

# Mindful Medicine: Updates and Insights in Psychiatric Pharmacy



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## Objectives

- 1) Discuss the importance of clinical teaching in pharmacy
- 1) Discuss various methods of clinical teaching in pharmacy settings
- 1) Review opportunities and challenges of clinical teaching in pharmacy



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# Schizophrenia

## Clinical Presentation Medications Clinical Practice Guidelines

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## Clinical Presentation

**Positive Symptoms:** (psychotic) symptoms that are present, but should not be

- Delusions\*
- Hallucinations\*
- Disorganized speech\*
- Illogical thoughts and speech
- Disorganized behavior

**Negative Symptoms:** symptoms that are not present, but should be

- Impoverished speech and thinking
- Lack of social drive
- Apathy
- Flatness of emotional expression

**Cognitive symptoms and additional limitations, including possible substance abuse**

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## 2020 APA Guidelines for Treatment of Schizophrenia

American Psychiatric Association recommends that:

- Patients with schizophrenia be treated with an antipsychotic medication and monitored for efficacy and side effects
  - Person-centered treatment
- Treatment-resistant patients, patients with substantial aggressive behavior or multiple suicide attempts should be treated with clozapine
- LAIs should be used in patients who have histories of poor adherence
- Dystonias and parkinsonism should be treated with anticholinergic medications
- Akathisia should be treated with a beta-blocker
- Tardive dyskinesia should be treated with VMAT2 inhibitor
- Psychosocial interventions should be implemented, including CBT, psychoeducation, supported employment services and social skills training

American Psychiatric Association. (2020). The American Psychiatric Association Practice Guideline for the Treatment of Patients With Schizophrenia. The American Psychiatric Association Practice Guideline for the Treatment of Patients With Schizophrenia. American Psychiatric Association Publishing. <https://doi.org/10.1176/appi.books.9780890424841>

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## 2020 APA Guidelines for Treatment of Schizophrenia

- Evidence indicates little difference in efficacy between FGAs and SGAs (except clozapine).
- Factors that should influence selection of antipsychotic:
  - Past treatment response
  - Affordability
  - Comorbidities
  - Side effects
  - Patient preference
  - Route of administration
  - Concomitant medications
  - Adherence
  - Treatment resistance

American Psychiatric Association. (2020). The American Psychiatric Association Practice Guideline for the Treatment of Patients With Schizophrenia. The American Psychiatric Association Practice Guideline for the Treatment of Patients With Schizophrenia. American Psychiatric Association Publishing. <https://doi.org/10.1176/appi.books.9780890424841>

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## Comparative Meta-Analysis of FGAs and SGAs

### Minimal differences in efficacy:

- Overall change in symptoms
  - Clozapine, olanzapine, risperidone
- Positive symptoms
  - Haloperidol, olanzapine, paliperidone, risperidone
- Negative symptoms
  - Clozapine, olanzapine, risperidone
- Depressive symptoms
  - Clozapine, olanzapine
- Social functioning
  - Brexpiprazole, lurasidone, olanzapine, paliperidone

**Differences in tolerability were more significant, suggesting that safety should be the primary driver in antipsychotic selection**

Huhn, M. et al. (2019) 'Comparative efficacy and tolerability of 32 oral antipsychotics for the acute treatment of adults with multi-episode schizophrenia: A systematic review and network meta-analysis', *The Lancet*, 394(10202), pp. 939–951. doi:10.1016/S0140-6736(19)31135-3.

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## Application Case

**KM is a 25-year old female who presents to your clinic with her mother. KM has just been released from the hospital and has been diagnosed with schizophrenia. Her mother explains that for the past 8 months, KM has been experiencing auditory and visual hallucinations of “spirits,” and having delusions about constantly being followed by members of an alien task force. Her mother also states that over the last 8 months, she has noticed signs of extreme social withdrawal, flat emotional expression, difficulty concentrating, difficulty sleeping, and illogical thoughts and speech in KM.**

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## Application Case (continued)

**Which of the following medications would be an appropriate first line treatment for KM based on the APA guidelines?**

- A. Haloperidol
- B. Aripiprazole
- C. Chlorpromazine
- D. Clozapine
- E. Fluphenazine

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## Second Generation Antipsychotics (SGAs)

Aripiprazole (Abilify®)  
 Asenapine (Saphris®)  
 Brexpiprazole (Rexulti®)  
 Cariprazine (Vraylar®)  
 Clozapine (Clozaril®)  
 Iloperidone (Fanapt®)  
 Lumateperone (Caplyta®)  
 Lurasidone (Latuda®)  
 Olanzapine (Zyprexa®)  
 Paliperidone (Invega®)  
 Quetiapine (Seroquel®)  
 Risperidone (Risperdal®)  
 Ziprasidone (Geodon®)

- “Atypical” antipsychotics
- **Less affinity for D<sub>2</sub> receptors**
- **Higher affinity for 5-HT receptors**
- Work on **both positive and negative** symptoms
  - 5-HT<sub>2A</sub> antagonism in combination with D<sub>2</sub> blockade → release of dopamine in prefrontal cortex → improvement in negative symptoms
- First line therapy\*

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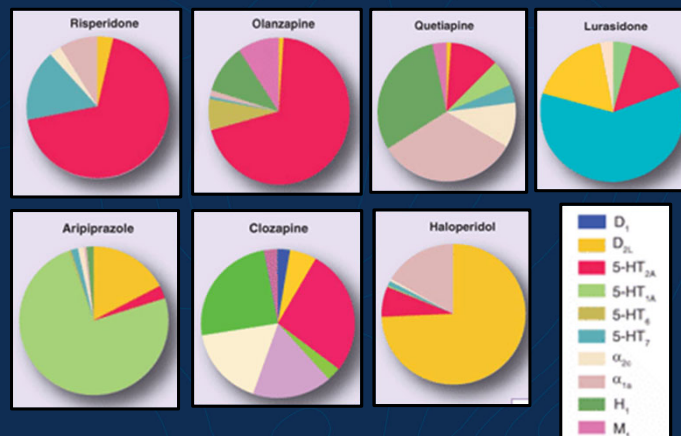


## Common Adverse Effects - SGAs

- ❖ Weight gain
  - ❖ Glucose dysregulation
  - ❖ Lipid abnormalities
  - ❖ Anticholinergic effects
  - ❖ Orthostatic hypotension
  - ❖ Hyperprolactinemia
  - ❖ QT<sub>c</sub> prolongation
  - ❖ Sedation
  - ❖ Seizures
- ❖ ↓ Extrapyrarnidal effects:
    - Akathisia: motor restlessness
    - Dystonia: muscle spasms
    - Pseudoparkinsonism: akinesia, tremor, bradykinesia, rigidity
    - Tardive Dyskinesia: abnormal, rigid, irregular, and spontaneous movements

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## Heterogeneity of SGAs



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## Application Case

KM takes aripiprazole 15 mg QD for 12 weeks, with no significant improvement in her symptoms. She comes to clinic today with her mother, and the physician asks you to develop a new treatment plan for her. Her updated labs are as follows:

A1c: 6.5%    LDL: 170 mg/dL    HDL: 25 mg/dL    TG: 170 mg/dL  
Wt: 215 lbs    Ht: 5'4"    QT Interval: 410ms

Which of the following antipsychotics would be most appropriate to initiate in KM at this time?

- A. Clozapine
- B. Ziprasidone
- C. Olanzapine
- D. Fluphenazine

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Adverse Effect Profiles of Second Generation Antipsychotics								
	Anti-Ach	EPS	↓ BP	↑ Prolactin	QTc	Sedation	Metabolic	Seizures
Associated Receptor:	Muscarinic	D2	Alpha	D2	KIR	H <sub>1</sub>	H <sub>1</sub> + 5HT <sub>2A</sub>	---
Aripiprazole	±	+	±	0	±	+	±	±
Asenapine	+	+	+	±	+	+	+	±
Brexipiprazole	±	+	±	0	±	+	±	±
Cariprazine	±	+	±	0	±	+	±	±
Clozapine	+++	+	+++	0	+	+++	+++	+++
Iloperidone	±	+	++	+	+	++	±	±
Lurasidone	±	+	+	±	+	±	±	±
Lumateperone	±	+	±	0	±	++	+	±
Olanzapine	++	±	+	+	±	+	+++	±
Paliperidone	±	++	++	+++	±	+	++	±
Quetiapine	+	±	++	±	+	++	++	±
Risperidone	±	++	++	+++	±	+	++	±
Ziprasidone	±	±	+	+	+	+	±	±

Chisholm-Burns MA, Wells BG, Schwinghammer TL, Malone PM, Kolesar JM, DiPiro JT (eds). Pharmacotherapy Principles & Practice, 6th ed. New York: McGraw-Hill, 2021

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## Application Case

KM has been taking ziprasidone for 6 weeks when she returns to clinic for a follow-up appointment. KM and her mother tell you that they have not noticed much improvement in KM's symptoms since starting the ziprasidone.

**What would you want to ask the patient/caregiver before making medication changes?**

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## Patient Education

### Medication-Specific Patient Education Points:

- Asenapine
  - Sublingual tablet (Saphris®)
  - Transdermal patch (Secuado®)
- Lurasidone (Latuda®), Ziprasidone (Geodon®) and Lumateperone (Caplyta®)
  - Absorption is increased with food
- Paliperidone (Invega®)
  - Ghost tablet

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## Application Case

KM starts taking the ziprasidone with food for 12 weeks, and notices some improvement in symptoms, but is still experiencing visual and auditory hallucinations and a lack of social drive. At her appointment today, her mother states concerns about suicidal thoughts and KM reports that the voices have been command in nature and have been telling her that she should harm herself. Based on this information, which of the following medications would be best to initiate in KM today?

- A. Clozapine
- B. Quetiapine
- C. Paliperidone
- D. Aripiprazole

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## Clozapine

**1<sup>st</sup> SGA released on market**

**Only medication with proven and superior efficacy in treatment-resistant patients**

- Additional FDA approval for treatment of suicidal behavior in people with psychosis
- Recommended for patients displaying aggressive behaviors

**Use is limited due to adverse effects**

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## Clozapine – REMS Update

In February 2025, the REMS Program was removed from clozapine, so pharmacists are no longer required to check the REMS website prior to dispensing clozapine.

