

# PART 8 MEDICATIONS

Dr. Merrill Norton Pharm.D.,D.Ph.,JCCDP-D  
Clinical Associate Professor  
University of Georgia College of Pharmacy  
Athens, Georgia  
mernort@uga.edu

Dr. Merrill Norton  
Pharm.D.,D.Ph.,JCCDP-D

---

---

---

---

---

---

---

---

## CLINICIAN PSYCHOTROPIC DRUG INFO

- Epocrates
- Monthly Prescribing Reference
- Facts and Comparisons
- Stahl's Essential Psychopharmacology 4<sup>rd</sup> Edition
- T-MAY Treatment of Maladaptive Aggression in Youth\* (Update 2013)
- Clinical Handbook of Psychotropic Drugs
- Adults
- Children and Adolescents
- 19<sup>th</sup> Edition
- Updated Yearly

Dr. Merrill Norton Pharm.D.,D.Ph.,JCCDP-D

---

---

---

---

---

---

---

---

## So What's New in Psychopharmacology?

- Vilazodone (Viibryd)
- Levomilnacipran (Fetzima)
- Vortioxetine( Brintellix)
- Asenapine (Saphris)
- Iloperadine (Fanapt)
- Lurasidone (Latuda)
- Zolpidem Spray (Zolpimist)
- Clozapine Oral Suspension (Versacloz)
- Fentanyl Oral Tablets (Abstral and Fentora)
- Fentanyl Nasal Spray (Lazandra)
- Fentanyl Buccal Film (Onsolis)
- Buprenorphine Transdermal (Butrans)
- Buprenorphine SL Tablets( Zubslov)
- Tapentadol(Nucynta)
- Hydrocodone (Zohydro)

Dr. Merrill Norton Pharm.D.,D.Ph.,JCCDP-D

---

---

---

---

---

---

---

---

FDA's Drug Safety Initiative  
**Communication with the Public**  
 Index to Drug-Specific Information For patients, consumers, and healthcare professionals. Provides links to safety sheets with the latest risk information about the drug, related press announcements, and other fact sheets.

Consumer Education: What You Need to Know to Use Medicine Safely Information to help patients and consumers work with health professionals to make the best medicine choices, buy safely, and use medicine so it's as safe and effective as possible.

[www.fda.gov/cder/drugSafety.htm](http://www.fda.gov/cder/drugSafety.htm)

Dr: Merrill Norton Pharm.D., D.Ph., JCCDP-D 4

---

---

---

---

---

---

---

---

## Atypical antidepressants

Newer antidepressants that are not/less serotonin specific or affect serotonin differently than SSRIs

- SSRI antidepressants
- Atypical antidepressants**
- Tricyclic antidepressants
- MAOI antidepressants
- Older mood stabilizers
- Newer mood stabilizers
- Older antipsychotics
- Newer antipsychotics
- Anticholinergics
- Benzodiazepines
- Other anxiolytic/hypnotics
- Stimulants
- Meds for dementia
- Meds for substance abuse
- Psychiatric uses of antihypertensives

- 1981- Desyrel (trazodone)
- 1989- Wellbutrin (bupropion)
- 1993- Effexor (venlafaxine)
- 1994- Serzone (nefazodone)
- 1996- Remeron (mirtazapine)
- 2004- Serzone discontinued although generics still available
- 2004- Duloxetine (Cymbalta)
- 2009- Desvenlafaxine (Pristiq)
- 2011- Vilazodone (Viibryd)
- 2013- Levomilnacipran (Fetzima)
- 2014- Vortioxetine (Brintellix)

Dr: Merrill Norton Pharm.D., D.Ph., JCCDP-D 5

---

---

---

---

---

---

---

---

## Mood Disorders in Children

- **Major Depressive Disorder**
  - Criteria are same for children, but clinically children often appear irritable
  - 1 in 20 teens suffer from depression <sup>9</sup>
    - Of these, only 1/3 receive treatment of any kind
    - Depression is a chronic illness
  - Can use screening tools (PHQ-9, Columbia Dep. Scale), but gold standard is clinical examination
  - Frequent monitoring, psycho-education, social support, and psychotherapy (CBT, IPT, supportive Tx) is standard of care <sup>9</sup>

Dr: Merrill Norton Pharm.D., D.Ph., JCCDP-D 6

---

---

---

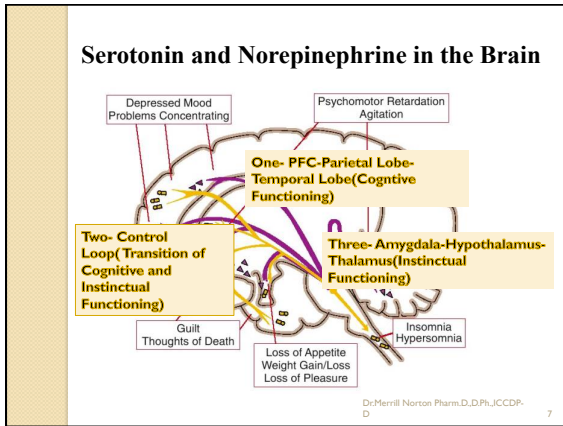
---

---

---

---

---




---

---

---

---

---

---

---

---

---

---

### Anti-Craving Medications

<p><b>Campral</b></p>	<p><b>Revia and Vivitrol</b></p>	<p><b>Antabuse</b></p>
<p><b>Suboxone</b></p>		<p style="font-size: 2em; font-weight: bold;">8</p>

