([Appendix E](#)) as appropriate

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

Quick Reference Guide

- Opioid naïve: Includes patients who are not chronically receiving opioid analgesic on a daily basis and therefore have not developed significant tolerance
- Opioid tolerant: Patients who are chronically receiving opioid analgesics on a daily basis. The FDA identifies this group as “receiving at least 60 mg of morphine daily, at least 30 mg of oral oxycodone daily, or at least 8 mg of oral hydromorphone daily or an equianalgesic dose of another opioid for a week or longer.”
- Incomplete cross-tolerance: Reduce dose of new opioid by 30-50% when switching from one opioid to another to account for tolerance to a currently administered opioid that does not extend completely to other opioids. Consequently, this phenomenon tends to lower the required dose of the new opioid.
- Dose titration: Adjusting the dose of an opioid should be individualized for each patient; refer to [Pages 2 and 3](#) of this algorithm for titration recommendations
- Dosing frequency: For long-acting opioids, dosing frequency is typically every 12-24 hours depending on the agent. Refer to [Appendix C](#) for Opioid Dose Considerations.
- Breakthrough pain: Doses of short-acting opioids for breakthrough pain should be 10-20% of the total daily dose given every 1-4 hours as needed. Breakthrough opioids can be given as frequently as every 1 hour for oral doses or every 15 minutes if IV (assuming normal renal/hepatic function).
- Elderly/organ dysfunction: Use additional caution when converting opioids in elderly patients (≥ 65 years old), and/or patients with hepatic, renal, or pulmonary dysfunction. Codeine, morphine, hydromorphone, and oxycodone should be used with caution in patients with decreased renal function.
- Opioids NOT recommended for cancer pain: Meperidine and mixed agonist-antagonists (pentazocine, nalbuphine, butorphanol) should be avoided
- Withdrawal symptoms: nausea, vomiting, diarrhea, anxiety, and shivering are common symptoms of opioid withdrawal. A gradual taper is recommended when discontinuing opioids.
- Overdose: Symptoms may include respiratory depression, constricted pupils, and decreased responsiveness. Naloxone is used to reverse the effects of an opioid. To administer, dilute 0.4 mg/mL (1 mL) ampule into 9 mL of sodium chloride 0.9% (NS) for total volume of 10 mL to achieve a 0.04 mg/mL concentration, and give 0.5 mL (0.02 mg) via slow IV push every 2 minutes until patient is more awake and respiratory status improves. **DO NOT** administer undiluted due to risk of precipitating rapid withdrawal, which may cause severe pain or seizures.
- Chemotherapy-related, intermittent pain: This type of pain may be managed with weak opioids (*e.g.*, tramadol) or combination opioid preparations (*e.g.*, hydrocodone with acetaminophen, etc.) See [Appendix C](#) for Opioid Dose Considerations, or refer to a drug information reference for additional information.
- Constipation is a common side effect with opioid use. Consider starting a bowel regimen in all patients taking opioids. Refer to [Appendix D](#).
- Duration of drug effect: Any residual drug in the patient's system must be accounted for and an assessment of any residual effects from discontinued long-acting opioids must be made before any new opioid is started. Example: fentanyl will continue to be released from the skin 12-36 hours after transdermal patch removal.
- The Texas Prescription Monitoring Program is an electronic database that tracks controlled substance prescriptions. It can help identify patients who may be misusing prescription opioids or other prescription medications and who may be at risk for overdose. Clinicians are encouraged to check the Texas PMP prior to initial opioid prescribing and at regular intervals. It can be accessed at <https://texas.pmpaware.net/login>

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

APPENDIX A: Comprehensive Pain Assessment

The comprehensive pain assessment should include the following:

1. Pain:

- a. For each site of pain, determine intensity level: 0-10 numeric rating scale (NRS) (no pain = 0, mild = 1-3, moderate = 4-6, severe = 7-10).
Assess at rest and with activity, location, onset (acute, chronic, acute exacerbation of chronic pain), pathophysiology (somatic, visceral, neuropathic), temporal factors (continuous, intermittent, breakthrough, incidental), etiology (*e.g.*, tumor, non-tumor related, fracture). (Use appropriate pain scale.)
- b. Evaluation of medical history includes: oncologic or other significant medical illnesses, medication history, relevant imaging and laboratory studies
- c. Physical examination
- d. Assess for presence of sedation [inpatient setting, consider Richmond Agitation Sedation Scale (RASS) and common opioid side effects ([Appendix D](#))]

2. Function:

- a. Evaluate patient's ability to ambulate, perform activities of daily living (ADL), range of motion (ROM), deep breathing, and coughing
- b. Assess restrictions related to pain
- c. Report patient's evaluation of functional ability

3. Psychosocial issues:

- a. Evaluate patient distress, family support, psychiatric history, patient/family knowledge and beliefs surrounding pain and its management, and risk factors for under treatment of pain which include: underreporting, prior treatment of pain and response to other pain medications, concerns about addiction to pain medications or side effects, extremes of age, gender, cultural barriers, communication barriers, and prior history of drug abuse
- b. Report patient's assessment of psychological distress

4. Personalized Pain Goal (PPG):

Determine the verbal or written goal stated by the patient describing the desired level/intensity of pain that will allow the patient to achieve comfort in physical, functional, and psychosocial domains

In addition to Comprehensive Pain Assessment, rule out or treat pain related to oncologic emergencies¹

¹ Pain related to an oncologic emergency requires assessment and treatment (*e.g.*, surgery, steroids, radiotherapy, antibiotics) along with an emergent consultation.

Examples of oncologic emergencies include:

- Bowel obstruction/perforation
- Brain metastasis
- Leptomeningeal metastasis
- Fracture or impending fracture of weight-bearing bone
- Epidural metastasis/spinal cord compression
- Pain related to infection

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

APPENDIX B: Non-opioids

CAUTION: All of these agents are antipyretic and may mask fever; use with caution in patients on myelosuppressive chemotherapy. Non-steroidal anti-inflammatory drugs (NSAIDs) may have antiplatelet effects that can increase the risk of bleeding in patients who are thrombocytopenic or receiving myelosuppressive chemotherapy and likely to become thrombocytopenic. Non-acetylated salicylates (*e.g.*, salsalate, choline magnesium trisalicylate and the COX-2 selected NSAID celecoxib) may have less effects on platelets, but should still be used with caution in a patient receiving myelosuppressive chemotherapy.

Non-opioids include acetaminophen and NSAIDs; they may be used alone or in combination with opioids for pain management. NSAIDs are useful adjuvant analgesics for bone pain.

