Medical Cannabis Update: Emerging Roles for Pharmacists
Laura Borgelt, PharmD, FCCP, BCPS, NCMP

Home Study Webcast
4 Slides Per Page
ACTIVITY DESCRIPTION
Twenty-nine states and the District of Columbia have now enacted laws regarding cannabis. This includes medical and recreational use of cannabis. Pharmacists may be uncomfortable discussing cannabis use with patients given its Schedule I status and potential drug interactions; however, it is necessary for pharmacists to provide education and effective counseling when patients use cannabis. This program will address key issues so that pharmacists are better able to discuss the medical use of cannabis with patients.

TARGET AUDIENCE
The target audience for this activity is pharmacists, pharmacy technicians and nurses in hospital, community, and retail pharmacy settings.

LEARNING OBJECTIVES
After completing this activity, the pharmacist will be able to:
• Identify the current status of cannabis in the United States.
• Describe the clinical pharmacology of cannabis and its active components.
• Evaluate clinical studies performed in various conditions to determine the effectiveness and adverse effects of medical cannabis.
• Identify potential drug interactions and other patient safety issues that may occur with the use of medical cannabis.
• Review important counseling strategies for patients considering medical cannabis use.

After completing this activity, the pharmacy technician will be able to:
• Identify the current status of cannabis in the United States.
• State patient safety issues that may occur with the use of medical cannabis.
• Review important counseling strategies for patients considering medical cannabis use.

ACCREDITATION
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ACTIVITY TYPE
Knowledge-Based Home Study Webcast

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University of Colorado School of Pharmacy

ABOUT THE AUTHOR
Dr. Borgelt is an Associate Dean and Professor at the University of Colorado Anschutz Medical Campus in the Departments of Clinical Pharmacy and Family Medicine. She received her Bachelor of Science degree from the University of Iowa and her Doctor of Pharmacy degree from the University of Colorado. She completed a Primary Care Residency with the University of Colorado and Kaiser Permanente. Dr. Borgelt is a board certified pharmacotherapy specialist, NAMS Certified Menopause Practitioner, and a fellow of the American College of Clinical Pharmacy (ACCP). She has been the recipient of several teaching and clinical awards and is an active member of and leader in multiple professional organizations.

Dr. Borgelt’s teaching, practice, and research focus on women’s health pharmacotherapy with an emphasis on reproductive health, including contraception; pregnancy and lactation; polycystic ovary syndrome; menopause; and osteoporosis. She has published numerous peer-reviewed women’s health articles, several book chapters, and is an editor of the textbook entitled “Women’s Health Across the Lifespan: A Pharmacotherapeutic Approach”. She has presented women’s health topics at local, national, and international conferences. Dr. Borgelt has served as past-chair of the American College of Clinical Pharmacy Women’s Health Practice and Research Network, participated in the Agency for Healthcare Research and Quality (AHRQ) Expert Panel for Medication Overuse in Women/Older Adults and the Health Resources and Services Administration (HRSA) expert panel for Interprofessional Collaboration in Women’s Health Curricula, and has been a member of the American Association of Colleges of Pharmacy Women’s Health Curriculum Task Force.

Furthermore, her initial interest in educating providers and patients about medical cannabis started about seven years ago when she was asked clinical questions about its use in pregnant and lactating women. Since that time, she has investigated the potential effectiveness and risks of cannabis in a comprehensive manner and has provided evidence-based presentations to medical, nursing, pharmacy, and patient organizations at the state and national level. In the last two years, she estimates that her state and national presentations have helped to educate approximately 6000 healthcare providers. Her most recent publication in Pharmacotherapy that described an evaluation of cannabis effectiveness in women with migraine headaches reached more reads than another article in the journal for 2016.