Dr. Merrill Norton Pharm.D.,D.Ph.,JCCDP-D

---

---

---

---

---

---

---

---

---

---

### Antabuse (Disulfiram)

- Alcohol abuse deterrent
- Prevents second step in alcohol metabolism
- When alcohol is consumed:
  - Causes buildup of acetaldehyde
    - Flushing, nausea, and palpitation will occur
  - If effects are ignored and drinking continues, results may be fatal!

9

Dr. Merrill Norton Pharm.D.,D.Ph.,JCCDP-D

---

---

---

---

---

---

---

---

---

---

### Antabuse (Disulfiram)

- Wait at least 12 hours after drinking alcohol before beginning Antabuse
- Avoid alcohol in sauces, foods, and medications
  - Read Labels
- Avoid paint fumes, paint thinner, and shellac (nail polish)
- Use caution with colognes, aftershave, and rubbing alcohol

Dr. Merrill Norton Pharm.D., D.Ph., JCCDP-D

10

---

---

---

---

---

---

---

---

### Antabuse (Disulfiram)

**Black Box Warning**

Disulfiram should never be administered to a patient when he is in a state of alcohol intoxication, or without his full knowledge. The physician should instruct relatives accordingly.

Dr. Merrill Norton Pharm.D., D.Ph., JCCDP-D

11

---

---

---

---

---

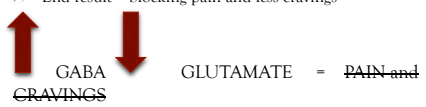
---

---

---

### Campral (Acamprosate)

- Used in conjunction with a treatment program
- Helps restore chemical balance
  - Increases GABA activity
  - Decreases glutamate activity
  - End result = blocking pain and less cravings



GABA ↑      ↓ GLUTAMATE = PAIN and CRAVINGS

Dr. Merrill Norton Pharm.D., D.Ph., JCCDP-D

12

---

---

---

---

---


---

---

---

### Campral (Acamprosate)

- Reduces SECONDARY withdrawal symptoms
  - Insomnia
  - Anxiety
  - Restlessness
  - Uncomfortable moods
- Proven to help patients with severe dependence to remain abstinent for several weeks to months



13

Dr. Merrill Norton Pharm.D., D.Ph., JCCDP-D

---

---

---

---

---

---

---

---

### Campral (Acamprosate)

- Will not reduce or eliminate PRIMARY alcohol withdrawal symptoms
- Minor side effects including nausea, diarrhea, and dizziness may be due to alcohol abstinence not the medication
- Must report feeling of depression, anxiety, or any suicidal thoughts to your health care provider

14

Dr. Merrill Norton Pharm.D., D.Ph., JCCDP-D

---

---

---

---

---

---

---

---

### Suboxone (Buprenorphine + Naloxone)

- Buprenorphine: opioid partial agonist
- Naloxone: opioid antagonist
- Prevents withdrawal symptoms
  - Buprenorphine: too weak to give a "high"
  - Naloxone: blocks the "high" from stronger opioids
- Serious side effects and death can occur if taken with benzodiazepines, sedatives, and alcohol

15

Dr. Merrill Norton Pharm.D., D.Ph., JCCDP-D

---

---

---

---

---

---

---

---

### Vivitrol/ Revia (Naltrexone)

- Vivitrol- monthly injection
  - \$\$\$expensive\$\$\$
- Revia- daily tablet
- This medication is a narcotic antagonist
- It does not decrease alcohol or opioid withdrawal symptoms
- Treats the cravings, NOT the addiction
- A person cannot have any opioids in system because sudden withdrawal symptoms will result
- Must be opioid free for 7 to 10 days before starting naltrexone

Dr. Merrill Norton Pharm.D., D.Ph., JCCDP-D

16

---

---

---

---

---

---

---

---

### Vivitrol/ ReVia (Naltrexone)

**Black Box Warning**

**Hepatotoxicity:** Naltrexone has the capacity to cause hepatocellular injury when given in excessive doses. Naltrexone does not appear to be hepatotoxic at the recommended doses. **Warn patients of the risk of hepatic injury and advise them to seek medical attention if they experience symptoms of acute hepatitis.** Discontinue use of naltrexone in the event of symptoms and/or signs of acute hepatitis.