*Providers should still monitor ANC in all patients taking clozapine.*

## Application Case

**What counseling points would be important to discuss with KM and her mother prior to recommending clozapine?**

# Clozapine

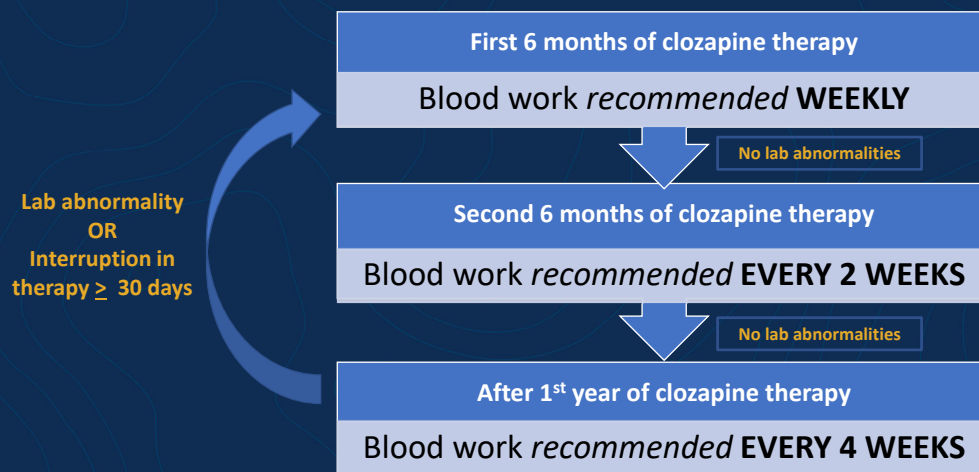
## Adverse Effects:

- Seizures
- Anticholinergic effects
- Hypersalivation
- Sedation
- Weight gain
- Agranulocytosis\*

American Psychiatric Association. (2020). The American Psychiatric Association Practice Guideline for the Treatment of Patients With Schizophrenia. The American Psychiatric Association Practice Guideline for the Treatment of Patients With Schizophrenia. American Psychiatric Association Publishing. <https://doi.org/10.1176/appi.books.9780890424841>

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## Clozapine Monitoring - Toxicity



American Psychiatric Association. (2020). The American Psychiatric Association Practice Guideline for the Treatment of Patients With Schizophrenia. The American Psychiatric Association Practice Guideline for the Treatment of Patients With Schizophrenia. American Psychiatric Association Publishing. <https://doi.org/10.1176/appi.books.9780890424841>

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## Clozapine Monitoring

Stage of Neutropenia	ANC Range (cells/mm <sup>3</sup> )	Clozapine Action and Monitoring Required
Mild	1000-1500	<b>Continue clozapine;</b> <u>monitor 3x weekly</u> until resolved (ANC>1500)
Moderate	500-999	<b>Interrupt therapy;</b> <u>monitor daily</u> until ANC >1000 <u>then 3x weekly</u> until resolved, then check weekly x 4 weeks (may restart clozapine)
Severe	<500	Discontinue therapy*; <u>Monitor daily</u> until ANC >1000 <u>then 3x weekly</u> until ANC >1500 If patient is re-challenged – resume treatment as new patient

\*May restart clozapine ONLY if prescriber determines benefits outweigh risks\*

[https://www.clozapinerems.com/CpmgClozapineUI/remis/pdf/resources/ANC\\_Table.pdf](https://www.clozapinerems.com/CpmgClozapineUI/remis/pdf/resources/ANC_Table.pdf)

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## Application Case (continued)

KM comes to a follow-up appointment 4 weeks after starting clozapine. She tells you that she has noticed an improvement in her visual and auditory hallucinations, but still has no motivation to hang out with her friends. Her mother tells you that she has noticed a drastic improvement in KM's mood, but she has not been sleeping well because she is drooling so much on her pillow at night that it is waking her up. She also reports only having 2-3 bowel movements per week, as opposed to 1x/day prior to starting clozapine.

What would you recommend for KM?

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## Managing Antipsychotic-Induced Adverse Effects

**Constipation**

**Hypersalivation**

**Extrapyramidal effects**

- Akathisia
- Bradykinesia
- Tardive dyskinesia

**Sexual dysfunction**

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## Managing Antipsychotic-Induced Adverse Effects

### Constipation:

- Prevention is critical (especially with clozapine)
  - Adequate hydration
  - Stool softeners
- Treatment:
  - 1<sup>st</sup> line:
    - Osmotic laxatives (PEG, lactulose)
    - Stimulant laxatives (senna, bisacodyl)
  - Bulk-forming, fiber-based laxatives not recommended

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## Managing Antipsychotic-Induced ADEs

### Hypersalivation:

- Non-Pharmacologic: sugar-free gum, chewing on ice chips
- Pharmacologic:
  - 1<sup>st</sup> line:
    - Ipratropium nasal spray: 1-2 sprays sublingually every 6 hours prn
    - Atropine ophthalmic drops: 1-2 drops sublingually QHS
  - 2<sup>nd</sup> line:
    - Terazosin 2mg PO QHS
    - Benztropine 1-2 mg PO BID
    - Glycopyrrolate 1-2mg PO QD-BID
    - Amitriptyline 100 mg PO QHS
    - Clonidine 0.1 mg PO QD

Stroup TS, Gray N. Management of common adverse effects of antipsychotic medications. World Psychiatry 2018;17:341-356.

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## Managing Antipsychotic-Induced Adverse Effects

### Sexual Dysfunction:

- Multiple possible mechanisms
- May present as reduced libido, anorgasmia or erectile dysfunction
- Management:
  - ↓ dose
  - PDE5 inhibitors in males
  - Switch to different antipsychotic
  - Add aripiprazole

John J, Thomas RP, Paul S, EK J, Job K. Antipsychotic induced sexual dysfunction. J Psychiatry 2018;21:1.  
Stroup TS, Gray N. Management of common adverse effects of antipsychotic medications. World Psychiatry 2018;17:341-356.

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Sexual Dysfunction: Adverse Effect Profiles of Second Generation Antipsychotics								
	Anti-Ach	EPS	↓ BP	↑ Prolactin	QTc	Sedation	Metabolic	Seizures
Aripiprazole	±	+	±	0	±	+	±	±
Asenapine	+	+	+	±	+	+	+	±
Clozapine	+++	+	+++	0	+	+++	+++	+++
Iloperidone	±	+	++	+	+	++	±	±
Lumateperone	±	+	±	0	±	++	+	±
Lurasidone	±	+	+	±	+	+	±	±
Olanzapine	++	±	+	+	±	+	+++	±
Paliperidone	±	++	++	+++	±	+	++	±
Quetiapine	+	±	++	±	+	++	++	±
Risperidone	±	++	++	+++	±	+	++	±
Ziprasidone	±	±	+	+	+	+	±	±

SGAs with ↓ incidence of sexual dysfunction:

- Aripiprazole, brexpiprazole, cariprazine
- Lumateperone
- Lurasidone
- Asenapine

Information compiled from: Chisholm-Burns MA, Wells BG, Schwinghammer TL, Malone PM, Kolesar JM, DiPiro JT (eds). Pharmacotherapy Principles & Practice, 6th ed. New York: McGraw-Hill, 2021

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## Managing Antipsychotic-Induced Adverse Effects

### Extrapyramidal Side Effects:

- **Akinesia, bradykinesia, muscle rigidity:**
  - Benztropine 1-2mg PO BID
  - Trihexyphenidyl 1-3mg PO TID
  - Diphenhydramine 25-50mg PO BID
- **Akathisia or Tremors:**
  - Propranolol 30-120mg PO QD
  - Mirtazapine 15-45 mg PO QD

Stroup TS, Gray N. Management of common adverse effects of antipsychotic medications. World Psychiatry 2018;17:341-356.  
American Psychiatric Association. (2020). The American Psychiatric Association Practice Guideline for the Treatment of Patients With Schizophrenia. The American Psychiatric Association Practice Guideline for the Treatment of Patients With Schizophrenia. American Psychiatric Association Publishing. <https://doi.org/10.1176/appi.books.9780890424841>

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## Managing Antipsychotic-Induced Tardive Dyskinesia

### Valbenazine (Ingrezza®):

- VMAT2 inhibitor
- Dosing: 40 mg PO QD x 1 week, then increase to 80 mg QD
  - ↓dose in CYP2D6 poor metabolizers
  - Avoid use with strong CYP3A4 inducers
  - ↓dose to 40 mg QD with strong CYP3A4 inhibitors
- Administration: take without food
- ADEs:
  - Somnolence
  - QT prolongation
  - Anticholinergic effects
  - Headache
- Cost: ~\$7000 per month

[https://www.accessdata.fda.gov/drugsatfda\\_docs/label/2017/209241lbl.pdf](https://www.accessdata.fda.gov/drugsatfda_docs/label/2017/209241lbl.pdf)

American Psychiatric Association. (2020). The American Psychiatric Association Practice Guideline for the Treatment of Patients With Schizophrenia. The American Psychiatric Association Practice Guideline for the Treatment of Patients With Schizophrenia. American Psychiatric Association Publishing. <https://doi.org/10.1176/appi.books.9780890424841>



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## Managing Antipsychotic-Induced Tardive Dyskinesia

### Deutetrabenazine (Austedo®):

- VMAT2 inhibitor
- Dosing: 12mg/day initially (48mg/day maximum)
  - Administer doses >12mg per day in divided doses
  - Baseline EKG with doses >24 mg/day
  - Avoid doses >36mg/day (18mg/dose) with CYP2D6 inhibitors or poor CYP2D6 metabolizers
- Administration: take with food
- ADEs:
  - Nasopharyngitis,
  - Insomnia
  - Depression
  - Agitation/restlessness
- Cost: ~\$6000 per month

<https://www.austedo.com/globalassets/austedo/prescribing-information.pdf>



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# Managing Antipsychotic-Induced Tardive Dyskinesia

## Clinical Considerations:

- AIMS prior to treatment and after to show efficacy

Facial and Oral Movements					
1. Muscles of Facial Expression e.g., movements of forehead, eyebrows, periorbital area, cheeks; Include frowning, blinking, smiling, grimacing	0	1	2	3	4
2. Lips and Perioral Area e.g., puckering, pouting, smacking	0	1	2	3	4
3. Jaw e.g., biting, clenching, chewing, mouth opening, lateral movement	0	1	2	3	4
4. Tongue Rate only increases in movement both in and out of mouth, NOT inability to sustain movement	0	1	2	3	4
Extremity Movements					
5. Upper (arms, wrists, hands, fingers) Include choreic movements (i.e., rapid, objectively purposeless, irregular, spontaneous); athetoid movements (i.e., slow, irregular, complex, serpentine). DO NOT include tremor (i.e., repetitive, regular, rhythmic).	0	1	2	3	4
6. Lower (legs, knees, ankles, toes) e.g., lateral knee movement, foot tapping, heel dropping, foot squirming, inversion and eversion of foot	0	1	2	3	4
Trunk Movements					
7. Neck, shoulders, hips e.g., rocking, twisting, squirming, pelvic gyrations	0	1	2	3	4
Global Judgments					
8. Severity of abnormal movements	0	1	2	3	4
9. Incapacitation due to abnormal movements	0	1	2	3	4
10. Patient's awareness of abnormal movements (rate only patient's report) 0 = not aware; 1 = aware, no distress; 2 = aware, mild distress; 3 = aware, moderate distress; 4 = aware, severe distress	0	1	2	3	4
Dental Status					
11. Current problems with teeth and/or dentures?	No	Yes			

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## Antipsychotic PK Parameters

Antipsychotic	Major CYP Enzymes	Other CYP Enzymes
Aripiprazole	3A4	2D6
Asenapine	1A2	3A4, 2D6
Brexpiprazole	2D6, 3A4	
Cariprazine	3A4	2D6
Clozapine	1A2	3A4, 2D6, 2C19
Haloperidol	2D6, 3A4	
Iloperidone	2D6, 3A4	
Lurasidone	3A4	
Olanzapine	1A2	2D6
Paliperidone	2D6, 3A4	
Perphenazine	2D6	
Quetiapine	3A4	2D6
Risperidone	2D6	3A4
Ziprasidone	3A4	

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## CYP2D6

**Metabolism of >25% of all prescription drugs**

**Polymorphic gene**

- 4-7%: slow-metabolizers
- 3%: ultra-rapid metabolizers

**Ultra-rapid metabolizers → possible link to increased risk of suicide**

**Genetic testing opportunity**

Stephens DB, de Leon J. CYP2D6 ultra-rapid metabolizer phenotype not associated with attempted suicide in a large sample of psychiatric inpatients. Pharmacogenomics 2016;17(12):2016-2086.  
Ma MK, Woo MH, McLeod HL. Genetic Basis of Drug Metabolism. Am J Health Syst Pharm. 2002;59(21).