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Medical Cannabis Update: Emerging Roles for Pharmacists

Learning Objectives

• Identify the current status of cannabis in the United States.
• Describe the clinical pharmacology of cannabis and its active components.
• Evaluate clinical studies performed in various conditions to determine the effectiveness and adverse effects of medical cannabis.
• Identify potential drug interactions and other patient safety issues that may occur with the use of medical cannabis.
• Review important counseling strategies for patients considering medical cannabis use.

The Story...
Disclosures

Dr. Borgelt has no relevant financial disclosures.
Dr. Borgelt will be discussing unapproved drugs and uses.
Dr. Borgelt has served as a member of six working groups:
• Colorado Department of Public Health and Environment (CDPHE):
  Amendment 64 (Marijuana Legalization) Task Force Working Group:
  Consumer Safety and Social Issues
• State Licensing Authority Labeling, Packaging, Product Safety and
  Marketing
• State Licensing Authority Medical and Retail Marijuana Mandatory Testing
  and Random Sampling
• State Licensing Authority Serving Size and Product Potency
• CDPHE Pregnancy and Breastfeeding Guidelines Committee
• CDPHE Retail Marijuana Public Health Advisory Committee

Self-Reflection Question

I know someone who consumes marijuana for medical or recreational purposes.

1. Yes, medical purposes only
2. No, recreational purposes only
3. Yes, both
4. No

Self-Reflection Question

I believe the most common reason people seek out marijuana is to...

1. relieve pain
2. improve symptoms of nausea and vomiting
3. relieve muscle spasms associated with multiple sclerosis
4. get high

Overall Goal For This Presentation...

...is to help pharmacists better understand the characteristics of marijuana and its effects so you can confidently talk with your patients about the potential benefits and risks of using marijuana.
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Marijuana or Cannabis

• Single molecule pharmaceuticals (synthetic)
  • Dronabinol (Schedule III)
  • Nabilone (Schedule II)
• Liquid extract: nabiximols (Sativex®)
  • Approved in 27 countries; U.S. - Phase III trials
• Liquid extract: cannabidiol (Epidiolex®)
  • FDA: orphan drug status for Dravet and Lennox-Gastaut syndromes
  • Expanded access INDs to several independent investigators
• Phytocannabinoid-dense botanicals
  • Cannabis sativa – medicinal plant (Schedule I)

Chemical Constituents of Cannabis

• Cannabinoids
• Flavonoids
• Terpenes/Terpenoids
• Sterols
• Thiols
• Phenols
• Lipids/waxes
• Fibrous material

Cannabinoids in Cannabis

More than 104 different cannabinoids

Medical Cannabis: Formulations

![Medical Cannabis Formulations](image)

Common Routes of Administration

- **LUNGS**: Vaporized or Smoked
  - Onset: sec - min
  - Duration: 1-3 hrs
- **GUT**: Oral Ingestion
  - Onset: 0.5-2 hrs
  - Duration: 4-8 hrs
- **SKIN**: Topical Application
  - Onset: 15-60 mins
  - Duration: 0.75-2 hrs

Organic material, hash, hash oil
Lipophilic, alcoholic, supercritical fluidic extracts of plant
Creams, tinctures, and patches made from plant extracts

Cannabis Status in the United States

![Cannabis Status in the United States](image)

Limited Medical Access, Low THC, High CBD
Medical and Recreational Marijuana
Medical Marijuana
No Medical Marijuana

Key Opinion

Considerations for medical use of marijuana are different than considerations for recreational use of marijuana.

Medical use: benefit – risk
Recreational use: risk - risk
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Cannabis: Cannabinoids

• Plant-derived cannabinoids
  • Δ⁹-tetrahydrocannabinol - THC
  • Δ⁸-tetrahydrocannabinol - THC
  • Cannabidiol – CBD
  • Cannabinol - CBN
  • Cannabigerol - CBG
  • Cannabichromene - CBC
  • Cannabicyclol - CBL
  • Cannabiolsolin - CBE
  • Cannabitrol - CBT
  • Miscellaneous
    • Cannabidiol (air-oxidation)