Dr. Merrill Norton Pharm.D., D.Ph., JCCDP-D

17

---

---

---

---

---

---

---

---

### ADHD Psychopharmacology and Medications- 2014

Dr. Merrill Norton Pharm.D., D.Ph., JCCDP-D

18

---

---

---

---

---

---

---

---

## Stimulants and ADHD

- Affects 5-10% of children in the US <sup>5</sup>
- 7 Million Ambulatory visits in 2006
- >\$31.1 Billion annual US cost
- 2:1 Male:Female ratio in general population but up to 9:1 in mental health clinics <sup>6</sup>
- 50% of clinical samples have ODD or CD <sup>6</sup>
- 25-30% have comorbid anxiety disorders <sup>6</sup>
- 20-25% have comorbid learning disorders <sup>6</sup>
- Why do we care?

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 19

---

---

---

---

---

---

---

---

---

---

## ADHD Medications

- Can help greatly with quality of life by affecting the ability to focus, decrease physical hyperactivity
- Combination of medications and behavioral interventions have been shown as a superior treatment to either alone <sup>7</sup>
- The goal of medication is *symptom reduction*, which requires careful assessment and ongoing monitoring of mental status/psychosocial functioning
- Use of Subscales can be helpful (Vanderbilt, Connors, etc) but not diagnostic – clinical judgment remains most important
- Stimulants
  - Most widely used
  - 65-75% efficacy in treating ADHD symptoms vs 4-30% placebo response
  - Only 55% of patients with ADHD get medication treatment
- Non-stimulants
  - May have fewer (or different) side effects
  - Typically considered second line treatment

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 20

---

---

---

---

---

---

---

---

---

---

## Non-Stimulant Treatment of ADHD

- Atomoxetine:
  - Selective NE reuptake inhibitor
  - Advantages: low abuse potential, less insomnia/growth problems
  - Disadvantages: delayed onset of effect (2-4 wks), lower efficacy than stimulants
  - Dose based on weight: 0.5mg/kg/day, up to 1.2mg/kg/day as tolerated
  - Adverse effects: nausea, stomach pain, moodiness, increased heart rate, Black Box – suicidality

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 21

---

---

---

---

---

---

---

---

---

---

### Other Non-stimulant Meds for ADHD

- Bupropion:
  - NE reuptake and DA reuptake inhibitor
  - Dosing is somewhat unclear in children; adults = mean 393mg/day of Wellbutrin XR
- $\alpha_2$  Adrenergic Agonists:
  - May strengthen working memory by improving functional connectivity in prefrontal cortex
    - Clonidine: less effective than stimulants, used as adjunct to manage tics, sleep problems and aggression
      - Adverse Effects include bradycardia and sedation
    - Guanfacine: more selective for  $\alpha_2$  receptor
      - less sedation/dizziness than clonidine
      - 2-4 mg with effect between 2-4 weeks

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 22

---

---

---

---

---

---

---

---

---

---

### The ADHD Brain Triangle

**Control Loop**  
Feed-Back Differential

Ascending Neural Radiations to Cortex  
Descending Neural Radiations to the Hippocampus/Thalamus/hypothalamus

Cerebral Cortex  
Anterior Thalamus Nucleus  
Cerebral Hemisphere  
Olfactory Bulb  
Visual Impulses  
Hypothalamus  
Pituitary Gland  
Mamillary Body of Hypothalamus  
Amygdaloid Nucleus

Corpus Callosum  
Thalamus  
Pineal Gland  
Hippocampus  
Cerebellum  
Auditory Impulses Projection to Spinal Cord  
Ascending Sensory Tracts

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 23

---

---

---

---

---

---

---

---

---

---

### Neural Pathways of ADHD

Basal forebrain  
Prefrontal cortex  
Amygdala  
Hippocampus  
Interotemporal cortex  
Cerebellum

Rhinal cortex (not visible, on medial surface of temporal lobe)