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## Application Case

**KM returns to clinic 6 months later and states that she was “doing great” with her medications and her symptoms were well-controlled until 2 weeks ago when her hallucinations worsened. She tells you that she has been under more stress at work, and she noticed that her symptoms worsened around that time. Her current dose of clozapine is 400 mg PO QHS.**

**KM’s mother tells you that she has also noticed an increase in KM’s symptoms and is concerned about KM’s constant smoking because of the increased stress at work.**

**What do you recommend for KM?**

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## Effect of Smoking on Drug Metabolism

Smoking induces CYP1A2

↑ or ↓ in smoking can alter levels of antipsychotics

- Clozapine, olanzapine, asenapine

Monitor patients for changes in efficacy and ADEs

Antipsychotic	Major CYP Enzymes	Other CYP Enzymes
Asenapine	1A2	3A4, 2D6
Clozapine	1A2	3A4, 2D6, 2C19
Olanzapine	1A2	2D6

Andrade, Chittaragan. Schizophrenia and Smoking. J Clin Psychiatry. 2012 73:6.

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## Tobacco Use

>70% of patients with schizophrenia smoke

↑ smoking rates in other psychiatric disorders as well

Meta-analysis: Abstinence Rates for Medications Compared to Placebo	
Medication	Estimated Abstinence Rates (95% CI)
Placebo	13.8
Nicotine Patch + ad lib gum or lozenge	36.5 (28.6-45.3)
Varenicline (1 mg BID)	33.2 (28.9-37.8)
Nicotine Patch + Bupropion SR	28.9 (23.5-35.3)
Bupropion SR (150mg BID)	24.2 (22.2-26.4)

<https://bphc.hrsa.gov/buckets/treatingtobacco.pdf>

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## Application Case

After discussing the negative health effects of smoking, KM decides that she is ready to quit. She is currently smoking 1 ppd, and she has tried to quit cold turkey multiple times but was unsuccessful. Which of the following products would be appropriate for KM?

- A. Varenicline
- B. Bupropion
- C. Nicotine patches + nicotine lozenges prn
- D. She is not a candidate for pharmacologic therapy for cessation because of her psychiatric illness

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## EAGLES Trial

Multinational, multicenter, randomized, double-blind, placebo and active-controlled trial

8144 patients with stable psychiatric conditions randomized to:

- Nicotine patch
- Varenicline
- Bupropion
- Placebo

12-week treatment phase and 12 week non-treatment phase

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## EAGLES Trial

	Non-psychiatric cohort* (n=3984)				Psychiatric cohort* (n=4074)			
	Varenicline (n=990)	Bupropion (n=989)	Nicotine patch (n=1006)	Placebo (n=999)	Varenicline (n=1026)	Bupropion (n=1017)	Nicotine patch (n=1016)	Placebo (n=1015)
Primary composite neuropsychiatric endpoint	13 (1.3%)	22 (2.2%)	25 (2.5%)	24 (2.4%)	67 (6.5%)	68 (6.7%)	53 (5.2%)†	50 (4.9%)
Estimated primary composite neuropsychiatric adverse events (% [95% CI])	1.25% (0.60 to 1.90)	2.44% (1.52 to 3.36)	2.31% (1.37 to 3.25)	2.52% (1.58 to 3.46)	6.42% (4.91 to 7.93)	6.62% (5.09 to 8.15)	5.20% (3.84 to 6.56)	4.83% (3.51 to 6.16)
Difference in risk of composite primary endpoint (RD% [95% CI])								
Versus placebo	-1.28 (-2.40 to -0.15)	-0.08 (-1.37 to 1.21)	-0.21 (-1.54 to 1.12)	..	1.59 (-0.42 to 3.59)	1.78 (-0.24 to 3.81)	0.37 (-1.53 to 2.26)	..
Versus nicotine patch	-1.07 (-2.21 to 0.08)	0.13 (-1.19 to 1.45)	..	..	1.22 (-0.81 to 3.25)	1.42 (-0.63 to 3.46)	..	..
Versus bupropion	-1.19 (-2.30 to -0.09)	..	..	..	-0.20 (-2.34 to 1.95)	..	..	..

	Non-psychiatric cohort* (n=3984)				Psychiatric cohort* (n=4074)			
	Varenicline (n=990)	Bupropion (n=989)	Nicotine patch (n=1006)	Placebo (n=999)	Varenicline (n=1026)	Bupropion (n=1017)	Nicotine patch (n=1016)	Placebo (n=1015)
(Continued from previous page)								
Primary composite neuropsychiatric endpoint (severe intensity only)	1 (0.1%)	4 (0.4%)	3 (0.3%)	5 (0.5%)	14 (1.4%)	14 (1.4%)	14 (1.4%)	13 (1.3%)

Anthenelli RM, Benowitz NL, West R, et al. Neuropsychiatric safety and efficacy of varenicline, bupropion and nicotine patch in smokers with and without psychiatric disorders (EAGLES): a double blind, randomized, placebo-controlled trial. Lancet 2016;387:2507-20.

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## EAGLES Trial

	Non-psychiatric cohort* (n=3984)				Psychiatric cohort* (n=4074)			
	Varenicline (n=990)	Bupropion (n=989)	Nicotine patch (n=1006)	Placebo (n=999)	Varenicline (n=1026)	Bupropion (n=1017)	Nicotine patch (n=1016)	Placebo (n=1015)
<b>During treatment and ≤30 days after last dose</b>								
Assessed	988	983	996	995	1017	1012	1006	1006
Suicidal behaviour and/or ideation	7 (1%)	4 (<1%)	3 (<1%)	7 (1%)	27 (3%)	15 (1%)	20 (2%)	25 (2%)
Suicidal behaviour†‡	0	0	1 (<1%)	1 (<1%)§	0	1 (<1%)	0	2 (<1%)
Suicidal ideation	7 (1%)	4 (<1%)	3 (<1%)	6 (1%)	27 (3%)	15 (1%)	20 (2%)	25 (2%)
<b>During follow-up (&gt;30 days after last treatment dose and through end of study)</b>								
Assessed	807	816	800	805	833	836	824	791
Suicidal behaviour and/or ideation	3 (<1%)	2 (<1%)	3 (<1%)	4 (<1%)	14 (2%)	4 (<1%)	9 (1%)	11 (1%)
Suicidal behaviour†¶	0	1 (<1%)	0	0	1 (<1%)	0	1 (<1%)	1 (<1%)
Suicidal ideation	3 (<1%)	2 (<1%)	3 (<1%)	4 (<1%)	14 (2%)	4 (<1%)	9 (1%)	11 (1%)

Anthenelli RM, Benowitz NL, West R, et al. Neuropsychiatric safety and efficacy of varenicline, bupropion and nicotine patch in smokers with and without psychiatric disorders (EAGLES): a double blind, randomized, placebo-controlled trial. Lancet 2016;387:2507-20.

42

## EAGLES Trial

### Abstinence Rates:

- Varenicline (highest) → nicotine patch → bupropion → placebo

### Most Common ADEs:

- Varenicline: nausea
- Bupropion: insomnia
- Nicotine patch: abnormal dreams
- Placebo: headache

**Conclusion: No significant increase in neuropsychiatric effects attributable to varenicline or bupropion compared to nicotine patch or placebo**

Anthenelli RM, Benowitz NL, West R, et al. Neuropsychiatric safety and efficacy of varenicline, bupropion and nicotine patch in smokers with and without psychiatric disorders (EAGLES): a double blind, randomized, placebo-controlled trial. Lancet 2016;387:2507-20.

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## Application Case (continued)

**The medical team has discussed smoking cessation options with KM, and she has decided to try nicotine patches and lozenges. Which of the following is the most appropriate recommendation that you should make to the medical resident regarding the plan for smoking cessation?**

- Monitor closely for ↑ in ADEs of clozapine
- Monitor closely for ↓ in efficacy of clozapine and possible ↑ in symptoms
- Monitor for serotonin syndrome
- Monitor for hypertensive crisis

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## Long-Acting Antipsychotics

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## CATIE Trial

### Clinical Antipsychotic Trials of Intervention Effectiveness (CATIE)

Medication	Overall Discontinuation (D/C) Rate	D/C Rate for Lack of Efficacy	D/C Rate for Intolerable Side Effects
Olanzapine	64%	15%	18%
Perphenazine	75%	25%	16%
Quetiapine	82%	28%	15%
Risperidone	74%	27%	10%
Ziprasidone	79%	24%	15%

Lieberman J, Stroup T, McEvoy J, et al. Effectiveness of Antipsychotic Drugs in Patients with Chronic Schizophrenia. New England Journal of Medicine, 2005; 353:12:1209-1223.

46



## LAI Administration in WV

- **Scope of practice for pharmacists in WV:**

- §30-5-10(a)(3)
- A licensed pharmacist may “provide drug administration.”  
“Administer” is defined in §30-5-4 as the direct application of a drug to the body of a patient or research subject by injection, inhalation, ingestion, or any other means.

- **Pharmacists may administer medications, but are not authorized to order or prescribe them**

- Authority is only granted to pharmacists (cannot be delegated)
- Must ensure that proper training and education has been completed

**Suggested Training:**

American Association of Psychiatric Pharmacists (AAPP) - Psychotropic Long-Acting Injectable Training Program

<https://code.wvlegislature.gov/30-5-10/>

<https://aapp.org/ed/lai>

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## Application Case (continued)

KM returns to clinic 12 weeks later and was successful in her quit attempt. She feels like her symptoms are fairly well-controlled, but her auditory hallucinations are still interfering with her ability to concentrate at work. She is hesitant about increasing her clozapine dose because she has experienced an increase in side effects with each dose increase, and she does not want to have to take another pill every day.