Endogenous Cannabinoid System

• Endocannabinoids and their receptors found throughout body: brain, organs, connective tissues, glands, and immune cells.
• In each tissue, the cannabinoid system performs different tasks; goal is always homeostasis
• When cannabinoid receptors are stimulated, variety of physiologic processes
  • CB1 receptors: nervous system, connective tissues, gonads, glands, organs
  • CB2 receptors: immune system and associated structures
• Endocannabinoids are substances our bodies make naturally to stimulate CB1 and CB2
  • Anandamide
  • 2-arachidonoylglycerol (2-AG)

Functional Effects of Anandamide at CB1 & CB2 Receptors

<table>
<thead>
<tr>
<th>Structure</th>
<th>Anandamide regulates</th>
<th>Resultant effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spinal cord</td>
<td>Inhibit GLU &amp; info transfer between body &amp; brain</td>
<td>Decreased pain sensitivity</td>
</tr>
<tr>
<td>Parasympathetic system</td>
<td>Inhibit Ach release, HR regulation, urination regulation</td>
<td>HR stimulation, sometimes inhibits urination</td>
</tr>
<tr>
<td>Sympathetic system</td>
<td>Inhibit NE release, HR regulation, blood vessel constriction</td>
<td>Delayed reduction in HR and blood pressure</td>
</tr>
<tr>
<td>Neuronal cells</td>
<td>Inhibition GLU-induced excitotoxicity</td>
<td>Neuroprotective effect - prevent cell injury</td>
</tr>
<tr>
<td>Adipose tissue</td>
<td>Stimulates lipogenesis</td>
<td>Increased adiposity, insulin resistance</td>
</tr>
<tr>
<td>Reproductive tissue</td>
<td>Reduces testosterone, luteinizing hormone</td>
<td>Reduced fertility, altered menstrual cycle</td>
</tr>
<tr>
<td>Skin</td>
<td>Reduces histamine</td>
<td>Anti-pruritic effect</td>
</tr>
<tr>
<td>General</td>
<td>Role in relaxing, eating, sleeping, forgetting, protecting</td>
<td>Provide relief from stress, reduction of injury</td>
</tr>
<tr>
<td>General</td>
<td>Inhibits immune B lymphocytes, natural killer cells</td>
<td>Anti-inflammatory activity</td>
</tr>
</tbody>
</table>
What happens when there is potential endocannabinoid deficiency, dysregulation, destabilization, or decreased binding?

Non-Cannabinoid Targets Linked to Cannabis

- Other G-protein receptors: GPR55, GPR55940, etc.
- G-protein-coupled receptors: noncompetitive inhibitor at μ- and δ-opioid receptors, NE, DA, 5-HT
- Ligand-gated ion channels: allosteric antagonism at 5-HT3, nicotinic, and enhance activation of glycine receptors
- Transient receptor potential channels (TRPVs): bind and activate TRPV1 similar to capsaicin, also CB1 receptors are located near TRPV1
- Ion channels: inhibition of Ca, K, Na channels by non-competitive antagonism
- Peroxisome Proliferator-Activated Receptors: PPARα and PPARγ are activated

Cannabidiol (CBD)

- Little binding affinity to CB1/CB2
- Suppresses enzyme fatty acid amide hydrolase ("FAAH") – enzyme that breaks down anandamide
- Opposes THC at CB1 receptor
- Stimulates release of 2-AG
- TRPV-1 receptor agonist
- 5-HT1A receptor activation
- GPR55 antagonist
Summary: Endocannabinoid System and THC