Recommended Starting Doses: The choice of non-opioid must depend on the individual risk/benefit balance for each patient. The mechanism of action and side effect profile of each option is different.

Drug	Recommended Starting Dose	Maximum Daily Dose	Comments
Acetaminophen	500-1,000 mg PO every 6 hours as needed	3,000 mg ¹	Available orally and per rectum. At higher doses, can cause fatal hepatotoxicity and renal damage. Avoid use in hepatic dysfunction. Does not have anti-inflammatory effect.
	650 mg IV every 4 hours 1,000 mg IV every 6 hours	Single dose: 1,000 mg/dose; Daily dose: 4,000 mg ¹ daily	IV acetaminophen is formulary restricted
Ibuprofen	200-800 mg PO every 6 hours as needed	3,200 mg	Inhibits platelet aggregation, can cause gastrointestinal side effects or renal failure. Use with caution in patients at high risk. ²
Naproxen	500 mg PO initial, then 250 mg every 4 hours as needed	1,500 mg	Inhibits platelet aggregation, can cause gastrointestinal side effects or renal failure. Use with caution in patients at high risk. ²
Celecoxib	200-400 mg PO every 12 or 24 hours as needed	400 mg	Does not affect platelet aggregation; can cause renal insufficiency
Ketorolac	15-30 mg IV or PO every 6 hours as needed	120 mg	Limit treatment to 5 days. Reduce dose by 50% if age > 65 years old or weight < 50 kg. Use is contraindicated in patients with advanced renal impairment or patients at risk for renal failure due to volume depletion. Inhibits platelet aggregation and can cause gastrointestinal side effects.

¹ Manufacturers of over-the-counter acetaminophen recommend no more than 3,000 mg daily

² Patients at high risk of serious gastrointestinal side effects or renal damage from NSAIDs include: elderly (> 60 years old), smokers, previous history of peptic ulcer, currently receiving corticosteroids, anticoagulants, or presence of existing renal, cardiac or liver impairment

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

APPENDIX C: Opioid Dose Consideration (Weaker medications are listed at the beginning of Appendix C)

Opioid	Initial short-acting dose in an opioid naïve patient		Onset (minutes)	Peak effect (hours)	Duration (hours)	Initial scheduled dosing in opioid naïve patients	Available oral dose formulations	Comments
	Route	Dose						
Codeine	PO IV/SC	30-60 mg N/A	30-60 -	1-1.5 -	4-8 -	Short-acting: 30-60 mg every 6 hours Long-acting: N/A	Short-acting: 15, 30, 60 mg tablets Long-acting: N/A	Available alone or in combination with 300 mg acetaminophen ¹ . Avoid use in renal and/or hepatic dysfunction.
Tramadol	PO IV/SC	25-50 mg N/A	30-60 -	1.5 -	3-7 -	Short-acting: 25 mg PO every 6 hours Long-acting: 100 mg ER daily	Short-acting (IR): 50 mg tablets; Long-acting (ER): 100, 200, 300 mg tablets	Increased risk of serotonin syndrome ² . May lower seizure threshold. Maximum daily dose 400 mg; consider lower doses if history or increased risk of seizures. Use with caution in renal dysfunction ³ .
Tapentadol	PO	50-100 mg	<60	1.25-1.5	4-6	Short-acting: PO every 4-6 hours Long-acting: PO every 12 hours	Short-acting: 50, 75, 100 mg tablets Long-acting: 50, 100, 150, 200, 250 mg tablets	Avoid MAOIs, SSRIs, or SNRIs due to potential risk for serotonin syndrome. New medication orders are restricted to Anesthesiology and Perioperative Medicine, Pain Medicine, or Palliative/Supportive Care. Maximum daily doses: tapentadol IR 600 mg and tapentadol ER 500 mg. Avoid use if creatinine clearance is less than 30 mL/minute.
Hydrocodone	PO IV/SC	5-10 mg N/A	10-20 -	1-3 -	4-8 -	Short-acting: 5-10 mg PO every 6 hours Long acting: hydrocodone ER (Hysingla® ER) 20 mg PO once daily hydrocodone ER (Zohydro® ER) (non-formulary) PO 10 mg every 12 hours	Short-acting: 5, 7.5, 10 mg tablets; 2.5 mg/5 mL liquid, in combination with acetaminophen Long-acting: hydrocodone ER (Hysingla® ER) 20, 30, 40, 60, 80, 100, 120 mg tablets hydrocodone ER (Zohydro® ER) (non-formulary) 10, 15, 20, 30, 40, 50 mg tablets	Doses greater than 160 mg/day of hydrocodone ER (Hysingla® or Zohydro® ER) have been associated with increased risk of QTc prolongation. Use with caution in renal dysfunction.

¹ Must consider all forms of acetaminophen (combination and individual) when determining total daily dosing. Manufacturers of over-the-counter acetaminophen recommend no more than 3,000 mg daily.

² When used with TCAs, MAOIs, SSRIs, SNRIs, or 2D6 or 3A4 inhibitors

³ Avoid use of tramadol ER when creatinine clearance is less than 30 mL/minute

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

APPENDIX C: Opioid Dose Consideration (Weaker medications are listed at the beginning of Appendix C) - continued

Opioid	Initial short-acting dose in an opioid naïve patient		Onset (minutes)	Peak Effect (hours)	Duration (hours)	Initial scheduled dosing in opioid naïve patients	Available oral dose formulations	Comments
	Route	Dose						
Morphine	PO IV/SC	5-15mg 2-3 mg	30 5-10	0.5-1 -	3-6 -	Short-acting: 5-10 mg PO every 4 hours; 2-4 mg IV every 4 hours Long-acting: 15 mg PO every 12 hours, or 20 or 30 mg PO once daily	Short-acting: 15, 30 mg tablets; 10 mg/5 mL, 20 mg/5 mL, 20 mg/mL liquid Long-acting: 15, 30, 60, 100 mg tablets	Available as tablet or liquid preparation. Short-acting preparations can be given via PEG tube. Avoid use in renal dysfunction.
Oxycodone	PO IV/SC	5-10mg N/A	10-15 N/A	0.5-1 N/A	3-6 N/A	Short-acting: 5 mg PO every 4 hours Long-acting: 10 mg PO every 12 hours	Short-acting: 5, 15, 30 mg tablets; 5 mg/5 mL, 20 mg/mL liquid Long-acting: 10, 20, 40, 80 mg tablets	Available alone or in combination with acetaminophen ¹ (e.g., oxycodone 5 mg with acetaminophen 325 mg in Percocet®). Use with caution in renal dysfunction.
Oxymorphone	PO IV/SC	5-10 mg 0.5 mg	no data 5 - 10	0.5-1 N/A	3-6	Short-acting: 5 mg PO every 4 hours Long-acting: 5 mg PO every 12 hours	Short-acting: 5,10 mg tablets Long-acting: 5, 10, 20, 40 mg tablets	Poor bioavailability - must be taken on empty stomach. Use with caution in renal dysfunction.
Hydromorphone	PO IV/SC	1-3 mg 0.5-1.5 mg	15-30 15-30	0.5-1 N/A	3-5 4-5	Short-acting: 2 mg PO every 4 hours IV/SC: 0.5-1 mg every 4 hours Long-acting: 8 mg PO every 24 hours	Short-acting: 2, 4, 8 mg tablets; 1 mg/mL liquid Long-acting: 8, 12, 16, 32 mg tablets	Use with caution in renal dysfunction