**What do you recommend for KM?**

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Depot Formulations of Antipsychotics		
Medication	Maintenance Dosing	Frequency
<b>Aripiprazole monohydrate (Abilify Maintena® or Asimtufii®)</b>	300-400 mg	Every 4 weeks Asimtufii: Every 8 weeks
<b>Aripiprazole lauroxil (Aristada®)</b>	441 mg	Every 4 weeks
	882 mg	Every 6 weeks
	1064 mg	Every 8 weeks
<b>Haloperidol (Haldol deconate®)</b>	100-450 mg	Every 4 weeks
<b>Olanzapine (Zyprexa Relprevv®)</b>	150–210 mg	Every 2 weeks
	300–405 mg	Every 4 weeks
<b>Paliperidone (Invega Sustenna®)</b>	39–234 mg	Every 4 weeks
<b>Paliperidone (Invega Trinza®)</b>	273-819 mg	Every 12 weeks
<b>Paliperidone (Invega Hafyera)</b>	1560mg	Every 6 months
<b>Risperidone (Risperdal Consta®)</b>	25–50 mg	Every 2 weeks
<b>Risperidone (Perseris®)*</b>	90-120 mg	Every 4 weeks (SQ)
<b>Risperidone (Rykindo®)</b>	12.5-50 mg	Every 2 weeks
<b>Risperidone (Uzedy®)</b>	50-250 mg	Every 4-8 weeks (SQ)

Riboldi J, Cavaleri D, Capogrosso CA, Crocarno C, Bartoli F, Carrà G. Practical Guidance for the Use of Long-Acting Injectable Antipsychotics in the Treatment of Schizophrenia. Psychol Res Behav Manag. 2022 Dec 30;15:3915-3929. doi: 10.2147/PRBM.S371991. PMID: 36605176; PMCID: PMC9809355.

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LAIs - SGAs									
Medication	Conversions								
<b>Aripiprazole (Abilify Maintena®)</b>	10mg/day PO → 300 mg IM Qmonth 15mg/day PO → 400 mg IM Qmonth ≥20mg/day PO → 600 mg IM Qmonth								
<b>Aripiprazole (Aristada®)</b>	<table> <tr> <th>Maintena Dose</th><th>Aristada Dose</th></tr> <tr> <td>300mg Qmonth →</td><td>441mg Qmonth</td></tr> <tr> <td>400mg Qmonth →</td><td>662mg Qmonth</td></tr> <tr> <td>600mg Qmonth →</td><td>882mg-1064mg Q4-8 weeks</td></tr> </table>	Maintena Dose	Aristada Dose	300mg Qmonth →	441mg Qmonth	400mg Qmonth →	662mg Qmonth	600mg Qmonth →	882mg-1064mg Q4-8 weeks
Maintena Dose	Aristada Dose								
300mg Qmonth →	441mg Qmonth								
400mg Qmonth →	662mg Qmonth								
600mg Qmonth →	882mg-1064mg Q4-8 weeks								
<b>Olanzapine (Zyprexa Relprevv®)</b>	<table> <tr> <td>10mg/day PO</td><td>→ 150mg Q2wks OR 300mg Q4wks</td></tr> <tr> <td>15mg/day PO</td><td>→ 210mg Q2wks OR 405mg Q4wks</td></tr> <tr> <td>20mg/day PO</td><td>→ 300mg Q2wks</td></tr> </table>	10mg/day PO	→ 150mg Q2wks OR 300mg Q4wks	15mg/day PO	→ 210mg Q2wks OR 405mg Q4wks	20mg/day PO	→ 300mg Q2wks		
10mg/day PO	→ 150mg Q2wks OR 300mg Q4wks								
15mg/day PO	→ 210mg Q2wks OR 405mg Q4wks								
20mg/day PO	→ 300mg Q2wks								

[https://www.pbm.va.gov/PBM/clinicalguidance/drugmonographs/Aripiprazole\\_Long\\_acting\\_IM\\_Monograph\\_Updated\\_March\\_2016.pdf](https://www.pbm.va.gov/PBM/clinicalguidance/drugmonographs/Aripiprazole_Long_acting_IM_Monograph_Updated_March_2016.pdf)  
[https://www.accessdata.fda.gov/drugsatfda\\_docs/label/2017/022173s0271bl.pdf](https://www.accessdata.fda.gov/drugsatfda_docs/label/2017/022173s0271bl.pdf)

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LAIs - SGAs	
Medication	Conversions
<b>Paliperidone (Invega Sustenna®)</b>	<u>Initial Dosing:</u> 234mg IM on Day 1 & 156mg IM on Day 8 <u>Maintenance Dosing:</u> 3mg PO/day → 39-78mg IM Qmonth 6mg PO/day → 117mg IM Qmonth 9mg PO/day → 156mg IM Qmonth 12mg PO/day → 234mg IM Qmonth
<b>Paliperidone (Invega Trinza®)</b>	<u>Sustenna Dose</u> <u>Trinza Dose</u> 78mg/month → 273mg Q3months 117mg/month → 410mg Q3months 156mg/month → 546mg Q3months 234mg/month → 819mg Q3months
<b>Risperidone (Risperdal Consta®)</b>	Initial dosing: 25mg Q2wks >4mg/day PO → 37.5mg-50mg Q2wks

<http://www.janssenlabels.com/package-insert/product-monograph/prescribing-information/RISPERDAL+CONSTA-pi.pdf>
<https://www.invegasustennahcp.com/dosing/transitioning>  
<https://www.invegatrinzahcp.com/dosing/treatment-transition>


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# Bipolar Disorder

## Clinical Presentation

## Medications

## Clinical Practice Guidelines


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## Application Case (continued)

KM's schizophrenia symptoms have been managed with clozapine (400 mg PO QHS) and aripiprazole LAI for the last 3 years. She comes to clinic today with her mother, who is concerned because for the last 3 months, KM had been "very down" and had lost interest in daily activities. Her PCP prescribed sertraline 50 mg PO daily 4 weeks ago. Her mother tells you that for the past 5 days, KM has been talking rapidly, not sleeping more than 2 hours per day, experiencing racing thoughts and is easily distracted.

**What is KM experiencing? What is the likely cause of these symptoms?**

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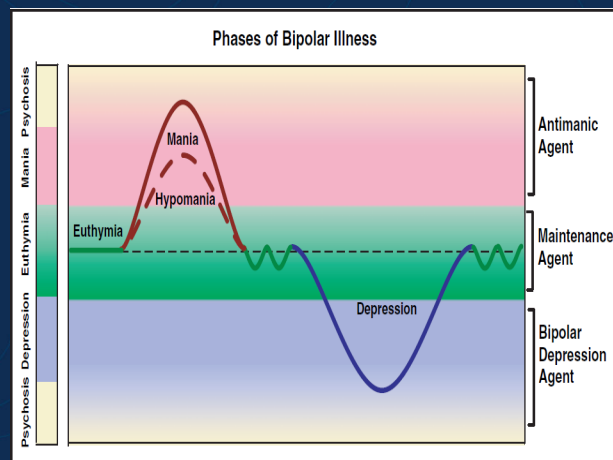
## Bipolar disorder

### Phases of bipolar disorder:

- Euthymia
- Depression
- Mania or hypomania

### Types of bipolar disorder:

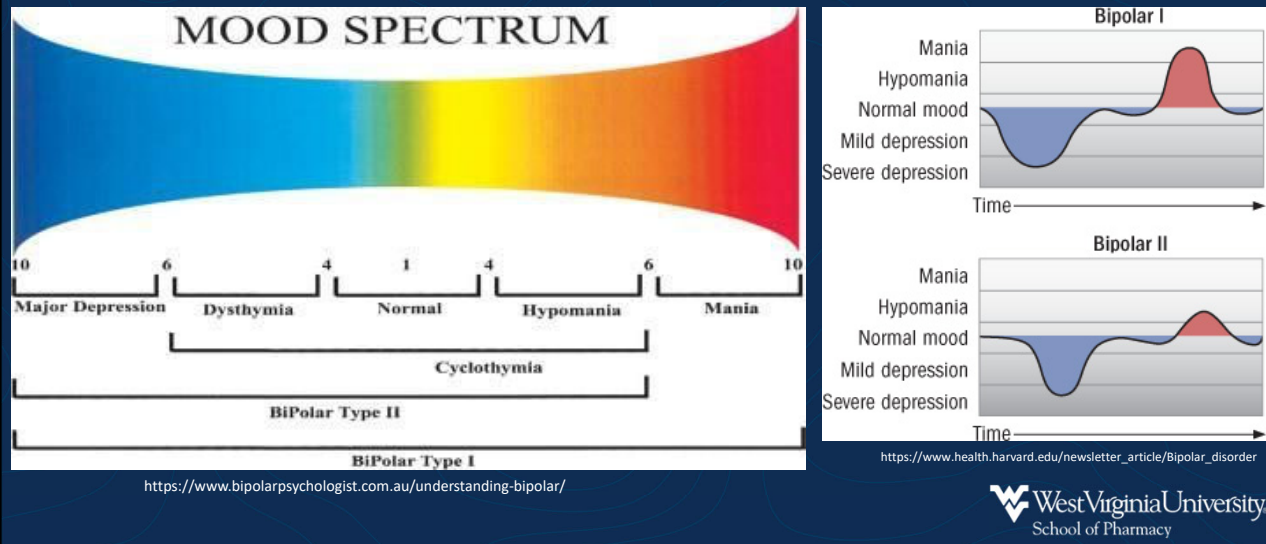
- Bipolar I Disorder: Depression + **Mania**
- Bipolar II Disorder: Depression + **Hypomania**
- Cyclothymia: Depressive Episodes + Hypomania



<https://www.bipolarpsychologist.com.au/understanding-bipolar/>

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## Bipolar disorder



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## Clinical presentation - Mania

### Mania:

- **1 week** of elevated mood and energy with at **least 3** of the following:
  - Inflated self-esteem (grandiosity)
  - Decreased need for sleep
  - Increased talking
  - Racing thoughts
  - Distractibility
  - Increased goal-directed activity
  - Excessive involvement of high-risk activities
- **Entails impairment of functioning or need for hospitalization**

### **Mania vs. Hypomania:**

**Hypomania occurs for at least 4 days and does not entail need for hospitalization**

Chisholm-Burns MA, Wells BG, Schwinghammer TL, Malone PM, Kolesar JM, DiPiro JT (eds). Pharmacotherapy Principles & Practice, 6th ed. New York: McGraw-Hill, 2021