THC

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Medical Cannabis Use

Cannabinoids for Medical Use: Systematic Review and Meta-Analysis

<table>
<thead>
<tr>
<th>CONDITION</th>
<th># TRIALS*</th>
<th>Result vs. placebo</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea/vomiting due to chemotherapy</td>
<td>3</td>
<td>Complete response</td>
<td>OR 3.82 (95% CI 1.55-9.42)</td>
</tr>
<tr>
<td>Chronic pain</td>
<td>8</td>
<td>Reduction of 30% or more in pain</td>
<td>OR 1.41 (95% CI 0.99-2.00)</td>
</tr>
<tr>
<td>Severe pain</td>
<td>15</td>
<td>Reduction of 30% or more in pain</td>
<td>OR 1.41 (95% CI 0.99-2.00)</td>
</tr>
<tr>
<td>Muscle spasms and MS</td>
<td>8</td>
<td>Ashworth spasticity scale WMD**</td>
<td>-0.12 (95% CI -0.24 to 0.01)</td>
</tr>
<tr>
<td>Nausea</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSD</td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cancer</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Seizures and Epilepsy</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cachexia</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Glaucoma</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HIV/AIDS</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degenerative neurological condition</td>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Variety of cannabinoid products evaluated
**WMD: weighted mean difference

Common AEs of cannabinoids included dizziness, dry mouth, nausea, fatigue, somnolence, euphoria, vomiting, disorientation, drowsiness, confusion, loss of balance, and hallucination.
Inhaled Cannabis for Neuropathic Pain: Meta-Analysis of Individual Data

- Synthesizes the individual participants’ original data obtained from the studies’ principal investigators
- Five randomized controlled trials evaluating inhaled cannabis
- Compared proportion of patients experiencing >30% clinical improvement in chronic neuropathic pain assessed with a continuous patient-reported instrument (e.g., visual analog scale) at baseline and after inhaled cannabis

RESULTS
- 178 patients with 405 observed responses
- Estimated OR (CRI) for >30% ↓ in pain score: 3.22 (1.59-7.24)
- Number needed to treat (CRI): 5.55 (3.35-13.7)
Note: gabapentin NNT 5.9 (4.6-8.3) for diabetic neuropathy

Adverse Effects

- Serious Adverse Effects (SAEs)
  - Placebo: 1 (psychosis)
  - Cannabis: 2 (hypertension, increased pain)
- Mild adverse effects
  - Anxiety, disorientation, difficulty concentrating, headache, dry eyes, burning sensation, dizziness, and numbness
  - Psychoactive effects (such as feeling “high”) were statistically significantly associated with treatment allocation in 2 studies and increased in frequency with increasing dose

Limitations and Conclusions

- Ineffective participant blinding
- Placebo effects likely
- Different causes of neuropathy
- Small number of studies and participants
- Difficult to estimate bioavailable cannabis
- Short-term data only (up to two weeks)

National Academies: Health Effects of Cannabis

- **Conclusive or substantial evidence** that cannabis or cannabinoids are **effective**:
  - for treatment of chronic pain in adults (cannabis)
  - for improving patient-reported multiple sclerosis (MS) spasticity symptoms, but limited evidence for clinician-measured spasticity (oral cannabinoids)
  - As anti-emetics in the treatment of chemotherapy-induced nausea and vomiting (oral cannabinoids)
National Academies: Health Effects of Cannabis

• **Moderate evidence** that cannabinoids, primarily nabiximols, are an effective:
  - to improve short-term sleep outcomes in patients with sleep disturbance associated with obstructive sleep apnea, fibromyalgia, chronic pain, and MS.

• Limited evidence that cannabis or oral cannabinoids are effective for:
  - increasing appetite and decreasing weight loss associated with HIV/AIDS (cannabis and oral cannabinoids)
  - improving symptoms of Tourette syndrome (THC capsules)
  - improving anxiety symptoms in individuals with social anxiety (cannabidiol)
  - improving symptoms of posttraumatic stress disorder (nabuline)
  - better outcomes (i.e., mortality, disability) after a traumatic brain injury or intracranial hemorrhage – statistical association

• Limited evidence that cannabis or oral cannabinoids are ineffective for:
  - improving symptoms of dementia (cannabidiol)
  - improving intraocular pressure associated with glaucoma (cannabinoids)
  - reducing depressive symptoms in individuals with chronic pain or MS (nabiximols, dronabinol, and nabuline)