¹Must consider all forms of acetaminophen (combination and individual) when determining total daily dosing. Manufacturers of over-the-counter acetaminophen recommend no more than 3,000 mg daily.

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

APPENDIX D: Opioid Side Effects – Prevention and Management

Side Effect	Prevention	Management
Sedation	<ul style="list-style-type: none"> Discontinue other sedating medications if appropriate Educate all patients receiving opioids drowsiness may result for a few days following initiation or increase in opioid regimen 	<ul style="list-style-type: none"> Consider rotation or dose reduction of opioid if sedation persists Consider psychostimulant: <ol style="list-style-type: none"> Methylphenidate (Ritalin®) 2.5-5 mg PO once or twice daily (last dose no later than 4 pm to avoid insomnia). Suggested times: 8 am and 12 noon daily. Needs controlled substance Class II (CII) prescription or Consider modafinil 100 mg once or twice daily
Opioid induced neurotoxicity Risk factors: <ul style="list-style-type: none"> High opioid dose Dehydration Renal failure Preexisting borderline cognition and/or delirium Use of other psychoactive drugs 	Eliminate non-essential CNS activating or depressing drugs (e.g., benzodiazepines)	<ul style="list-style-type: none"> Consider reversible causes such as metabolic disorders, liver or renal dysfunction, dehydration, hypercalcemia, organic brain disease; treat as appropriate. Consider one or more of the following: <ol style="list-style-type: none"> Opioid rotation (see Appendix H) Opioid dose reduction or discontinuation Discontinue other offending drugs (benzodiazepines) Hydration Symptomatic treatment with haloperidol 1-5 mg PO, IV, or SC every 4 hours as needed Avoid using naloxone even if delirium is thought to be due to opioid use
Respiratory depression	<ul style="list-style-type: none"> Monitor sedation and respiratory status (respiratory rate and oxygen saturation) during the first 24 hours in opioid naïve patients Titrate opioids cautiously Consider dose reduction or opioid rotation if patient has excessive sedation 	<ul style="list-style-type: none"> Call MD, HOLD opioids, provide supplemental oxygen If patient minimally responsive or unresponsive and respiratory rate is ≤ 8 bpm, administer naloxone. Recommended dose: naloxone 0.4 mg diluted in 9 mL sodium chloride (0.9%) for total volume of 10 mL, give 0.5 mL (0.02 mg) via slow IV push every 2 minutes until patient is more awake and respiratory status improves. (<i>Half life of naloxone is short and patient may need naloxone infusion for long-acting opioids. If no change with naloxone, rule out other causes for the respiratory depression.</i>) If patient is actively dying, DNR (do not resuscitate) and receiving comfort care, naloxone administration may not be appropriate

Continued on next page

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

APPENDIX D: Opioid Side Effects – Prevention and Management - continued

Side Effect	Prevention	Management
Nausea, Vomiting	<ul style="list-style-type: none"> • Titrate opioid dose slowly and steadily • Provide antiemetics available with opioid prescription • Metoclopramide 10 mg PO • For patients at high risk of nausea consider scheduled antiemetics for 5 days and then change to as needed 	<ol style="list-style-type: none"> 1. Investigate for other causes of nausea (e.g., constipation, bowel obstruction, chemotherapy or other medications) and treat per guidelines. Initiate scheduled antiemetics. Example: metoclopramide 5 to 10 mg PO, IV, or SC every 6 hours. 2. Add or increase non-opioid or adjuvant medications for additional pain relief so opioid dose can be reduced 3. If analgesia is satisfactory, reduce opioid dose by 25% 4. Consider opioid rotation if nausea remains refractory
Constipation	<p>Unless alterations in bowel patterns such as bowel obstruction or diarrhea exist, all patients receiving opioids should be started on laxative bowel regimen and receive education for bowel management.</p> <ol style="list-style-type: none"> 1. Stimulant laxative plus stool softener: For example: Senokot-S® (senna 8.6 mg plus docusate 50 mg), 2 tablets/day and titrate up to maximum 9 tablets/day 2. Ensure adequate fluids, dietary fiber and exercise if feasible 3. Prune juice followed by warm beverage may be considered 	<ol style="list-style-type: none"> 1. Assess potential causes of constipation (such as recent opioid dose increase, use of other constipating medications, new bowel obstruction) 2. Increase Senokot-S® (or senna and docusate tablets if using separate) and add 1 or both of the following: <ol style="list-style-type: none"> a. Milk of magnesia oral concentrate (1,200 mg/5 mL) 10 mL PO 2-4 times daily b. Polyethylene glycol (Miralax™) 17 grams in 8 ounce beverage daily 3. If no response to above, perform digital rectal exam (DRE) to rule out low impaction (do not perform if neutropenic, thrombocytopenic, or post-operative bowel surgery) Continue above steps and <ul style="list-style-type: none"> • If impacted: disimpact manually if stool is soft. If not, soften with mineral oil fleet enema before disimpaction. Follow up with milk of molasses enemas until clear with no formed stools. • Consider use of short-acting analgesics before disimpaction • If not impacted on rectal examination, patient may still have higher level impaction. Consider abdominal imaging and/or administer milk of molasses enema along with 8 ounces of magnesium citrate orally. • See Bowel Management SmartSet 4. Methylnaltrexone (Relistor®) may be given to patients who meet the following criteria: <ul style="list-style-type: none"> • Patient experiencing opioid-induced constipation • Patient has not demonstrated an adequate response to other laxative therapy • Patient does not have a known or suspected mechanical gastrointestinal obstruction