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## Manic/Hypomanic Symptoms

Affective	Behavioral	Cognitive	Social
Euphoria	Pressured Speech	Grandiosity	Suicidal
Elated	Hyperactive	Poor Insight	Irritable
Boisterous	Speeded Up	Distractible	Suspicious
Labile	Restless	Flight of Ideas	Violent
Anger/Rage	Hypsomnia	Ideas of Reference	Impulsive
Irritability	Overconfident	Loose Associations	Seductive
Dissatisfaction	Fearless	Disorganized	Overconfident
Rapid Fluctuations	Reckless	Delusions	Controlling
Panic	Poor Judgment	Hallucinations	Conflict

Chisholm-Burns MA, Wells BG, Schwinghammer TL, Malone PM, Kolesar JM, DiPiro JT (eds). Pharmacotherapy Principles & Practice, 6th ed. New York: McGraw-Hill, 2021

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## Depressive Symptoms

Table 39-1		
Evaluation and Diagnosis of Mood Episodes		
Diagnosis Episode	Impairment of Functioning or Need for Hospitalization <sup>a</sup>	DSM-5 Criteria <sup>b</sup>
Major depressive	Yes	<p>At least 2-week period of either depressed mood or loss of interest or pleasure in normal activities, associated with at least five of the following symptoms:</p> <ul style="list-style-type: none"> <li>• Depressed, sad mood (adults); can be irritable mood in children</li> <li>• Decreased interest and pleasure in normal activities</li> <li>• Decreased or increased appetite, weight loss or weight gain</li> <li>• Insomnia or hypersomnia</li> <li>• Psychomotor retardation or agitation</li> <li>• Decreased energy or fatigue</li> <li>• Feelings of excessive guilt or worthlessness</li> <li>• Impaired concentration or indecisiveness</li> <li>• Recurrent thoughts of death, suicidal thoughts or attempts</li> </ul>

Chisholm-Burns MA, Wells BG, Schwinghammer TL, Malone PM, Kolesar JM, DiPiro JT (eds). Pharmacotherapy Principles & Practice, 6th ed. New York: McGraw-Hill, 2021

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## APA Guidelines – Bipolar Disorder (2002)

<b>Acute Mania - First Line</b>	<b>Severe Mania</b>	Lithium + Antipsychotic Valproate + Antipsychotic
	<b>Less Ill Patients</b>	Lithium, valproate or antipsychotic
<b>Acute Depression - First Line:</b>	<b>Severe depression</b>	Lithium + Antidepressant* ECT (if suicidal or psychotic)
	<b>Less ill Patients</b>	Lithium or lamotrigine
<b>Maintenance - First Line:</b>	<b>Monotherapy</b>	Lithium, VPA or lamotrigine Antipsychotics should be reassessed and tapered if initiated during mania**

\*Limited data

\*\*First generation antipsychotics

Hirschfeld, R. M. A., Bowden, C. L., Gitlin, M. J., Keck, P. E., Suppes, T., Thase, M. E., & Perlis, R. H. (2002). Practice guideline for the treatment of patients with bipolar disorder, second edition. In N. C. Numerous Contributors (Ed.), *American Psychiatric Association practice guidelines for the treatment of psychiatric disorders: Compendium 2002* (pp. 547–634). American Psychiatric Association.

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## CANMAT Guidelines – Bipolar Disorder

<b>Acute Mania - First Line</b>	<b>Monotherapy</b>	Lithium, divalproex, SGAs
	<b>Adjunctive Therapy</b>	WITH lithium or divalproex: SGAs
<b>Acute Depression - First Line:</b>	<b>Monotherapy</b>	Lithium, lamotrigine, quetiapine
	<b>Combination Therapy</b>	Lithium or divalproex and SSRI, olanzapine and SSRI, lithium and divalproex, lithium or divalproex and bupropion
<b>Maintenance - First Line:</b>	<b>Monotherapy</b>	Lithium, SGA, VPA or lamotrigine
	<b>Combination</b>	Mood stabilizer + SGA or lamotrigine

Yatham LN, Kennedy SH, Parikh SV, Schaffer A, Bond DJ, Frey BN, Sharma V, Goldstein BJ, Rej S, Beaulieu S, Alda M, MacQueen G, Milev RV, Ravindran A, O'Donovan C, McIntosh D, Lam RW, Vazquez G, Kapczinski F, McIntyre RS, Kozicky J, Kanba S, Lafer B, Suppes T, Calabrese JR, Vieta E, Malhi G, Post RM, Berk M. Canadian Network for Mood and Anxiety Treatments (CANMAT) and International Society for Bipolar Disorders (ISBD) 2018 guidelines for the management of patients with bipolar disorder. *Bipolar Disord*. 2018 Mar;20(2):97-170. doi: 10.1111/bdi.12609. Epub 2018 Mar 14. PMID: 29536616; PMCID: PMC5947163.

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## Medications for Bipolar Disorder

- Lithium
- Valproic acid (divalproex)
- SGAs
- Lamotrigine



Chisholm-Burns MA, Wells BG, Schwinghammer TL, Malone PM, Kolesar JM, DiPiro JT (eds). Pharmacotherapy Principles & Practice, 6th ed. New York: McGraw-Hill, 2021

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## Application Case (continued)

**KM is diagnosed with schizoaffective disorder in clinic. Which of the following medications would be most appropriate to manage KM's acute manic episode?**

- A. Valproic acid/valproate
- B. Carbamazepine
- C. Lamotrigine
- D. Quetiapine

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## Valproic acid (VPA)

**Acute mania, mixed episodes, maintenance**

**ADEs:**

- GI complaints
- Weight gain
- Fine hand tremors
- Sedation
- Alopecia

**Drug-drug interactions: common (LTG, warfarin, CNS depressants)**

**Sprinkle formulation available**

**Should be avoided in pregnancy**

Hirschfeld, R. M. A., Bowden, C. L., Gitlin, M. J., Keck, P. E., Suppes, T., Thase, M. E., & Perlis, R. H. (2002). Practice guideline for the treatment of patients with bipolar disorder, second edition. In N. C. Numerous Contributors (Ed.), *American Psychiatric Association practice guidelines for the treatment of psychiatric disorders: Compendium 2002* (pp. 547–634). American Psychiatric Association.

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## Lithium

**1<sup>st</sup> line for acute mania, acute depression and maintenance**

**ADEs:**

- GI upset
- Tremors
- Polyuria (nephrogenic diabetes insipidus)
- Rash
- Alopecia
- Akathisia
- Hypothyroidism
- Weight gain
- Leukocytosis

- Benefit in suicidal patients
- Interactions:
  - No CYP interactions
  - Several drug-drug interactions
- Renally eliminated
- Narrow therapeutic index
  - 0.8-1.2 mEq/L
  - Monitor trough levels

Hirschfeld, R. M. A., Bowden, C. L., Gitlin, M. J., Keck, P. E., Suppes, T., Thase, M. E., & Perlis, R. H. (2002). Practice guideline for the treatment of patients with bipolar disorder, second edition. In N. C. Numerous Contributors (Ed.), *American Psychiatric Association practice guidelines for the treatment of psychiatric disorders: Compendium 2002* (pp. 547–634). American Psychiatric Association.

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# Lithium toxicity



## Blood levels >1.5 mEq/L

- >1.5 mEq/L → ataxia, tremor, vomiting, diarrhea, confusion
- >2.5 mEq/L → CNS depression, arrhythmia, seizure, coma

## ↑ Risk of Lithium Toxicity:

- Sodium restriction
- Dehydration
- Vomiting/Diarrhea
- Age > 50 years
- Heart failure
- Cirrhosis
- Drug interactions

## Management of Lithium Toxicity:

- Discontinue lithium
- ER management
  - IV fluids
- Monitor:
  - Renal and electrolyte status
  - Fluid balance
  - Neurologic changes
- Dialysis if lithium [] >4 mEq/L

Hirschfeld, R. M. A., Bowden, C. L., Gitlin, M. J., Keck, P. E., Suppes, T., Thase, M. E., & Perlis, R. H. (2002). Practice guideline for the treatment of patients with bipolar disorder, second edition. In N. C. Numerous Contributors (Ed.), *American Psychiatric Association practice guidelines for the treatment of psychiatric disorders: Compendium 2002* (pp. 547–634). American Psychiatric Association.

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# Management of Lithium-Induced Side Effects

Adverse Drug Effect	Management
Dermatologic (rash, worsening psoriasis)	Discontinue
Tremor	↓ dose, add propranolol
CNS (agitation, confusion, ↓ concentration)	↓ dose
GI	↓ dose, use XR formulation
Hypothyroidism	Add levothyroxine
Polydipsia/Polyuria	↓ dose, add amiloride, dose QHS or ↑ fluid intake
Nephrotoxicity	Use lowest effective dose; discontinue
Teratogenicity	Avoid during 1 <sup>st</sup> trimester

Hirschfeld, R. M. A., Bowden, C. L., Gitlin, M. J., Keck, P. E., Suppes, T., Thase, M. E., & Perlis, R. H. (2002). Practice guideline for the treatment of patients with bipolar disorder, second edition. In N. C. Numerous Contributors (Ed.), *American Psychiatric Association practice guidelines for the treatment of psychiatric disorders: Compendium 2002* (pp. 547–634). American Psychiatric Association.

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## Lithium Drug-Drug Interactions

### ↑ Lithium Levels:

- Thiazides
- NSAIDs
- ACEi/ARBs
- Renal dysfunction
- Dehydration
- Salt restriction

### • ↓ Lithium Levels:

- Theophylline

Hirschfeld, R. M. A., Bowden, C. L., Gitlin, M. J., Keck, P. E., Suppes, T., Thase, M. E., & Perlis, R. H. (2002). Practice guideline for the treatment of patients with bipolar disorder, second edition. In N. C. Numerous Contributors (Ed.), *American Psychiatric Association practice guidelines for the treatment of psychiatric disorders: Compendium 2002* (pp. 547–634). American Psychiatric Association.

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## SGAs

### Efficacy in acute mania has been well documented

- Fairly rapid time to symptom improvement

### May be especially beneficial for anxiety symptoms during manic episode

### ADEs:

- Metabolic effects
  - High: olanzapine, quetiapine
  - Moderate: risperidone, asenapine, brexpiprazole,
  - Low: Ziprasidone, aripiprazole, cariprazine, lurasidone, lumateperone
- EPS, sedation, orthostatic hypotension, Ach effects, QTc prolongation

Hirschfeld, R. M. A., Bowden, C. L., Gitlin, M. J., Keck, P. E., Suppes, T., Thase, M. E., & Perlis, R. H. (2002). Practice guideline for the treatment of patients with bipolar disorder, second edition. In N. C. Numerous Contributors (Ed.), *American Psychiatric Association practice guidelines for the treatment of psychiatric disorders: Compendium 2002* (pp. 547–634). American Psychiatric Association.