• No or insufficient evidence to support or refute that cannabinoids are effective for:
  - cancer-associated anorexia cachexia syndrome and anorexia nervosa
  - cancers, including glioma
  - irritable bowel syndrome
  - epilepsy
  - spasticity in patients with paralysis due to spinal cord injury
  - chorea and certain neuropsychiatric symptoms associated with Huntington’s disease
  - symptoms associated with amyotrophic lateral sclerosis (ALS)
  - Parkinson’s disease or levodopa-induced dyskinesia
  - dystonia
  - treatment for mental health outcomes in individuals with schizophrenia or schizophreniform psychosis
  - achieving abstinence in the use of addictive substances

National Academies: Health Effects of Cannabis

- Tachycardia
- Palpitations
- Hypertension
- Coughing
- Wheezing
- Sputum production
- Lethargy, Sedation, Slowed Reaction Time
- Psychological dysfunction: impaired coordination, memory formation, recollection, focus
- Visual Disturbances
Summary

Cannabis may have a role in a variety of conditions when patients have failed other FDA-approved treatments. Adverse effects do occur so benefits and risks should be weighed for individual patients while considering patient safety and public health concerns.

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Drug Interactions

<table>
<thead>
<tr>
<th>Cannabinoid</th>
<th>CYP-450 2C9</th>
<th>CYP-450 2C19</th>
<th>CYP-450 3A4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Δ9-THC</td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Δ8-THC</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>CBD</td>
<td></td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>CBN</td>
<td>*</td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

Clinically Important Drug-Drug Interactions

- Chlorpromazine
- Clobazam
- Clozapine
- CNS depressants
- Disulfiram
- Hexobarbital
- Hydrocortisone
- Ketoconazole
- Protease inhibitors (indinavir, nelfinavir)
- MAO inhibitors
- Phenytoin
- Theophylline
- Tricyclic antidepressants
- Warfarin

*Note: significant synergistic interaction found between CBD and levetiracetam. Significant antagonistic interactions noted with CBD + clobazam and CBD + carbamazepine. (AES Annual Meeting December 2015)
### Drug Interactions: Pharmacist Call to Action

<table>
<thead>
<tr>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorpromazine</td>
<td>Marijuana smoking increased clearance of chlorpromazine</td>
<td>N</td>
<td></td>
<td></td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>Clobazam</td>
<td>Increased clobazam levels (60-80% higher) with CBD use</td>
<td>N</td>
<td>Y</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clozapine</td>
<td>Possible increased clozapine metabolism by marijuana induction of CYP1A2</td>
<td>N</td>
<td></td>
<td>P (with marijuana cessation)</td>
<td>P (with marijuana cessation)</td>
<td></td>
</tr>
</tbody>
</table>

Y=yes; N=no; P=possible

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### Drug Interactions: Pharmacist Call to Action

<table>
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</tr>
</thead>
<tbody>
<tr>
<td>Ketoconazole</td>
<td>Peak THC concentration increased by 27%</td>
<td>N</td>
<td></td>
<td>P</td>
<td>P</td>
<td></td>
</tr>
<tr>
<td>MAO inhibitors</td>
<td>Possible enhancement of orthostatic hypotension</td>
<td>N</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phenytoin</td>
<td>May enhance CNS depressant effect. Possible increased phenytoin metabolism by marijuana induction.</td>
<td>N</td>
<td>Y</td>
<td>P (with marijuana cessation)</td>
<td>P (with marijuana cessation)</td>
<td></td>
</tr>
<tr>
<td>Protease inhibitors</td>
<td>Significant decrease in peak concentration of indinavir and nelfinavir.</td>
<td>N</td>
<td></td>
<td></td>
<td>P</td>
<td></td>
</tr>
</tbody>
</table>
Medical Cannabis and Opioid Use

Limited evidence that there is less opioid overdose deaths than expected in states with legal medical marijuana.