Disclaimer: *This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.*

APPENDIX E: Specialty Services Consultation Guidelines

MD Anderson offers three coordinated pain specialty core services, consisting of Acute Pain Medicine, Pain Medicine and Palliative/Supportive Care, as well as Integrative Medicine. Guidelines for consultation to these services include the following:

- A. Consult to one of the specialty core services should be considered for *any* patient whose pain remains uncontrolled for over 24 hours. Special patient population in which pain assessment and management may be especially challenging include the following:
- Substance use disorders - except tobacco (current or past history)
 - Emotional, behavioral, and mental disorders
 - Cognitive disorders
 - Communicative disorders
 - Developmental disabilities
 - Vision and hearing impairments and disabilities
 - Refractory symptoms and dying patient
- B. For postoperative and perioperative pain: Acute Pain Medicine and/or Integrative Medicine
- C. For acute pain in inpatients: Pain Medicine in cases of pre-existing chronic pain
- D. For patients with chronic pain and no evidence of active cancer: Pain Medicine and/or Integrative Medicine
- E. For patients with evidence of active cancer with pain as the sole or predominant symptom: Pain Medicine, Palliative/Supportive Care Service, and/or Integrative Medicine
- F. For patients with evidence of active cancer and pain accompanied by multiple symptoms: Palliative/Supportive Care and/or Integrative Medicine
- G. For patients with pain in the context of cancer in the palliative stage or end of life: Palliative/Supportive Care and/or Integrative Medicine
- H. For patients with suspected opioid addiction, request a consult to one of the specialty core services for a referral to a treatment program. See [Appendix I](#) for Treatment Services.

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson’s specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient’s care. This algorithm should not be used to treat pregnant women.

APPENDIX F: Adjuvant “Co-analgesics” for Neuropathic Pain Syndromes and Chronic Pain

Drug Class and Uses)	Medication	Recommended Starting Dose	Maximum Daily Dose	Comments
Anticonvulsants (various NP types)	Gabapentin	100-300 mg PO daily	3,600 mg PO per day in 3 divided doses	Used in PHN and NP. May cause drowsiness, dizziness, peripheral edema. Dose adjust for renal impairment.
	Pregabalin	25-75 mg PO twice daily	600 mg PO per day in 3 divided doses	Used in DN, PHN, FM, and NP. May cause drowsiness, dizziness, peripheral edema. Dose adjust for renal impairment.
	Carbamazepine	100 mg PO twice daily	1,200 mg PO per day in 2 divided doses	Used in TGN and NP. Associated with aplastic anemia, agranulocytosis, bone marrow suppression, severe dermatologic reactions, hyponatremia. May cause drowsiness, dizziness, nausea. Significant drug interactions. Avoid in hepatic dysfunction.
	Oxcarbazepine	150-300 mg PO daily	2,400 mg PO per day in 2 divided doses	Used in TGN and NP. Associated with severe dermatologic reactions, hyponatremia. May cause drowsiness, dizziness. Dose adjust for renal impairment.
	Topiramate	25-50 mg PO twice daily	200 mg PO twice per day	Used in NP. May cause acidosis, drowsiness, dizziness, nausea. Dose adjust for renal impairment and hepatic dysfunction.
	Tiagabine	4 mg PO at bedtime	8 mg PO per day	Used in NP. May produce seizures in patients with history of seizures. May cause drowsiness, dizziness, diarrhea. Use with caution if hepatic dysfunction. Higher doses result in increased side effects.
Tricyclic Antidepressants (TCA)	Amitriptyline	10-25 mg PO at bedtime	150 mg PO at bedtime	Consider for continuous and shooting neuropathic pain. Caution in elderly or frail, or patients with glaucoma or arrhythmias. May cause sedation, arrhythmias, dry mouth, orthostasis, urinary retention. Consider duloxetine for NP, DN and musculoskeletal pain. Caution in patients with seizures; avoid MAOIs, other SSRIs or SNRIs due to potential for serotonin syndrome. Duloxetine may increase the risk of bleeding events. Concomitant use of aspirin, NSAIDs, warfarin, and other anticoagulants may add to this risk. Taper slowly.
	Nortriptyline	10-25 mg PO at bedtime	75 mg PO at bedtime	
	Desipramine	10-25 mg PO at bedtime	150 mg PO at bedtime	
Serotonin-Norepineprine Reuptake Inhibitors (SNRI)	Duloxetine	20-30 mg PO daily	60 mg PO per day	
	Venlafaxine	37.5 mg PO daily	225 mg PO per day	

DN = diabetic neuropathy
 FM = fibromyalgia
 MAOI = monoamine oxidase inhibitors

NP = neuropathic pain
 PHN = postherpetic neuralgia
 SNRIs = serotonin-norepinephrine reuptake inhibitors

SSRIs = selective serotonin reuptake inhibitors
 TCAs = tricyclic antidepressants
 TGN = trigeminal neuralgia

Continued on next page

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson’s specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient’s care. This algorithm should not be used to treat pregnant women.

APPENDIX F: Adjuvant “Co-analgesics” commonly used for Neuropathic Pain Syndromes and Chronic Pain – continued

Drug Class and Uses	Medication	Recommended Starting Dose	Maximum Daily Dose	Comments
Muscle relaxants (muscle pain, spasm)	Baclofen ¹	5 mg PO twice daily	80 mg PO per day in 3-4 divided doses	Caution in patients with seizures, cardiovascular disease, glaucoma, myasthenia gravis, renal or hepatic impairment, patients on TCAs or MAOIs, or advanced age. May cause anticholinergic effects and significant drowsiness. Caution additive sedation if used with other central nervous system depressants.
	Cyclobenzaprine	5 mg PO three times daily	30 mg PO per day in 3 divided doses	
	Diazepam	2-10 mg PO three to four times daily	40 mg per day	
	Metaxalone	400 mg PO three times daily	3,200 mg PO per day in 3-4 divided doses	Methocarbamol IV: may repeat course after drug free interval of 48 hours
	Methocarbamol	500 mg PO four times daily 1,000 mg IV every 8 hours	4,000 mg per day in 3-6 divided doses; IV for 3 days maximum if PO not possible	
	Tizanidine	2-4 mg PO at bedtime	36 mg per day in 2-3 divided doses	
Corticosteroids (inflammation, nerve compression)	Dexamethasone	Varies by clinical situation (IV or PO) Standard dose 4-16 mg/day	Varies by clinical situation	May cause impaired healing, infection, thrush, hyperglycemia, weight gain, myopathy, stomach upset, psychosis, emotional instability

MAOI = monoamine oxidase inhibitors

TCAs = tricyclic antidepressants

¹Intrathecal formulation not on MD Anderson Cancer Center Formulary

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

APPENDIX G: Pain Management Education for Patient and Family Prior to Discharge

Management of cancer pain is an integral component of cancer care. Patient education in the following areas should be provided to patients.