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 24

---

---

---

---

---

---

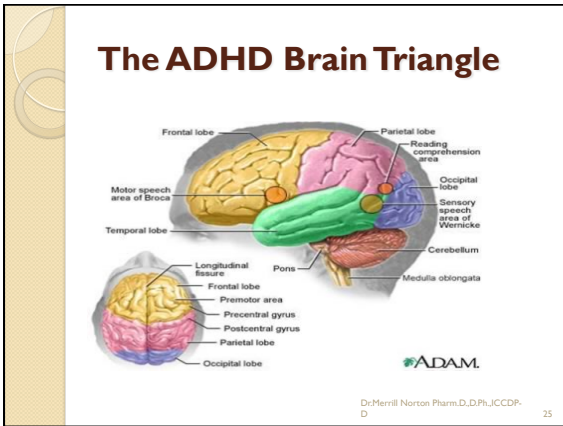
---

---

---

---





---

---

---

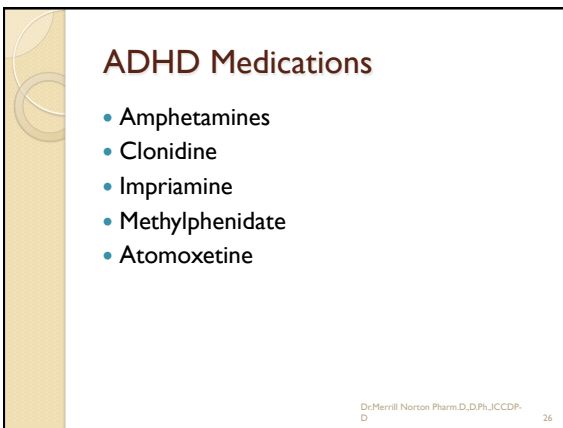
---

---

---

---

---



---

---

---

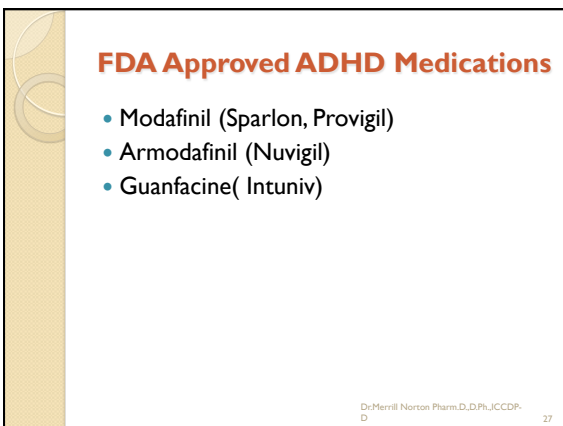
---

---

---

---

---



---

---

---

---

---

---

---

---

**Psychopharmacology of Affective Disorders and Medications - 2014**

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 28

---

---

---

---

---

---

---

---

**Mood Disorders in Children**

- Major Depressive Disorder
  - Criteria are same for children, but clinically children often appear irritable
  - 1 in 20 teens suffer from depression <sup>9</sup>
    - Of these, only 1/3 receive treatment of any kind
    - Depression is a chronic illness
  - Can use screening tools (PHQ-9, Columbia Dep. Scale), but gold standard is clinical examination
  - Frequent monitoring, psycho-education, social support, and psychotherapy (CBT, IPT, supportive Tx) is standard of care <sup>9</sup>

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 29

---

---

---

---

---

---

---

---

**Treatment of Depression**

- All children with depression should have ongoing psychotherapy as this has been shown to reduce suicidal thoughts and behaviors. <sup>2</sup>
- If medications are indicated, begin with Fluoxetine
  - It is the only FDA approved SSRI for depression in children 8 and up.
- If this does not work, consider switching to another SSRI <sup>2</sup>. Citalopram, Escitalopram, Sertaline are all good options. Do not use Paroxetine. <sup>14</sup>
- If this still does not work, consider switching to venlafaxine. <sup>12</sup>

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 30

---

---

---

---

---

---

---

---

### SSRI Treatment Choices for Depression

SSRI	Forms	Start Dose	+/- by	Max Dose	+RCT Evid.	FDA Approval
Fluoxetine	Tab, liquid	10 mg	5-10mg	60mg	Y	8-17
Sertraline	Tab, liquid	25mg	12.5-25 mg	200mg	Y	N
Citalopram	Tab, liquid	10mg	10mg	40mg	Y	N
Escitalopram	Tab, liquid	5mg	5mg	20mg	Y	12-17
Paroxetine	Tab, liquid	10mg	10mg	60mg	N	N
Fluvoxamine	Tab, liquid	25mg BID	25mg	300mg	N	N

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 31

---

---

---

---

---

---

---

---

---

---

## Atypical antidepressants

Newer antidepressants that are not/less serotonin specific or affect serotonin differently than SSRIs

SSRI antidepressants

Atypical antidepressants

Tricyclic antidepressants

MAOI antidepressants

Older mood stabilizers

Newer mood stabilizers

Older antipsychotics

Newer antipsychotics

Anticholinergics

Benzodiazepines

Other anxiolytic/hypnotics

Stimulants

Meds for dementia

Meds for substance abuse

Psychiatric uses of antihypertensives

- 1981- Desyrel (trazodone)
- 1989- Wellbutrin (bupropion)
- 1993- Effexor (venlafaxine)
- 1994- Serzone (nefazodone)
- 1996- Remeron (mirtazapine)
- 2004- Serzone discontinued although generics still available
- 2004- Duloxetine (Cymbalta)
- 2009- Desvenlafaxine (Pristiq)
- 2011- Vilazodone (Viibryd)
- 2013- Levomilnacipran(Fetzima)
- 2014- Vortioxetine( Brintellix)

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 32

---

---

---

---

---

---

---


---

---

---

## Pediatric Bipolar Disorder

- Controversial diagnosis
- Psychosocial interventions are necessary in addition to medications
- Approved Medications by FDA for manic and mixed states in ages 10-17: Lithium, Quetiapine, Risperidone, Aripiprazole. Olanzapine has been approved to age 13 and up.
- Also used but not officially approved: Carbamazepine, Divalproex in monotherapy and as augmentation to above agents, as well as Ziprasidone, Clozapine, and ECT (in adolescents).
- topiramate and oxcarbazepine only have negative studies in children under age 18, so DON'T USE THEM!!



Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 33

---

---

---

---

---

---

---

---

---

---

 **Bipolar Disorder Treatment**

Dr. Merrill Norton Pharm.D.,D.Ph.,JCCDP-D  
34

---

---

---


---

---

---

---

---

 **The Rise of Child Bipolar Disorder**

- In 1996, an ADHD clinic reported a high frequency of comorbid bipolar disorder in its study patients
  - Credited with triggering increased national interest in this diagnosis
- 40 fold increase in office visits for child bipolar disorder from 1994 to 2003
  - Correlated with a dramatic increase in use of antipsychotics to treat child bipolar disorder

Dr. Merrill Norton Pharm.D.,D.Ph.,JCCDP-D  
Biederman J et al 1996  
Momeni G et al 2007  
35

---

---

---


---

---

---

---

---

 **Diagnostic Overlap Example: ADHD and Bipolar**

- **Mania symptoms, during period of abnormal mood:**
  - *Distractible*
  - *Flight of ideas/racing thoughts*
  - *Activity (goal directed) increase*
  - *Sleep need decreased*
  - *Talkative (pressured speech)*
  - *Indiscretions/risk taking*
  - *Grandiosity*
- **All but the last two are ADHD symptoms easily re-interpreted as “bipolar”**

Dr. Merrill Norton Pharm.D.,D.Ph.,JCCDP-D  
36

---

---

---

---

---

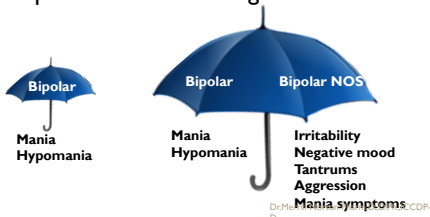
---

---

---

### “Bipolar NOS”

- Bipolar symptoms, but not full criteria of Bipolar 1 (mania) or Bipolar 2 (hypomania)
- Since no specific criteria, umbrella of “Bipolar” disorder enlarges



Dr. Merrill Norton Ph.D. Safer DJ. 2009 37

---

---

---

---

---

---

---

---

### Chronic Irritability

- Irritable mood a diagnostic criterion for at least 10 different disorders in DSM
  - Including GAD, PTSD, Depression
  - NOT specific to bipolar
- But, chronically irritable kids are impaired
  - Stimulates a desire to diagnose and treat something
  - Pressure to use label of “Bipolar NOS”
  - Maybe be 5HT1A-1C receptor malfunction

Dr. Merrill Norton Ph.D. Safer DJ. 2009 38

---

---

---

---

---

---

---

---

### What Becomes of Chronic Irritability?

- Risk of having major depression as an adult
- Longitudinal studies: almost never found to develop an adult bipolar disorder

Brotman MA et al, 2006; Stringaris et al, 2010. D.D.P.N.J.CCDP. 39

---

---

---

---

---

---

---

---

**Dysregulated Kids Might Have...**

- **Disorders:**
  - Depression
  - Post-trauma symptoms or syndrome
  - Anxiety
  - Disruptive Behavior Disorders
  - Autism affective lability
- **Causative Stressors:**
  - Ongoing abuse/neglect
  - Environmental instability
  - Temperament mismatch with parental expectations

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 40

---

---

---

---

---

---

---

---

**DSM-5 To the Rescue?**

**Disruptive Mood Dysregulation Disorder**  
(proposed diagnosis, 4/12)

- severe recurrent, out of proportion temper outbursts
- temper outbursts occur three or more times per week
- mood between outbursts is persistently irritable or angry
  - 12 or more month duration
  - at least in two settings
  - onset before age 10 years
  - can't diagnose before age 6

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 41

---

---

---

---

---

---

---

---

**Power of Bipolar Family History**

- Increases chance of a child developing bipolar, but not dramatically
  - first degree relative bipolar disorder, increases likelihood by 5x
  - second degree relative bipolar, increase likelihood by 2.5x
  - Even given a generous prevalence of 2% bipolar in the population, most children of a bipolar parents (~90%) will not have bipolar disorder

Youngstrom E & Duntz J JAACAP 44:7, 2005  
Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 42

---

---

---

---

---

---

---

---

**Course Of True Bipolar Disorder**

- Substance Abuse in up to 60%
- Anxiety disorders in up to 50%
- Psychotic features in up to 50%
- Relationship Disruptions
- Work Disruptions
- Hospitalizations
- Suicidality
  - Reported up to 15% eventually complete suicide