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## Lamotrigine

**Less effective for mania; used for depression or maintenance**

### ADEs:

- Maculopapular rash
- Dizziness
- Drowsiness
- Headache
- Blurred vision
- Nausea

**Slower onset due to slow titration**

### Drug-drug interactions: common

- LTG + VPA → severe interaction → reduce LTG dose by 50%
- LTG + CBZ → increase LTG dose

Hirschfeld, R. M. A., Bowden, C. L., Gitlin, M. J., Keck, P. E., Suppes, T., Thase, M. E., & Perlis, R. H. (2002). Practice guideline for the treatment of patients with bipolar disorder, second edition. In N. C. Numerous Contributors (Ed.), *American Psychiatric Association practice guidelines for the treatment of psychiatric disorders: Compendium 2002* (pp. 547–534). American Psychiatric Association.

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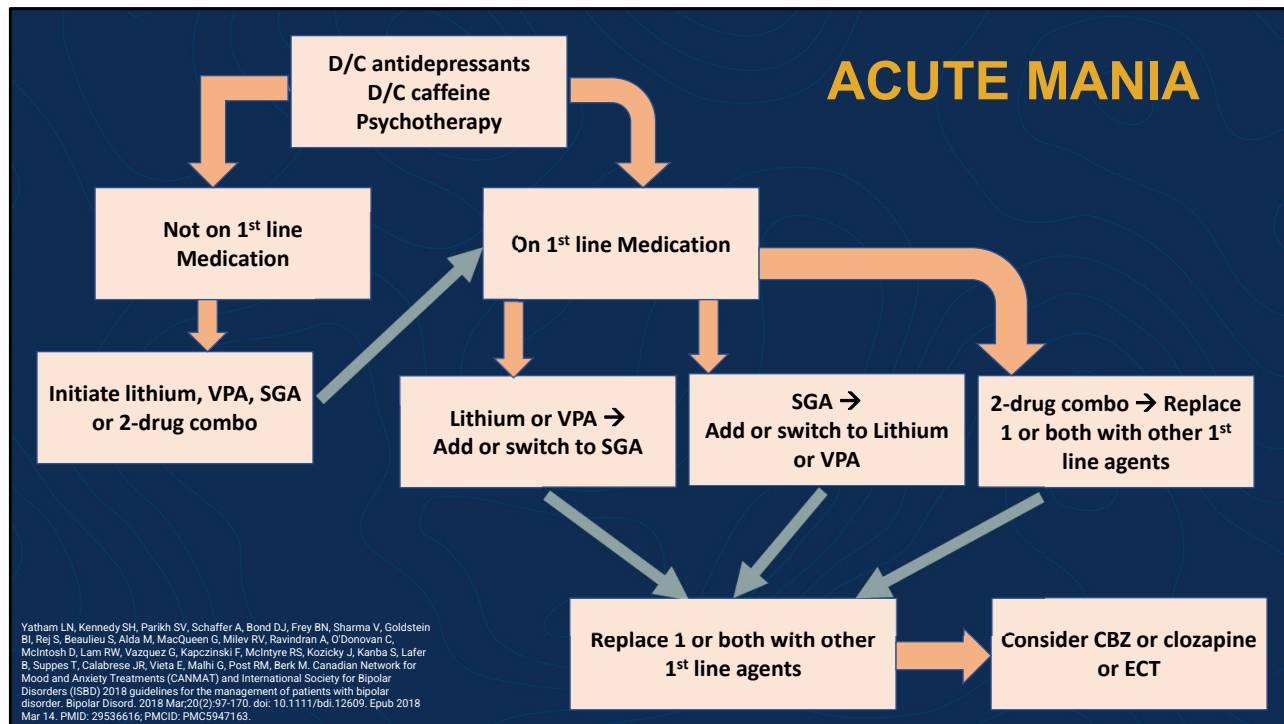
## Guidelines: CANMAT (Mania)

<b>First Line</b>	<b>Monotherapy</b>	Lithium, divalproex, olanzapine, risperidone, quetiapine, aripiprazole, ziprasidone, asenapine, paliperidone
	<b>Adjunctive Therapy</b>	WITH lithium or divalproex: risperidone, quetiapine, olanzapine, aripiprazole, asenapine
<b>Second Line</b>	<b>Monotherapy</b>	Carbamazepine, ECT, haloperidol
	<b>Combination Therapy</b>	Lithium and divalproex
<b>Not Recommended</b>	<b>Monotherapy</b>	Gabapentin, topiramate, lamotrigine, verapamil, tiagabine
	<b>Combination therapy</b>	Risperidone and carbamazepine, olanzapine and carbamazepine

Yatham LN, Kennedy SH, Parikh SV, Schaffer A, Bond DJ, Frey BN, Sharma V, Goldstein BJ, Rej S, Beaulieu S, Alda M, MacQueen G, Milev RV, Ravindran A, O'Donovan C, McIntosh D, Lam RW, Vazquez G, Kapczinski F, McIntyre RS, Kozicky J, Kanba S, Lafer B, Suppes T, Calabrese JR, Vieta E, Malhi G, Post RM, Berk M. Canadian Network for Mood and Anxiety Treatments (CANMAT) and International Society for Bipolar Disorders (ISBD) 2018 guidelines for the management of patients with bipolar disorder. *Bipolar Disord*. 2018 Mar;20(2):97-170. doi: 10.1111/bdi.12609. Epub 2018 Mar 14. PMID: 29536616; PMCID: PMC5947163.

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## Pharmacologic treatment – Acute depression

**Assess for secondary causes**  
**Taper off benzos, sedative-hypnotics**  
**Mild – Moderate → Lithium, SGA, VPA, LTG**  
**Severe → 2-3 drug combination**

- Mood stabilizer (VPA or Lithium) + SGA ± LTG

**Clinical Pearl: Only use antidepressants in combination with a mood stabilizer in patients with bipolar disorder**

Hirschfeld, R. M. A., Bowden, C. L., Gitlin, M. J., Keck, P. E., Suppes, T., Thase, M. E., & Perlis, R. H. (2002). Practice guideline for the treatment of patients with bipolar disorder, second edition. In N. C. Numerous Contributors (Ed.), *American Psychiatric Association practice guidelines for the treatment of psychiatric disorders: Compendium 2002* (pp. 547–634). American Psychiatric Association.

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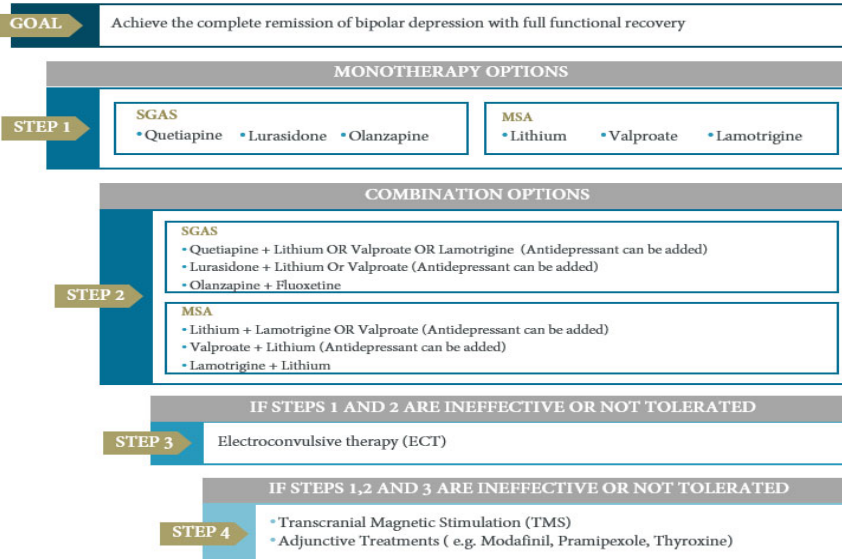
## Guidelines: CANMAT (Depression)

First Line	Monotherapy	Lithium, lamotrigine, quetiapine
	Combination Therapy	Lithium or divalproex and SSRI, olanzapine and SSRI, lithium and divalproex, lithium or divalproex and bupropion
Second Line	Monotherapy	Divalproex, lurasidone
	Combination Therapy	Quetiapine and SSRI, adjunctive modafinil, lithium or divalproex and lamotrigine, lithium or divalproex and lurasidone
Third Line	Monotherapy	Carbamazepine, olanzapine, ECT
Not Recommended	Monotherapy	Gabapentin, aripiprazole, ziprasidone
	Combination therapy	Adjunctive ziprasidone, adjunctive levetiracetam

Yatham LN, Kennedy SH, Parikh SV, Schaffer A, Bond DJ, Frey BN, Sharma V, Goldstein BJ, Rej S, Beaulieu S, Alda M, MacQueen G, Milev RV, Ravindran A, O'Donovan C, McIntosh D, Lam RW, Vazquez G, Kapczinski F, McIntyre RS, Kozicky J, Kanba S, Lafer B, Suppes T, Calabrese JR, Vieta E, Malhi G, Post RM, Berk M. Canadian Network for Mood and Anxiety Treatments (CANMAT) and International Society for Bipolar Disorders (ISBD) 2018 guidelines for the management of patients with bipolar disorder. *Bipolar Disord*. 2018 Mar;20(2):97-170. doi: 10.1111/bdi.12609. Epub 2018 Mar 14. PMID: 29536616; PMCID: PMC5947163.

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### TREATMENT OF ACUTE BIPOLAR DEPRESSION.



Malhi G, S., et al. (2015). Royal Australian and New Zealand College of Psychiatrists clinical practice guidelines for mood disorders. *Australian & New Zealand Journal of Psychiatry*, 49(12), 1087-1206.

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## Application Case (continued)

KM's acute hypomanic episode resolves, and the medical resident wants to know what changes should be made to her medication regimen for maintenance of her schizoaffective disorder. Which of the following is the most appropriate recommendation?

- A. Discontinue clozapine and continue the valproic acid
- B. Continue the clozapine and valproic acid
- C. Discontinue the valproic acid and continue the clozapine
- D. Discontinue clozapine and valproic acid and initiate lamotrigine

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## Pharmacologic treatment - Maintenance

**1<sup>st</sup> line:** SGA, lithium, VPA or lamotrigine

**2<sup>nd</sup> line:** CBZ

**Goal:** monotherapy if possible

**Based on clinical scenario:**

- Depressive-dominant → Lamotrigine may be preferred
- Manic-dominant → SGA or lithium may be preferred

**Polytherapy:**

- Mood Stabilizer (VPA or Lithium) + SGA or Lamotrigine

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## Pharmacologic Therapy Overview

Medication	Acute Mania	Acute Depression	Maintenance
Lithium	+	+	+
VPA	+	+	+
Lamotrigine		+	+
Aripiprazole	+		+
Olanzapine	+	w/fluoxetine	+
Ziprasidone	+		+
Lurasidone	+	+	+
Risperidone	+		+
Quetiapine	+	+	+
CBZ/OXC	+		+
Lumateperone		+	

Information in table compiled from: Chisholm-Burns MA, Wells BG, Schwenghammer TL, Malone PM, Kelsour JM, DiPiro JT (eds). *Pharmacotherapy Principles & Practice*, 6th ed. New York: McGraw-Hill, 2021

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## Therapeutic Drug Monitoring

### Therapeutic Drug Levels:

- Monitor **troughs** weekly during titration → monitor monthly once stabilized
  - Monitor more frequently with interacting agents
- Lithium:
  - 0.8-1.2 mEq/L
- VPA:
  - 50-125 mcg/mL
- CMZ:
  - 4-12 mcg/mL

Hirschfeld, R. M. A., Bowden, C. L., Gitlin, M. J., Keck, P. E., Suppes, T., Thase, M. E., & Perlis, R. H. (2002). Practice guideline for the treatment of patients with bipolar disorder, second edition. In N. C. Numerous Contributors (Ed.), *American Psychiatric Association practice guidelines for the treatment of psychiatric disorders: Compendium 2002* (pp. 547-634). American Psychiatric Association.