1. General Pain Education: Specific teaching information is available in Patient Education-On Line. Education should include the following:

- A. Relief of pain is important and there is no benefit to suffering with pain
- B. Expect optimal treatment for pain and side effects
- C. Pain can usually be well controlled with oral medications. There are many options available to control pain.
- D. Non-drug treatments can also be helpful for pain relief. Some examples include:
 - Acupuncture
 - Biofeedback
 - Breathing and relaxation exercises
 - Distraction
 - Heating pads or cold packs
 - Imagery
 - Massage, pressure or vibration
 - Prayer or meditation
 - Rest
 - Transcutaneous electrical nerve stimulation (TENS)
- E. Communication with healthcare team is critical to pain management and avoiding serious side effects. Communication should include:
 - Patient understanding about how to rate their pain type, severity/intensity, and personalized pain goals (PPG). A numeric pain scale should be provided with explanation.
 - Potential problems or side effects of pain medications
 - Concerns about difficulty in obtaining medications (such as cost or inadequate amount of tablets)

2. Specific Information Related to Opioid Use (such as morphine and related medications). Specific teaching information is available in Patient Education-On Line.

- A. Morphine and morphine-like medications are often used to relieve pain
- B. When opioids are used to treat cancer pain and taken only as prescribed, addiction is rarely a problem
- C. Taking opioids now will not diminish later effectiveness
- D. Discuss potential side effects of opioids, and their prevention and management
- E. Prevention of constipation will be needed by most patients
- F. Opioids are controlled substances that need to be properly safeguarded in the home
- G. Opioids must be used with caution, and should not be mixed with alcohol or illicit substances
- H. Opioids must be stored and disposed of properly. MD Anderson's Floor 2 Pharmacy and Mays Clinic Pharmacy are authorized collection locations, and medications can be disposed of in the green bins.

3. Pain Education Discharge/Resource Checklist:

- A. A written plan for pain medications, listing all medications to be used with dosage and frequency. Provide patient with printed copy of updated medication reconciliation.
- B. Written information on who to call (provider, service, phone number) for pain issues and plan for follow up care. Instruct patient/caregiver to call if:
 - Problems in obtaining prescriptions or taking the medication
 - New pain, change in pain, or pain not relieved with medication
 - Nausea and vomiting that prevents eating for 1 day
 - No bowel movements for 3 days
 - Difficulty arousing the patient from sleep easily during daytime
 - Confusion

Disclaimer: *This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.*

APPENDIX G: Pain Management Education for Patient and Family Prior to Discharge - continued

3. Pain Education Discharge/Resource Checklist - continued:

C. MD Anderson Cancer Center has multiple resources for pain management

- Online resources – Patient Education Online is available for staff at <http://inside2.mdanderson.org/apps/pe> or for patients at <https://my.mdanderson.org>
- Specialty services for pain management include: Acute Pain Medicine, Pain Medicine, Palliative/Supportive Care, and Integrative Medicine.
Referral from primary service is required. Pain Medicine, Palliative/Supportive Care, and Integrative Medicine have clinics 5 days a week.
 - Integrative Medicine services such as acupuncture, massage, and mind-body therapies are available through online consults or by calling 713-794-4700.
Further information can be found at <http://www.mdanderson.org/departments/integrative-medicine-program>.
- The Learning Center provides information about health, cancer, and cancer prevention.
 - Available resources include:
 - Journals, consumer health magazines and newsletters
 - Online journals, electronic books and databases
 - Books, audio books, and DVDsFree booklets
 - Patients, family members, and the general public can visit either location Monday-Friday, 9 am - 4 pm
 - Law Learning Center, Main Building, Floor 4, near Elevator A
 - Levit Learning Center, Mays Clinic, Floor 2, near Elevator T

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

APPENDIX H: Equianalgesic Opioid Dose Conversion

Note: This chart is based on the Centers for Disease Control and Prevention (CDC) recommendations (<https://www.cdc.gov/drugoverdose/resources/data.html>). The equianalgesic doses (oral and parenteral) can be affected by interpatient variability, type of pain (e.g., acute versus chronic), chronic administration, and tolerance. The following table should serve as a guide when switching from one opioid to another. It is recommended to reduce the dose of the new opioid by 30-50% to account for incomplete cross tolerance, and to periodically monitor for efficacy and adverse reactions and the dose adjusted accordingly.

Opioid	Oral Dose (PO)	Parenteral Dose (IV/SC)	Conversion Factor: Parenteral to Oral Opioid	Conversion Factor: Oral Opioid to Oral Morphine
Morphine	30 mg	12 mg	2.5	1
Oxycodone	20 mg	N/A	N/A	1.5
Hydrocodone	30 mg	N/A	N/A	1
Oxymorphone	10 mg	1 mg	10	3
Hydromorphone	7.5 mg	3 mg	2.5	4
Fentanyl¹	N/A	120 mcg	N/A	Should be managed by clinicians experienced in pain management
Methadone and buprenorphine should only be initiated and managed by clinicians experienced in pain management. Consider consult to pain specialists if needed.				