Stern,FA and Herman JB,2004  
D 43

---

---

---

---

---

---

---

---

**Bipolar Treatment**

- If clear manic episodes, strongly recommend get them to child psychiatrist
- Management difficult because:
  - High rate of substance abuse
  - High rate of medication non-compliance
  - Even with treatment, recurrences happen
  - High rates of family disruption from the illness
  - Suicidal behavior is common

Dr:Brent,et,al,1988;1993:DP  
D 44

---

---

---

---

---

---

---

---

**Bipolar Treatments**

- Atypical antipsychotics
- Mood Stabilizers
- Combination therapy
- Antidepressants if used cautiously
- Family therapy (support/education/adherence)
- Sleep hygiene
- Psychotherapy for:
  - depression treatment
  - coping skills
  - supporting medication treatment adherence

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP  
D 45

---

---

---

---

---

---

---

---

**Medications will not resolve:**

- Family stress/conflict
- Poor parenting strategies
- School stress/conflict
- Strong willed temperament
- Intellectual deficits
- Developmental impairments

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 46

---

---

---

---

---

---

---

---

**What Is A Mood Stabilizer?**

- FDA does not recognize this term
- As relates to treatment of bipolar disorder, ideally treats both depressive and manic episodes as well as prevents recurrence of mood episodes.
  - Lithium
  - Antipsychotics
  - Anti-epileptic drugs
- Since no one compound does this well, multiple meds are often used together

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 47

---

---

---

---

---

---

---

---

**Atypical Antipsychotic Responses**

- risperidone, quetiapine, olanzapine, aripiprazole, ziprasidone
- 11 open trials with 53% response rate
- 8 controlled trials with 66% response rate

Better tolerated than AEDs as a group.

Source: Kathleen Myers MD, 2011  
Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 48

---

---

---

---

---

---

---

---



### Some Risks common to all Atypical Antipsychotics

- Sedation
- Tardive dyskinesia
- Cholesterol/blood sugar
- Dystonia (muscle stiffness)
- Akathisia (restlessness)
- Lower seizure threshold (mildly)
- Weight gain (olanzapine > the rest)
  - Assume that ALL cause weight gain in kids
- Neuroleptic Malignant Syndrome

Dr. Merrill Norton Pharm.D.,D.Ph.,JCCDP-49

---

---

---

---

---

---

---

---

### Bipolar Disorder in Adolescence

- Often misdiagnoses as schizophrenia, Axis II, or developmental issue
  - Adolescent onset occurs in one-third of bipolar patients
- Strong positive family history is common among those with adolescent onset
- Large dosages of medications are often required for control
- Early and vigorous treatment is important because of impact of disorder on developmental tasks and self-concepts

Dr. Merrill Norton Pharm.D.,D.Ph.,JCCDP-50

---

---

---

---

---

---

---

---

### Changes in Bipolar Illness over Time

- Broadening of diagnostic criteria to include mood incongruent psychotic symptoms
- Decreased age of onset
- Greater substance abuse comorbidity
- More widespread use of antidepressants
- Therefore, increased ratio of atypical to typical cases

Dr. Merrill Norton Pharm.D.,D.Ph.,JCCDP-51

---

---

---

---

---

---

---

---

**Bipolar disorder**

Three classes of medications used clinically

- Traditional mood stabilizer- LiC03
- Anticonvulsants-valproate, carbamazepine, lamotrigine, topiramate
- Atypical antipsychotics (including risperidone, quetiapine, olanzapine, ziprasidone)

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 52

---

---

---

---

---

---

---

---

**Consensus Practice Guidelines**

- Acute treatment of manic, mixed, and hypomanic episodes
  - Selecting a mood stabilizer
  - Selecting adjunctive treatments for psychosis, agitation, and insomnia
- Acute treatment of bipolar depression
  - Selecting an overall strategy
  - Selecting specific medications
  - Continuation and maintenance treatment

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 53

---

---

---

---

---

---

---

---

**Bipolar disorder-LiC03**

- FDA approved age 13 and up
- Mechanism- evidence of multiple neurotransmitter effects (dopamine, serotonin, acetylcholine, NE, and GABA)  
Common SE's- thirst, GI, taste
- More troubling- tremor, acne
- Significant- renal, thyroid, ? Teratogenic

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 54

---

---

---

---

---

---

---

---



Dr: Merrill Norton Pharm.D., D.Ph., JCCDP-  
D 55

---

---

---

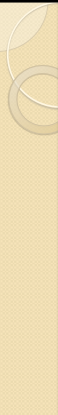
---

---

---

---

---



**Bipolar Disorder- LiCO<sub>3</sub> (cont)**

- Med interactions- note ibuprofen
- Narrow therapeutic window (approx 0.5-1.2 meQ/L)
- Monitor renal and thyroid function
- Compliance critical, Some evidence of loss of efficacy with non-compliance