From: Medical Cannabis Laws and Opioid Analgesic Overdose Mortality in the United States, 1999-2010

States with medical cannabis laws had a 24.8% lower mean annual opioid overdose mortality rate (95% CI, −37.5% to −9.5%; P = .003) compared with states without medical cannabis laws.

This association strengthened over time
- Year 1 (−19.9%, 95% CI, −30.6% to −7.7%; P = .002)
- Year 2 (−25.2%, 95% CI, −40.6% to −5.9%; P = .01)
- Year 3 (−23.6%, 95% CI, −41.1% to −1.0%; P = .04)
- Year 4 (−20.2%, 95% CI, −33.6% to −4.0%; P = .02)
- Year 5 (−33.7%, 95% CI, −50.9% to −10.4%; P = .008)
- Year 6 (−33.3%, 95% CI, −44.7% to −19.6%; P < .001)

Patient Safety Issues

- Unintentional exposure
- Consistency (or lack thereof)
- Quality and purity
- Packaging
- Labeling
- Testing – content and contaminants
- Accuracy of education provided

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Patient Case

• 2 yo male with lethargy is brought to the emergency department of Children’s Hospital Colorado. Several tests are performed including:
  • Urinalysis
  • Comprehensive metabolic panel
  • Complete blood count
  • APAP/ASA levels
  • EKG
  • Urine toxicology
  • CT head
  • Chest X-ray

What are potential causes of his lethargy? Should he be admitted?

Patient Case, Con’t

• Admitted to hospital
• Unintentional exposure to marijuana
• Source of marijuana: babysitter

What counseling should occur for this patient and/or family?

Patient Case

• 17 yo male displays unusual behavior in the classroom and is brought to the counselor’s office
• Counselor verifies that the student is high and obtained cannabis (gummy bears) from a friend
• Student admits to using cannabis several times per week; claims it reduces his anxiety and anger
• Student does not think it impacts his school grades or ability to play sports (football and basketball)

What counseling should occur for this student?

Patient Case

• 27 yo female comes to clinic for second trimester prenatal visit (24 weeks pregnant)
• Medications: prenatal vitamin once daily
• Social history: no alcohol, no tobacco, smokes cannabis one to two times daily
  • Initially started cannabis to relieve nausea in first trimester; continued cannabis because it “improved sleep”
• She has heard about cannabis having potential harm on the fetus, but does not think the studies were done well enough to make conclusions about harm; feels benefits outweighs any risks

What counseling should occur for this patient?
Patient Case

- 62 yo female with long-standing diabetes and severe neuropathic pain; other conditions include hypertension, dyslipidemia, and arthritis
- For neuropathic pain and arthritis, she has tried seven different FDA-approved or OTC medications; currently taking APAP, oxycodone and pregabalin
- Started cannabis about 3 months ago
  - Vaporizes THC:CBD (1:1) twice daily
- Reduced oxycodone dose by 30% since cannabis; has continued APAP, pregabalin and cannabis

What counseling should occur for this patient?

Counseling Strategies: Medical Cannabis

- Reason for use
  - "Patients use cannabis for many different conditions. For what condition(s) are you using cannabis?"
- Cannabis use (formulation, dose, frequency)
  - "By what method(s) do you use cannabis?"
  - "What strain and/or cannabinoid concentrations are you using?"
  - "How often are you using cannabis?"
- Concurrent drug use
  - "What other medications are you taking at this time?"
  - Screen for drug interactions

Counseling Strategies: Medical Cannabis

- What to expect
  - "What benefits did your provider tell you to expect by using cannabis?"
  - "What adverse effects did your provider tell you to expect?"
- When to seek further medical attention
  - Bothersome psychoactive effects
  - Cannabinoid hyperemesis syndrome (cyclic vomiting)
  - Withdrawal symptoms (if discontinuing)
- Follow-up when needed
  - Contact pharmacist or prescriber if any adverse effect becomes too bothersome or if any questions about marijuana use