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## **Application Case (continued)**

**KM comes to clinic for a follow-up appointment and states that she is not having any issues with her medications, but has been having increasing suicidal thoughts and is having difficulty using coping mechanisms to manage them.**

**What questions would you want to ask KM to determine next steps in your treatment plan?**

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## **Suicidality – Warning Signs and Red Flags**

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## Suicidality

**Suicide rate: up to 30x higher in patients with schizophrenia and bipolar disorder than general population**

**Suicidal thoughts may be mediated by the hippocampus**

**Changes in prefrontal cortical metabolism has also been linked to suicidal behavior**

Doms P, Rihmer Z, Gonda X. Suicide Risk in Bipolar Disorder: A Brief Review. Medicina (Kaunas). 2019 Jul 24;55(8):403. doi: 10.3390/medicina55080403. PMID: 31344941; PMCID: PMC6723289.



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## Suicidality

### Risk Factors

#### **Health Disorders**

#### **Environmental**

- Access to lethal means
- Prolonged stress
- Stressful life events
- Exposure to another person's suicide

#### **Historical**

- Prior suicide attempt(s)
- Family history of suicide
- Childhood abuse, neglect or trauma

### Protective Factors

- Access to mental health care
- Feeling connected to family and community support
- Problem-solving and coping skills
- Limited access to lethal means
- Beliefs that encourage connecting and help-seeking and/or discourage suicidal behaviors

Doms P, Rihmer Z, Gonda X. Suicide Risk in Bipolar Disorder: A Brief Review. Medicina (Kaunas). 2019 Jul 24;55(8):403. doi: 10.3390/medicina55080403. PMID: 31344941; PMCID: PMC6723289.



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# Suicidality

**National Suicide Hotline:**  
**(800)-283-8255**

**Watch for changes in behavior or presence of new behaviors**

## Warning Signs: Talk

- Hopelessness
- Having no reason to live
- Being a burden to others
- Feeling trapped
- Unbearable pain

## Warning Signs: Mood

- Depressed
- Anxious
- Irritable
- Humiliated/Shamed
- Angry

## Warning Signs: Behavior

- Increased use of alcohol or drugs
- Investigating methods of suicide
- Withdrawing from activities
- Isolating from family and friends
- Changes in sleep patterns
- Saying goodbye to people
- Giving away possessions
- Aggression

Doms P, Rihmer Z, Gonda X. Suicide Risk in Bipolar Disorder: A Brief Review. Medicina (Kaunas). 2019 Jul 24;55(8):403. doi: 10.3390/medicina55080403. PMID: 31344941; PMCID: PMC6723289.

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# Providing Comprehensive Care to Patients with Schizophrenia and Bipolar Disorder

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## Comprehensive Care

- Monitoring for efficacy and side effects
  - PANSS
  - AIMS
  - Suicidal ideations
  - Metabolic labs (A1c, lipids)
- Patient and caregiver education
- Cognitive behavioral therapy
- Miscellaneous
  - Nutrition counseling, financial resources, transportation
  - Vaccines

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## Useful Resources for Clinicians

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## Resources for Clinicians

American Psychiatric Association  
Pocket guides  
Guideline summaries

American Association of Psychiatric Pharmacists  
Training programs  
Updates

SMI Adviser  
LAI dosing and conversions  
Clozapine resources



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## New Medication Update



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## Xanomeline and trospium (Cobenfy®)

- **Gained FDA Approval in September 2024**
  - BID dosing
  - Dosing: 50mg xanomeline/20 mg trospium BID x 2 days then increase to 100 mg/20 mg BID
- **Xanomeline: M1 and M4 agonist**
- **Trospium: peripherally acting muscarinic antagonist → goal is to ameliorate xanomeline-related adverse effects in peripheral muscarinic receptors**
  - No activity on D<sub>2</sub> receptors
- **EMERGENT-2 Trial:**
  - Randomized, double-blind, placebo-controlled 5-week phase 3 trial for adults 18-65 years of age with schizophrenia diagnosis and PANSS score of  $\geq 80$
- **EMERGENT-4 and EMERGENT-5 : 52-week open-label trials showed similar results**

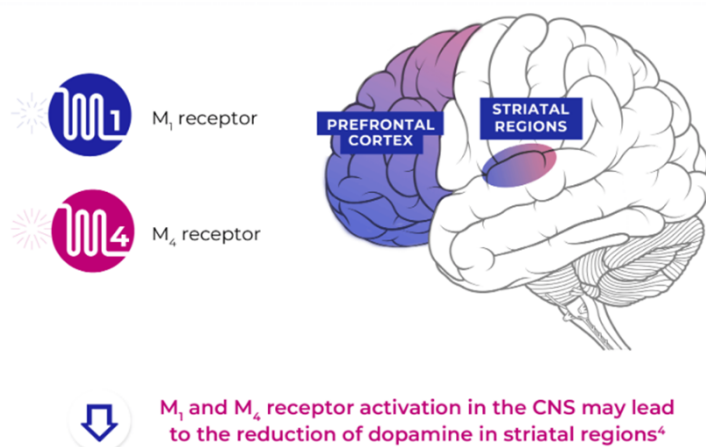
<https://www.labiotech.eu/en/depth/new-treatments-schizophrenia/#test-that-you-need-NE26099D-KarXTN3A%20muscarinic%20agonist%20offers%20promising%20advances%20in%20the%20long%20term%20of%20drugs%20called%20muscarinic%20agonists>

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## Mechanism of Action

Selective\* M<sub>1</sub> and M<sub>4</sub> receptor activation is believed to modulate dopamine release<sup>3,4,6,7</sup>

M<sub>1</sub> and M<sub>4</sub> receptors are highly expressed in regions associated with schizophrenia symptoms. Muscarinic receptors are **not highly expressed** in areas associated with **motor control and hormone regulation**.<sup>3,4,6,7</sup>



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## EMERGENT-2 Results

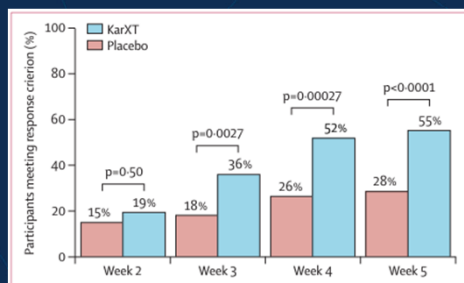
	KarXT (n=117)	Placebo (n=119)	Difference (95% CI)	Cohen's d	p value
<b>Primary endpoint</b>					
PANSS total score*	-21.2 (1.7)	-11.6 (1.6)	-9.6 (-13.9 to -5.2)	0.61	<0.0001
<b>Secondary outcome measures</b>					
PANSS positive symptom subscale score†	-6.8 (0.5)	-3.9 (0.5)	-2.9 (-4.3 to -1.5)	0.59	<0.0001
PANSS negative symptom subscale score‡	-3.4 (0.5)	-1.6 (0.5)	-1.8 (-3.1 to -0.5)	0.40	0.0055
PANSS Marder negative factor score§	-4.2 (0.5)	-2.0 (0.5)	-2.2 (-3.6 to -0.8)	0.44	0.0022
CGI-S scale score¶	-1.2 (0.1)	-0.7 (0.1)	-0.6 (-0.9 to -0.3)	0.58	<0.0001
PANSS responders (≥30% reduction from baseline in PANSS total score)	51/93 (55%)	28/99 (28%)	27% (13 to 39)	NA	<0.0001

Data are LSM change (SE) from baseline or n/N (%). CGI-S=Clinical Global Impression-Severity. mITT=modified intent-to-treat. NA=not applicable. PANSS=Positive and Negative Syndrome Scale. KarXT=xanomeline-trospium. \*PANSS total score range, 30–120 (higher score reflects greater severity). †PANSS positive symptoms subscale score range, 7–49 (higher score reflects greater severity). ‡PANSS negative symptoms subscale score range, 7–49 (higher score reflects greater severity). §PANSS Marder negative factor range, 7–49 (higher score reflects greater severity). ¶CGI-S scale range, 1–7 (1 indicating no illness and 7 indicating severe illness). ||On the basis of the floor-adjusted total score (total score minus 30), assessed in patients with available week-5 scores.

**Table 2: Efficacy measures at week 5 (mITT population)**

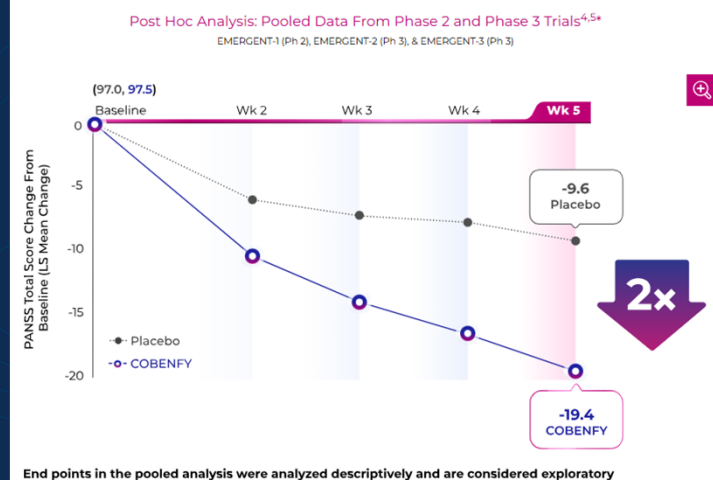
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## EMERGENT-2 Results



**Figure 4: Percentage of participants with ≥30% reduction from baseline in PANSS total score by trial week**  
Based on floor-adjusted total score (total score minus 30). PANSS=Positive and Negative Syndrome Scale. KarXT=xanomeline-trospium.