¹ See [Appendix J](#) for transdermal fentanyl conversion

Continued on next page

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

APPENDIX H: Equianalgesic Opioid Dose Conversion - continued

Steps for Opioid Rotation:

1. Stop current opioid regimen
2. Calculate total dose of current opioid (scheduled and PRN doses) used in the previous 24 hour period
3. Calculate the dose of the new opioid using the equianalgesic dose conversion table (from previous page) and conversion equation (below)

$$\frac{\text{Equianalgesic dose per route of CURRENT opioid}}{24 \text{ hour dose per route of CURRENT opioid}} = \frac{\text{Equianalgesic dose per route of NEW opioid}}{24 \text{ hour dose per route of NEW opioid}}$$

4. Calculate for incomplete cross-tolerance between opioids. Decrease the target dose from step 3 by 30-50% to obtain the new opioid dose.
5. Calculate scheduled pain dose. Divide the new opioid dose (from step 4) by number of doses to be given over 24 hours and administer as scheduled doses.
6. Calculate breakthrough pain dose as 10-20% of calculated new opioid dose to administer as needed every 1 hour
7. Titrate new opioid regimen until adequate analgesia is achieved

Opioid Rotation Example: Rotation from morphine PCA¹ (total daily dose of 120 mg IV) to oral oxycodone

1. Stop current opioid regimen
2. Calculate dose of current opioid (scheduled and PRN doses) used in the previous 24 hours which equals 120 mg IV morphine
3. Calculate the dose of the new opioid using the equianalgesic dose conversion table and conversion equation (below)
 - a. Calculate IV morphine to PO morphine based on conversion table and conversion equation :

$$\frac{6 \text{ mg IV morphine}}{120 \text{ mg IV morphine over 24 hours}} = \frac{15 \text{ mg PO morphine}}{X \text{ mg PO morphine over 24 hours}} \quad X = 300 \text{ mg PO morphine}$$
 - b. Calculate PO morphine to PO oxycodone based on conversion table:

$$\frac{300 \text{ mg PO morphine}}{X \text{ mg PO oxycodone}} = \frac{15 \text{ mg PO morphine}}{10 \text{ mg PO oxycodone}} \quad X = 200 \text{ mg PO oxycodone}$$
4. Calculate for incomplete cross-tolerance. After a 30-50% dose reduction, the oxycodone dose calculated above should be between 100-140 mg per day.
5. Calculate scheduled pain dose. Extended release (ER) oxycodone is dosed every 12 hours; recommend oxycodone ER 60 mg every 12 hours (based on tablet availability)
6. Calculate breakthrough pain dose as 10-20% of recommended 120 mg oxycodone dose and administer as needed every 1 hour.

Immediate release (IR) oxycodone is between 12-24 mg per dose and may be administered every 1-4 hours.
 Based on tablet availability recommend oxycodone IR 10-20 mg every 1-4 hours as needed for breakthrough pain.
7. Titrate new opioid regimen until adequate analgesia is achieved

¹ See Appendix K for Patient Controlled Analgesia (PCA)

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

APPENDIX I: Treatment Services

Note: Most treatment facilities require insurance coverage or sufficient payment to cover treatment. If patient has insurance, call the customer service number to find a facility in-network to avoid a large out-of-pocket debt.

- Treatment Facilities for Alcohol and Drug Abuse
Houston, Texas
(800) 304-2219
- Bay Area Recovery Center
1807 FM 517
East Dickinson, Texas 77539
(713) 705-3457
- The Council on Alcohol and Drugs
Houston, Texas
www.councilonrecovery.org
- Clearinghouse for treatment, education, and recovery groups, *etc.*
303 Jackson Hill St.
Houston, Texas 77007
(713) 914-0556, (281) 866-7557
- UT Health Houston Behavioral and Biomedical Science Building
941 East Rd. First floor
Houston, Texas 77054
(713) 500-3784
- Hazelden Betty Ford
Multiple locations around the country
(866) 831-5700
- The Treehouse
Scurry, Texas (South of Dallas)
(888) 683-1406
- St. Joseph Hospital
1401 St. Joseph Parkway
Houston, Texas 77002
(713) 575-1000, (800) 466-0792
- West Oaks Hospital (Dr. George Santos)
www.westoaks.org
6500 Hornwood
Houston, Texas 77074
- UT Health Harris County Psychiatric Center (HCPC)
2800 South MacGregor Way
Houston, TX 77021
(713) 741-5000
- SAMHSA, Substance Abuse and Mental Health Services Administration
Behavioral Health Treatment Services Locator: www.findtreatment.samhsa.gov
Enter patient's address and zip code on website
(800) 622-4357
- The Menninger Clinic
12301 S. Main St.
Houston, Texas 77035-6207
(713) 275-5000
- Narcotics Anonymous
www.na.org
Houston area Narcotics Anonymous
www.hascona.org
(713) 661-4200

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

APPENDIX J: Fentanyl

Dosage Forms	Onset	Peak	Duration	Doses Available per Formulary	Comments
Parenteral (IV/Subcutaneous)	Almost immediate	Several minutes	0.5-1 hour	0.05 mg/mL (5 mL vial for injection) PCA ¹ syringe supplied as 2,500 mcg/50 mL	
Transdermal patch ¹	12-24 hours	24-72 hours	48-72 hours	12 (delivers 12.5), 25, 50, 75, 100 mcg/hour	Bioavailability 90%; Do <i>not</i> cut patch, apply heat, or use in patients who develop fever - results in faster onset, shorter duration, and possible overdose. After transdermal patch removal, continued absorption of fentanyl occurs from the skin. Delayed administration of another long-acting opioid should be considered due to persistent serum levels of fentanyl. Due to differences in bioavailability, fentanyl products are not interchangeable on a microgram-to-microgram basis.
Transmucosal lozenge (Actiq®)	5-15 minutes	20-40 minutes	Related to blood level	200, 400, 600 mcg	Bioavailability 50%; not interchangeable on a microgram-to-microgram basis with other fentanyl products
Sublingual Tablet (Abstral®)	5-15 minutes	30-60 minutes	2 hours	100, 200, 300, 400, 600, 800 mcg	Bioavailability 54%; not interchangeable on a microgram-to-microgram basis with other fentanyl products

Drug specific characteristics:

- Fentanyl is 80-100 times more potent than morphine. Fentanyl is not recommended for initial use in opioid naïve patients. Use in non-opioid tolerant patients may lead to fatal respiratory depression.
- Transdermal fentanyl should only be used in patients with stable opioid requirements. Due to its long half-life of 17 hours, the dose may be difficult to titrate if pain is not well-controlled.
- When initiating transdermal fentanyl, patients should use short-acting opioids as needed until efficacy is obtained (peak effect 24-72 hours)
- Titrate patients on transdermal fentanyl no more frequently than every 3 days after initial dose, and then every 6 days thereafter. Initial evaluation of maximum analgesic effect should not be made before 24 hours.
- Caution with CYP450 3A4 inhibitors, which can increase fentanyl plasma concentrations
- May be used in patients with renal dysfunction
- Prior to processing initial prescriptions for **rapid onset fentanyl**, the prescriber must register with the [TIRF REMS Access Program](#) and complete a Prescriber and Patient agreement

Morphine to Fentanyl conversion: 1 mg of IV morphine or 2.5 mg of oral morphine = 10 micrograms of IV fentanyl