Dr: Merrill Norton Pharm.D., D.Ph., JCCDP-  
D 56

---

---

---

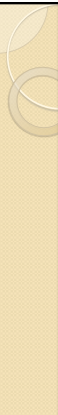
---

---

---

---

---



**Lithium Intoxication**

- **Mild – drowsiness, poor concentration, unsteady gait, hand tremors, diarrhea**
- **Moderate – speech difficulties, muscle weakness, confusion, sedation**
- **Severe – changes in consciousness, convulsions, coma, cardiovascular collapse, death**

**Bottom line:**  
Lithium is difficult to use due to its low therapeutic index. Blood levels have to be monitored.

Dr: Merrill Norton Pharm.D., D.Ph., JCCDP-  
D 57

---

---

---

---

---

---

---

---

**Bipolar disorder-Anticonvulsants**

- Valproate
- Off label use- few rigorous studies
- Mechanism likely involves GABA, Protein kinase C, possibly kindling
- Monitor levels
- Common SE's- sedation, wt gain, GI
- Rare/Serious SE's-Teratogenic (neural tube), ?PCO, Hepatic damage, pancreatitis

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 58

---

---

---

---

---

---

---

---

**Bipolar disorder- Anticonvulsants**

- Carbamazepine- off label- literature limited
- Autoinduction, leukopenia, rash, aplastic anemia, thrombocytopenia- use more infrequent
- Third Generation- Lamotrigine, Topiramate- literature limited, some promising info. Significant SE's include rash with Lamotrigine, weight loss with Topiramate

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 59

---

---

---

---

---

---

---

---

**Bipolar disorder- Antipsychotics**

- Typical AP's (haloperidol, fluphenazine) less used-Atypicals more common-
- Includes risperidone, quetiapine, olanzapine, ziprasidone-
- Mechanism- D2 blockade  $\pm$  5HT2 effects

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 60

---

---

---

---

---

---

---

---

**Bipolar disorder-Antipsychotics (cont)**

- Common SE's- Dry mouth, blurry vision, constipation, sedation, wt gain (except ziprasidone)
- Rare/Serious- association with DM (particularly olanzapine), Movement d/o, EPS, NMS, ?Tardive dyskinesia
- Monitor with ADA guidelines- wt, waist, BMI

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 61

---

---

---

---

---

---

---

---

**Antipsychotics- 2014**

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 62

---

---

---

---

---

---

---

---

**Atypical Antipsychotics**

- Atypicals are not necessarily interchangeable-each has a unique profile, and may differ considerably re side effects
- Research data exists for risperidone in preschoolers

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 63

---

---

---

---

---

---

---

---

## Risperidone

- Open label studies and case reports for indicate positive effects for:  
 Autism spectrum disruptive/aggressive behavior  
 Mental Retardation disruptive/aggressive behavior  
 General Aggression

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 64

---

---

---

---

---

---

---

---

## Risperidone cont'd

- Controlled study –  
 Autistic Disorder with severe aggressive/ disruptive behavior  
 101 children 5-17 yrs (mean 8.8 yrs, no data re # of 5 yr olds)  
 49 assigned to risperidone, 51 to placebo–  
 0.5-3.5mg/d for 8 weeks  
 69% on risperidone had 25% or greater reduction in symptoms vs. 12% on placebo  
 (McCracken et al '02, NEJM)

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 65

---

---

---

---

---

---

---

---

## Treatment: Risperidone (Risperdal)

<ul style="list-style-type: none"> <li>• Positives:</li> <li>No blood tests</li> <li>Once a day dosing</li> <li>Fast</li> <li>Shotgun</li> <li>FDA approved Risperdal (risperidone) for the treatment of schizophrenia in adolescents, ages 13 to 17, and for the short-term treatment of manic or mixed episodes of bipolar I disorder in children and adolescents ages 10 to 17.</li> </ul>	<ul style="list-style-type: none"> <li>• Negatives:</li> <li>Prolactin</li> <li>Some reports of mania induction</li> <li>Weight gain</li> <li>Sedation</li> <li>NMS</li> <li>Tardive dyskinesia</li> <li>Diabetes risk</li> </ul>
---	---

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 66

---

---

---

---

---

---

---

---

**Treatment: Olanzapine (Zyprexa)**

<ul style="list-style-type: none"><li>• Positives: No blood tests Once a day dosing Data FDA indication Fast Shotgun</li></ul>	<ul style="list-style-type: none"><li>• Negatives: Sedation Weight gain Diabetes risk</li></ul>
--	---

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 67

---

---

---

---

---

---

---

---

**Ziprasidone (Geodon)**

- Weight neutral
- Sedating vs activating
- Efficacy?