### Post-hoc analysis: Pooled PANSS total score data



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## EMERGENT Results – Safety Profile

### Adverse Reactions Reported in ≥2% of COBENFY-Treated Patients and Greater Than Rate of Placebo in EMERGENT-2 & -3<sup>4</sup>

Adverse reaction	COBENFY (N=251)	Placebo (N=253)
Nausea	19%	4%
Dyspepsia <sup>a</sup>	18%	5%
Constipation	17%	7%
Vomiting	15%	1%
Hypertension <sup>b</sup>	11%	2%
Abdominal pain <sup>c</sup>	8%	4%
Diarrhea	6%	2%
Tachycardia <sup>d</sup>	5%	2%
Dizziness	5%	2%
Gastroesophageal reflux disease	5%	<1%
Dry mouth	4%	2%
Somnolence	3%	2%
Vision blurred	3%	0
Salivary hypersecretion	2%	0
Orthostatic hypotension	2%	1%
Cough <sup>e</sup>	2%	1%
Extrapyramidal symptoms (EPS), non-akathisia <sup>f</sup>	2%	<1%

Kaul J, Sawchak S, Correll C, et al. Efficacy and safety of the muscarinic receptor agonist KarXT (xanomeline-trospium) in schizophrenia (EMERGENT-2) in the USA: results from a randomised, double-blind, placebo-controlled, flexible-dose phase 3 trial. The Lancet. 2024; 403 (10422): 160-170. [https://doi.org/10.1016/S0140-6736\(23\)01390-6](https://doi.org/10.1016/S0140-6736(23)01390-6).

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## EMERGENT Results – Safety Profile

### Incidence of certain metabolic side effects was low in short-term studies<sup>5</sup>

#### Shifts From Baseline to End Point in EMERGENT -1, -2, & -3 (pooled data)<sup>5</sup>

Fasting glucose	From normal to impaired: 1.8% vs 1.7% for placebo	Proportion of metabolic shifts was similar to placebo
Total cholesterol	From borderline to high: 6.8% vs 5.1% for placebo	
Fasting triglycerides	From borderline to high: 0.7% vs 1.7% for placebo	
Prolactin	+0.75 µg/L vs -1.38 µg/L for placebo	No meaningful increase in mean levels

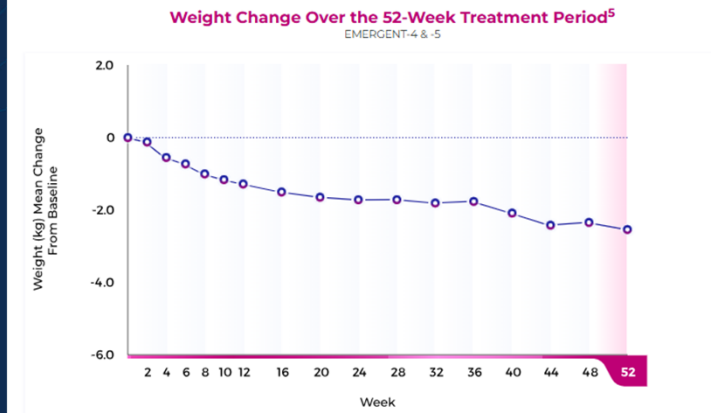
<https://www.cobenfyhcp.com/safety>

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## EMERGENT Results – Safety Profile

The majority of patients did not experience clinically significant weight gain from Week 5 to Week 52<sup>1</sup>



<https://www.cobenfyhcp.com/safety>

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## EMERGENT Results – Safety Profile

**Movement disorders: short-term safety data<sup>5</sup>**

	COBENFY (N=251)	Placebo (N=253)
5-wk pivotal trials (EMERGENT-2 & -3) <sup>4,5</sup>		
EPS (excluding akathisia)	2%	<1%
Akathisia and restlessness	2%	1%

<https://www.cobenfyhcp.com/safety>

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## Patient Assistance Program

**COBENFY**  
(xanomeline and trospium chloride) capsules  
50mg/20mg, 100mg/20mg, 125mg/30mg

About COBENFY ▼ Taking COBENFY Support & Resources ▼ Real Stories Living With Schizophrenia Sign Up ▼

### You can sign up for our Co-Pay Card

Eligible participants may pay as little as \$0. If you have private or commercial health insurance, you may be eligible to pay as little as \$0 per month through a co-pay savings offer. [Certain terms and conditions apply.](#)

[Check my eligibility](#)

<https://www.cobenfy.com/support-program>

**COBENFY cares.**  
Co-Pay Assistance Program  
Member ID:  
BdID: 610613  
RxPCN: 2001  
GBP: 77770216  
Activation required.  
Visit [cobenfy.com/sign-up-to-ask](https://cobenfy.com/sign-up-to-ask)  
or call 1-877-COBENFY (1-877-362-3639).  
Your eligibility, commercially insured COBENFY patients.  
Restrictions apply. See back of card for details.

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## Medications on the Horizon

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## Therapeutic Targets for New Schizophrenia Medications

- Noradrenergic alpha2-receptor modulators
- 5HT<sub>2C</sub> receptor agonists
- Cholinergic receptor modulators
- Glutamate receptor modulators
- GABA receptor agonists
- NMDARs Stimulants

<https://www.empr.com/home/news/drugs-in-the-pipeline/disappointing-results-for-ulotaront-in-two-phase-3-schizophrenia-trials/>

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## New Drug Update - Novel Treatment (Ulotaront)

May 2019: FDA granted Breakthrough Therapy designation to SEP-363856 for treatment of schizophrenia

MOA: trace amine-associated receptor (TAAR1) activator and 5HT<sub>1A</sub> activator

- **No D<sub>2</sub> or 5HT<sub>2A</sub> activity**

Preliminary results showed improvement in PANSS score compared to placebo

**Phase 3 studies showed no improvements compared to placebo → now being studied for depression**

<https://www.empr.com/home/news/drugs-in-the-pipeline/disappointing-results-for-ulotaront-in-two-phase-3-schizophrenia-trials/>

<https://www.empr.com/home/news/drugs-in-the-pipeline/novel-treatment-for-schizophrenia-gets-fdas-breakthrough-therapy-designation/>

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## Medications on the Horizon

### Iclepertin

- Oral glycine transporter (GlyT1) inhibitor
- Phase II Trials:
  - May improve cognitive function in patients with schizophrenia and Alzheimer's disease
- Phase III trials underway

<https://www.newron.com/news-and-media/regulatory-news/newron-announces-positive-top-line-results-potentially-pivotal-phase>

Wunderlich, G., Blahova, Z., Garcia, M. et al. Efficacy and safety of the novel GlyT1 inhibitor BL425809 in Alzheimer's dementia: a randomized controlled trial. *Alz Res Therapy* 15, 24 (2023). <https://doi.org/10.1186/s13195-023-01163-3>



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## Medications on the Horizon

### Brilaroxazine

- Serotonin-dopamine modulator
  - Partial agonist at 5HT<sub>1A</sub>, antagonist at 5HT<sub>2A</sub> and 5HT<sub>7</sub>
- Phase III trials:
  - PANSS reduction of 23.9 points (compared to 13.8 with placebo)
  - Low discontinuation rates
  - No serious adverse effects
  - No change in bodyweight, blood glucose or lipid levels compared to placebo
  - <1% of patients reported EPS
- Expected to submit to FDA in 2025

<https://revivapharma.com/reviva-announces-positive-topline-results-from-global-pivotal-phase-3-recover-trial-of-brilaroxazine-in-schizophrenia/>

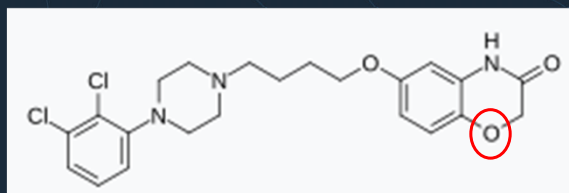


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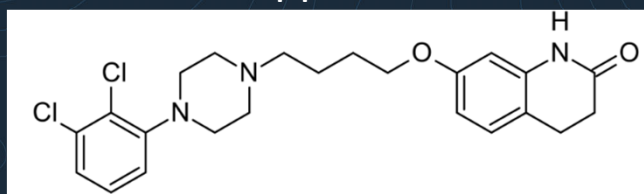
# Brilaroxazine

Also known as oxaripiprazole

Brilaroxazine



Aripiprazole



Chen, Z., Fan, L., Wang, H. *et al.* Structure-based design of a novel third-generation antipsychotic drug lead with potential antidepressant properties. *Nat Neurosci* 25, 39–49 (2022). <https://doi.org/10.1038/s41593-021-00971-w>

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## Assessment Questions

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## Assessment Question

Which of the following medications is NOT available as a long acting injectable?

- A. Clozapine
- B. Risperidone
- C. Paliperidone
- D. Aripiprazole

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## Assessment Question

A patient that is experiencing medication-induced akathisia should be prescribed:

- A. Benztropine
- B. Propranolol
- C. Levothyroxine
- D. Deutetrabenazine

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## Assessment Question

The 2020 APA Guidelines for schizophrenia recommend \_\_\_\_\_ for treatment of tardive dyskinesia.

- A. Anticholinergics
- B. VMAT2 inhibitors
- C. Beta-blockers
- D. Stool softeners



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## Assessment Question

The APA Guidelines recommend clozapine for patients with:

- A. Treatment resistance
- B. Suicidal ideations
- C. Aggressive behaviors
- D. All of the above



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## Assessment Question

The CANMAT guidelines recommend all of the following medications as first line options for treatment of an acute manic episode except:

- A. Quetiapine
- B. Lamotrigine
- C. Valproic acid
- D. Lithium

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## Assessment Question

Which of the following is NOT effective at treating acute depressive episodes in a patient with bipolar disorder?

- A. Quetiapine
- B. Lithium
- C. Aripiprazole
- D. Valproic acid

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## Assessment Question

Name 3 risk factors for suicide in a patient with schizophrenia or bipolar disorder.



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## Assessment Question

Pharmacists in WV are permitted to administer long-acting injectable antipsychotics if proper training and education are completed.

- A. True
- B. False



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## Assessment Question

Which of the following will NOT cause increased lithium levels?

- A. Increased sodium
- B. ACE inhibitors
- C. NSAIDs
- D. Thiazides

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## Assessment Question

Which of the following medications for bipolar disorder interacts with lamotrigine?

- A. Valproic acid
- B. Lithium
- C. Quetiapine

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## Assessment Question

If a patient with schizophrenia increases his smoking habits from  $\frac{1}{2}$  ppd to 1 ppd while taking olanzapine, which of the following is true?

- A. The patient should be monitored for increased symptoms
- B. The patient should be monitored for increased side effects
- C. Olanzapine metabolism is not affected by changes in smoking

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## Questions?



[ashleigh.barrickman@hsc.wvu.edu](mailto:ashleigh.barrickman@hsc.wvu.edu)

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## CE Evaluation Access Code

\*\*\*\*\*

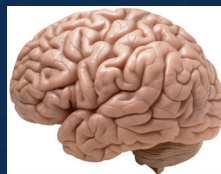
Capital Letters, No spaces, complete by \_\_\_\_\_

Note: CE credit will be reported to NABP CPE Monitor within 4-6 weeks



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## Mindful Medicine: Updates and Insights in Psychiatric Pharmacy



Ashleigh Barrickman, PharmD, BCACP, CTTS



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