Example: Conversion from oral morphine ER 90 mg every 12 hours to fentanyl IV

1. 24-hour morphine dose is 90 + 90 = 180 mg
2. Decrease 180 mg by 30% for incomplete tolerance = 126 mg
3. 1 mg morphine IV = 2.5 mg morphine oral = 10 micrograms fentanyl IV, then new 24-hour morphine dose of 126 mg = 24 hour fentanyl IV dose of 504 micrograms
4. Divide 24-hour fentanyl dose calculated by 24 hours = 21 micrograms/hour

Thus an appropriate starting dose for fentanyl IV per hour (as basal rate in PCA) is 20 micrograms/hour

¹ See [Appendix K](#) for Patient Controlled Analgesia (PCA)

Continued on next page

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

APPENDIX J: Fentanyl - continued

Transdermal Fentanyl (TDF) Dosing:

Option 1: 2 mg oral morphine is approximately 1 microgram *per hour* transdermal fentanyl

Example: Total daily dose of morphine 100 mg translates to approximately 50 micrograms transdermal patch, to be applied every 72 hours

Option 2: Calculate the total daily dose of morphine and then use the following table to select the appropriate patch strength

Oral Morphine (mg/day)	Transdermal Fentanyl (mcg/hour)
30-90	25
91-150	50
151-210	75
211-270	100
Each additional 60 mg/day	An additional 25 mcg/hour

Note: This table should **NOT** be used to convert from TDF to other therapies because this conversion to TDF is conservative. Use of this table for conversion to other analgesic therapies can overestimate the dose of the new agent.

- To convert patients to another opioid, remove the transdermal fentanyl patch and titrate the dose of the new analgesic based upon the patient's report of pain until adequate analgesia has been attained. Upon patch removal, 17 hours or more are required for a 50% decrease in serum fentanyl concentrations.
- Must prescribe short-acting opioid for breakthrough pain

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

APPENDIX K: Patient Controlled Analgesia (PCA)

Suggested initial PCA settings: All opioid doses must be individualized (use the institutional order set for all new PCA orders and dose changes)

1. Opioid naïve patients

Opioid	Demand (PCA) dose (dose range)	Lock out interval (minutes)	1-hour dose limit (optional)	Continuous dose (basal)	Nurse bolus as needed for pain	Nurse bolus interval (hours)
Morphine (milligrams)	1 mg (0.5-2.5)	10-30 min	4 mg	see below	2-4 mg	2
Hydromorphone (milligrams)	0.2 mg (0.1-0.5)	10-30 min	0.8 mg	see below	0.5-1 mg	2
Fentanyl (micrograms)	10 mcg (5-25)	10-30 min	40 mcg	see below	25 mcg	2

- Patient should be alert and demonstrate ability to administer demand dose for pain. If concerns about cognitive failure or significant anxiety, consider Specialty Consultation: Acute Pain, Pain Medicine, Palliative/Supportive Care (see [Appendix E](#) for description of services).
- Carefully consider adding continuous (basal) dose after 12-24 hours if using frequent demand doses or if pain not controlled. Suggested basal dose is 30-50% of average hourly dose.
 Example: The 12-hour total morphine demand dose is 20 mg, calculate continuous dose as $20/12 = 1.7$ mg/hour then 1.7×0.3 (30%) = 0.5 mg/hour basal rate

2. Opioid tolerant patients (currently receiving opioid therapy)

PCA orders should take into account the patient's current opioid regimen, clinical situation (severity and etiology of the pain, side effects from opioids, baseline drowsiness, need for opioid rotation). If there are significant side effects, drowsiness, confusion, respiratory or central nervous system concerns, it is recommended to call for Specialty Consultation: Acute Pain, Pain Medicine, Palliative/Supportive Care (see [Appendix E](#) for description of services) for PCA ordering.

- Calculate total dose of opioid (scheduled and PRN doses) used in the previous 24-hour period
- Use Equianalgesic Opioid Dose Conversion table ([Appendix H](#)) to calculate dose of IV opioid being considered for PCA. Decrease dose by 30-50% to adjust for lack of complete cross tolerance to obtain new IV dose.
- Divide new IV dose (from above step) by 24 hours, to obtain hourly (basal) dose
- Calculate demand (PCA) dose as 10-20% of new IV opioid dose to use as needed for pain every hour

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

SUGGESTED READINGS

Agency for Healthcare Research and Quality (AHRQ): Management of Cancer Pain Volumes I and II

Allard, P., Maunsell, E., Labbé, J., & Dorval, M. (2001). Educational interventions to improve cancer pain control: A systematic review. *Journal of Palliative Medicine*, 4(2), 191-203.

Anderson, R., Sayers, J. H., Abram, S., & Schlicht, C. (2001). Accuracy in equianalgesic dosing: Conversion dilemmas. *Journal of Pain and Symptom Management*, 21(5), 397-406.

Breitbart, W., Chandler, S., Egel, B., Ellison, N., Enck, R. E., Lefkowitz, M., & Payne, R. (2000). An alternative algorithm for dosing transdermal fentanyl for cancer-related pain. *Oncology (Williston Park, NY)*, 14(5), 695-705.

Bruera, E., & Kim, H. N. (2003). Cancer pain. *Jama*, 290(18), 2476-2479.

Bruera, E., Pereira, J., Watanabe, S., Belzile, M., Kuehn, N., & Hanson, J. (1996). Opioid rotation in patients with cancer pain: A retrospective comparison of dose ratios between methadone, hydromorphone, and morphine. *Cancer*, 78(4), 852-857

Burton, A. W., Fanciullo, G. J., Beasley, R. D., & Fisch, M. J. (2007). Chronic pain in the cancer survivor: a new frontier. *Pain Medicine*, 8(2), 189-198.

Cancer Care Nova Scotia, & Broadfield, L. (2005). *Best Practice Guidelines for the Management of Cancer-related Pain in Adults*. Cancer Care Nova Scotia.

Cairns, R. (2001). The use of oxycodone in cancer-related pain: A literature review. 522-527

Carr, D. B., Goudas, L. C., Balk, E. M., Bloch, R., Ioannidis, J. P., & Lau, J. (2004). Evidence report on the treatment of pain in cancer patients. *JNCI Monographs*, 2004(32), 23-31.

Davis, M. P., Weissman, D. E., & Arnold, R. M. (2004). Opioid dose titration for severe cancer pain: A systematic evidence-based review. *Journal of Palliative Medicine*, 7(3), 462-468.