Role Play
Role of the Pharmacist: Medical Cannabis

- Pharmacists in three states currently have medical cannabis dispensing role (CT, MN, NY)
- Provide education related to the clinical efficacy, safety, and management of patients using cannabis and its various components
- Collect and document information in the pharmacy patient profile about patient use of cannabis and its various components and provide appropriate patient counseling
- Support regulatory changes to facilitate clinical research related to the clinical efficacy and safety associated with the use of cannabis and its various components

Summary

Counseling strategies vary based on individual patient situations. Efforts should be made to determine medical history, medication history, social history, and other patient-specific factors to determine what, why, and how cannabis is being used.

*Pharmacists: also screen for drug interactions

Conclusions

- Current status of cannabis is Schedule I, yet allowed in most states.
- Cannabis and its active components impact the endocannabinoid system to provide various effects.
- Many dosage formulations of cannabis available to patients.
- Clinical studies performed in children and adults demonstrate some effectiveness for certain conditions; adverse effects are reported in all studies so benefits and risks must be carefully weighed.
- Potential drug interactions and patient safety concerns are important issues for pharmacists to address with patients using cannabis.
- Pharmacists have an important role in monitoring and education related to cannabis use.

Questions?

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Exam Questions:

1. Which of the following forms of cannabis is currently FDA-approved and available as an oral formulation?
   A. Nabiximols
   B. Dronabinol
   C. Cannabidiol
   D. Tetrahydrocannabidiol

2. Which of the following statements is true about the status of whole plant cannabis in the United States?
   A. Every state has at least one enacted law regarding medical cannabis
   B. More than half of the states have enacted laws for medical and recreational cannabis
   C. More than half of the states have enacted laws for medical cannabis.
   D. No states have enacted laws regarding medical or recreational cannabis because it is illegal.

3. Which of the following endogenous systems of the body is most responsible for the actions of cannabis?
   A. Nervous system
   B. Musculoskeletal system
   C. Integumentary system
   D. Endocannabinoid system

4. Which of the following cannabinoids is known to be most responsible for the psychoactive effects of marijuana?
   A. $\Delta^9$-tetrahydrocannabinol - THC
   B. Cannabidiol – CBD
   C. Cannabinol - CBN
   D. Cannabigerol – CBG
5. For which of the following conditions is there conclusive or substantial evidence that cannabis is effective in adults?

   A. Posttraumatic stress disorder  
   B. Depression and anxiety  
   C. Chronic pain  
   D. Irritable bowel syndrome

6. Which of the following is a commonly reported side effect associated with marijuana use?

   A. Hirsutism  
   B. Sedation  
   C. Decreased heart rate  
   D. Low blood pressure

7. Which of the following medications is most likely to interact with medical marijuana?

   A. Ketoconazole  
   B. Gabapentin  
   C. Lisinopril  
   D. Clopidogrel

8. Which of the following statements is true regarding the concurrent use of cannabis and opioids?

   A. There is conclusive evidence that mortality rates are increased opioid overdose deaths in states with legal medical cannabis.  
   B. There is no evidence regarding mortality in states with legal medical cannabis.  
   C. There is moderate evidence that there are increased deaths related to cannabis overdose in states with legal medical cannabis.  
   D. There is limited evidence that there are fewer opioid overdose deaths than expected in states with legal medical cannabis.

9. Which of the following patient safety issues is/are important to address when counseling patients about use of medical marijuana?

   A. Child-resistant packaging  
   B. Keeping marijuana out of the reach of children  
   C. Proper labels and warnings  
   D. Potential drug interactions  
   E. All of the above
10. Which of the following counseling strategies should NOT be used when discussing cannabis use with patients?

A. Ask the patient about their method(s) of cannabis use
B. Ask the patient what adverse effects their provider told them about
C. Tell the patient when to seek immediate medical attention
D. Tell the patient that cannabis has no beneficial effects and should not be used