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 68

---

---

---

---

---

---

---

---

**Quetiapine (Seroquel)**

- Midrange sedation
- Midrange weight gain
- Diabetes risk

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 69

---

---

---

---

---

---

---

---

**Newer Antipsychotics**

- **Asenapine (Saphris) Approved 2009**
- **Iloperadine (Fanapt) Approved 2009**
- **Lurasidone (Latuda) Approved 2010**

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 70

---

---

---

---

---

---

---

---

**Saphris (asenapine maleate) 2009**

Manufactured by Merck

Comes as sublingual tablet  
5mg & 10mg strengths

Approved for acute mixed or manic episodes in bipolar I disorder & acute treatment of schizophrenia

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 71

---

---

---

---

---

---

---

---

**Saphris (asenapine maleate) 2009**

Exact mechanism of action unknown—  
potentially antagonizes D2 & 5HT<sub>2A</sub> receptors

Does not affect muscarinic cholinergic receptors

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 72

---

---

---

---

---

---

---

---



**Saphris (asenapine maleate) 2009**

Metabolized by direct glucuronidation by UGT1A4 and oxidative metabolism by CYP1A2

50% renal elimination  
40% fecal elimination

$t_{1/2} = 24h$

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 73

---

---

---

---

---

---

---

---

**Saphris (asenapine maleate) 2009**

Side effect profile

- weight gain 3 to 5%
- oral hypoesthesia 5%
- akathisia 4 to 6%
- dizziness 5 to 11%
- extrapyramidal disease 7 to 10%
- somnolence 13 to 24%
- prolonged QT interval
- hypersensitivity reaction
- neuroleptic malignant syndrome

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 74

---

---

---

---

---

---

---

---

**Fanapt (iloperidone) 2009**

Manufactured by Novartis

Comes as oral tablet  
1mg, 2mg, 4mg, 6mg, 8mg, 10mg & 12mg strengths

Approved for schizophrenia

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 75

---

---

---

---

---

---

---

---

**Fanapt (iloperidone) 2009**

Exact mechanism of action unknown—  
potentially antagonizes D2 & 5HT<sub>2</sub>  
receptors

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 76

---

---

---

---

---

---

---

---

**Fanapt (iloperidone) 2009**

Extensively metabolized by O-  
demethylation by CYP3A4 and carbonyl  
reduction and hydroxylation by CYP2D6

45-58% renal elimination  
~20% fecal elimination

$t_{1/2} = 18$  to 33h

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 77

---

---

---

---

---

---

---

---

**Fanapt (iloperidone) 2009**

Side effect profile

- orthostatic hypotension 3 to 5%
- tachycardia 3 to 12%
- weight gain 1 to 18%
- hyperprolactinemia 26%
- xerostomia 8 to 10%
- dizziness 10 to 20%
- somnolence 9 to 15%
- prolonged QT interval
- cerebrovascular accident
- transient ischemic attack

Dr:Merrill Norton Pharm.D.,D.Ph.,JCCDP-  
D 78

---

---

---

---

---

---

---

---

**Fanapt (iloperidone) 2009**

Drug interactions  
Contraindicated for risk of cardiotoxicity:  
sparfloxacin, mesoridazine, cisapride,  
dronedarone, pimozide, thioridazine,  
posaconazole

Contraindicated for risk of neuroleptic malignant  
syndrome & increased EPS:  
metoclopramide

Potential major interaction with any drug that can  
prolong QT interval and with strong 3A4 inhibitors

DcMerrill Norton Pharm.D.D.Ph.JCCDP-  
D 79

---

---

---

---

---

---

---

---

**Latuda (lurasidone) 2010**

Manufactured by Sunovion

Comes as oral tablet  
40mg & 80mg strengths

Approved for schizophrenia

DcMerrill Norton Pharm.D.D.Ph.JCCDP-  
D 80

---

---

---

---

---

---

---

---

**Latuda (lurasidone) 2010**

Exact mechanism of action unknown—  
potentially antagonizes D2 & 5HT<sub>2A</sub>  
receptors

Moderately antagonizes  $\alpha$ -2C &  $\alpha$ -1A  
adrenergic receptors

Partially antagonizes 5HT<sub>1A</sub> receptors

DcMerrill Norton Pharm.D.D.Ph.JCCDP-  
D 81

---

---

---

---

---

---

---

---

**Latuda (lurasidone) 2010**

Extensively metabolized CYP3A4

9% renal elimination  
80% fecal elimination

$t_{1/2} = 18h$

Dr. Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 82

---

---

---

---

---

---

---

**Latuda (lurasidone) 2010**

Side effect profile

- nausea 12%
- akathisia 6 to 22%
- extrapyramidal disease 10 to 39%
- Parkinsonism 11%
- somnolence 15 to 26%
- agitation 6%
- agranulocytosis

Dr. Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 83

---

---

---

---

---

---

---

**Latuda (lurasidone) 2010**

Drug interactions

Contraindicated for increased Latuda plasma concentration:  
ketoconazole

Contraindicated for decreased Latuda plasma concentration:  
rifampin

Contraindicated for risk of neuroleptic malignant syndrome & increased EPS:  
metoclopramide

Potential major interaction with diltiazem causing increased Latuda plasma concentration

Dr. Merrill Norton Pharm.D.,D.Ph.,JCCDP-D 84

---

---

---

---

---

---

---