Devine, E. C. (2003). Meta-analysis of the effect of psychoeducational interventions on pain in adults with cancer. *Oncology Nursing Forum-Oncology Nursing Society* 30(1), 75-98.

Donner, B., Zenz, M., Tryba, M., & Strumpf, M. (1996). Direct conversion from oral morphine to transdermal fentanyl: A multicenter study in patients with cancer pain. *Pain*, 64(3), 527-534.

Ferrante, F., Bedder, M., Caplan, R., Chang, H., Connis, R., Harrison, P., ... Portenoy, R. (1996). Practice guidelines for cancer pain management: A report by the American society of anesthesiologists task force on pain management, cancer pain section. *Anesthesiology*, 84(5), 1243-1257.

Ferreira, K. A. S. L., Kimura, M., & Teixeira, M. J. (2006). The WHO analgesic ladder for cancer pain control, twenty years of use. How much pain relief does one get from using it?. *Supportive Care in Cancer*, 14(11), 1086-1093.

Fine, P. G., Miaskowski, C., & Paice, J. A. (2004). Meeting the challenges in cancer pain management. *Journal of Supportive Oncology*, 2(6), 5-22

Gordon, D. B., Dahl, J. L., Miaskowski, C., McCarberg, B., Todd, K. H., Paice, J. A., ... Carr, D. B. (2005). American pain society recommendations for improving the quality of acute and cancer pain management: American pain society quality of care task force. *Archives of Internal Medicine*, 165(14), 1574-1580.

Continued on next page

Disclaimer: This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.

SUGGESTED READINGS - continued

- Hagen, N. A., Fisher, K., Victorino, C., & Farrar, J. T. (2007). A titration strategy is needed to manage breakthrough cancer pain effectively: Observations from data pooled from three clinical trials. *Journal of Palliative Medicine*, 10(1), 47-55.
- Hanks, G. W., Conno, F. d., Cherny, N., Hanna, M., Kalso, E., McQuay, H. J., ... Expert Working Group of the Research Network of the European Association for Palliative Care. (2001). Morphine and alternative opioids in cancer pain: The EAPC recommendations. *British Journal of Cancer*, 84(5), 587-593.
- Jost, L. M. (2005). ESMO Minimum Clinical Recommendations for the management of cancer pain. *Annals of Oncology*, 16(suppl 1), i83-i85.
- Kleinert, R., Lange, C., Steup, A., Black, P., Goldberg, J., & Desjardins, P. (2008). Single dose analgesic efficacy of tapentadol in postsurgical dental pain: The results of a randomized, double-blind, placebo-controlled study. *Anesthesia & Analgesia*, 107(6), 2048-2055.
- McNicol, E., Strassels, S., Goudas, L., Lau, J., & Carr, D. (2004). Nonsteroidal Anti-Inflammatory Drugs, Alone or Combined With Opioids, for Cancer Pain: A Systematic Review Supported in part by the AHRQ under contract 290-07-0019 and sustained through funding from the Richard Saltonstall Charitable Foundation and the Evenor Armington Fund. This article is an updated, expanded version of a section of an Agency for Healthcare and Research Quality (AHRQ) report (Goudas L, Carr DB, Bloch R, et al: Management of cancer pain: Evidence Report/Technology Assessment No. 35 *Journal of Clinical Oncology*, 22(10), 1975-1992.
- McNicol, E., Horowicz-Mehler, N., Fisk, R. A., Bennett, K., Gialeli-Goudas, M., Chew, P. W., ... Carr, D. (2003). Management of opioid side effects in cancer-related and chronic noncancer pain: a systematic review. *The Journal of Pain*, 4(5), 231-256.
- McPherson, M. L. (2009). Demystifying opioid conversion calculations: A guide for effective dosing. ASHP.
- Mercadante, S. (2007). Opioid titration in cancer pain: a critical review. *European Journal of Pain*, 11(8), 823-830.
- Miaskowski, C., Cleary, J., Burney, R., Coyne, P., Finley, R., Foster, R., ... Weisman, S. J. (2005). Guideline for the management of cancer pain in adults and children. *Glenview, IL: American Pain Society*, 3.
- National Comprehensive Cancer Network (2019). *Adult Cancer Pain* (NCCN Guideline Version 2.2019). Retrieved from https://www.nccn.org/professionals/physician_gls/pdf/pain.pdf
- Patanwala, A. E., Duby, J., Waters, D., & Erstad, B. L. (2007). Opioid conversions in acute care. *Annals of Pharmacotherapy*, 41(2), 255-267.
- Reddy, A., Yennurajalingam, S., Desai, H., Reddy, S., de la Cruz, M., Wu, J., ... Gayle, V. (2014). The opioid rotation ratio of hydrocodone to strong opioids in cancer patients. *The Oncologist*, 19(11), 1186-1193.
- Zech, D. F., Grond, S., Lynch, J., Hertel, D., & Lehmann, K. A. (1995). Validation of World Health Organization Guidelines for cancer pain relief: A 10-year prospective study. *Pain*, 63(1), 65-76.

Disclaimer: *This algorithm has been developed for MD Anderson using a multidisciplinary approach considering circumstances particular to MD Anderson's specific patient population, services and structure, and clinical information. This is not intended to replace the independent medical or professional judgment of physicians or other health care providers in the context of individual clinical circumstances to determine a patient's care. This algorithm should not be used to treat pregnant women.*

DEVELOPMENT CREDITS:

This practice consensus statement is based on majority opinion of the cancer pain experts at the University of Texas MD Anderson Cancer Center for the patient population. These experts included:

Eduardo Bruera, MD (Palliative Care Medicine)
Diana Cauley, PharmD (Pharmacy Clinical Programs)
Shalini Dalal, MD (Palliative Care Medicine)[‡]
Larry Driver, MD (Pain Medicine)
Olga N. Fleckenstein[♦]
Pauline Koinis, BSMT[♦]

Dhanalakshmi Koyyalagunta, MD (Pain Medicine)
Keyuri U Popat, MD (PeriOperative Medicine)
Suresh K. Reddy, MD (Palliative Care Medicine)
Eden Mae C. Rodriguez, PharmD (Pharmacy Clinical Programs)
Alan D. Valentine, MD (Psychiatry)
Monica Wattana, MD (Emergency Medicine)

The document is based upon the consensus of pain experts. Evidence regarding specific clinical outcomes associated with the use of this or similar pain algorithms applied in comprehensive cancer centers is sparse. Other algorithms or approaches may produce similar or better outcomes.

[‡] Core Development Team Lead

[♦] Clinical Effectiveness Development Team