Overview/Goals

- Understand the basics of brain function and the targets of medication
- Understand how psychiatrists go about assessing kids and making decisions about medications
- Consider how to enhance teamwork
- Overview of the different kinds of medications used in kids: targets/side effects

Structural Brain Regions

• Frontal Lobe:
  – Focus of attention, focus, concentration, planning ("executive functioning")
  – Deep portions of the frontal lobe involved in emotion regulation

• Parietal Lobe:
  – Integration of sensory input (spatial organization), integration with memory functions (connected to other regions)

• Temporal Lobe
  – Auditory comprehension/processing
    • Left side phonological
    • Right side intonation, rhythm

• Occipital Lobe
  – Primary site for visual perception

• Cerebellum
  – Coordination of movement
  – Some evidence for coordination of thinking as well

• Brainstem
  – Relay station
  – Basic functions (respiratory)
Neurotransmitter Systems:

Dopamine
Serotonin
Norepinephrine

Neurobiology: Summary

• The brain is separated into functional regions
• Multiple coordinated neurotransmitter systems underlie regulation of emotions and behavior
• Medications are intended to target neurotransmitter systems

What do psychiatrists do?

• Assessment: purpose and methods
• Treatment recommendations: how to decide? medications? therapy? both? community supports?
• Ongoing care: how to coordinate?
Assessment

Purpose:
- To identify differences from that expected for "normal" development
- To find the best explanation (one or more) for these differences
- To determine the strengths and vulnerabilities present in the child’s system

Methods:
- Interview is the primary tool for most psychiatric disorders
- Need to talk with child/adolescent, with family/caretakers and with other collateral sources
  - Therapist
  - School personnel
  - Other parties (e.g. PO, family preservation, residential staff)

Methods:
- Questionnaires can help
  - Screening, symptom clusters
- Tests done by others (psychologists)
  - Psychoeducational testing
  - Neuropsychological testing
  - Projective testing techniques
  - Personality inventories
Assessment

- Outcome:
  - Understanding of the problems that the child or adolescent faces
    - DSM diagnosis terms
    - Functional terms
  - Understanding the resources/strengths that are available
  - Understand the transition needs for youth

- What it can’t do:
  - Magic ball to tell the “truth” when there are multiple views of events
  - Be 100% sure 100% of the time
  - Some problems/diagnoses evolve in presentation
    - We still have lots to learn, so controversy
  - Gain the clearest understanding without access to as much of the data as possible

- How to make it work for the child and family:
  - Make the question clear: why assessment? why now? what do we want from the psychiatrist?
  - Get as much collateral information as possible before assessment
  - Let the family, others know what to expect
    - How much time for the assessment
    - What is the relationship between psychiatrist and rest of the team
    - How might getting the assessment help child/family
    - How to engage the family of youth in residential care
Treatment Recommendations

- Based on:
  - Diagnosis (or diagnoses)
  - Priorities (where do we need to start?)
  - Best available evidence
  - Understanding of needs of child and family
  - Informed consent
  - Negotiation given the possibilities

- Multifaceted
  - Medications?
  - Therapy (which kind?)
  - How intensive?
  - What is the best way to deliver?
  - What else besides ‘treatment’ will be important?
    - Permanency, transition planning, community resources

Ongoing Care

- How to evaluate effectiveness
  - What is frequency of follow-up?
  - What changes will we be looking for?
  - How will we decide whether change is happening?
  - How will we know if something is not going well?
  - How will we know when to stop?
Ongoing Care

• How to work together
  – Who will be on the team?
  – Whose job is whose?
  – How will communication occur?
  – How will we handle conflict?
    • Between child/family and team
    • Between team members
  – How will we make decisions?

Usual Approach

Special issues to consider for youth in foster care

• Investigations of prescribing patterns show that youth in foster care system are different than for youth in general
  – Higher rates of psychotropic prescribing
  – Higher rates of multiple medications
• Not clear why this is
  – Youth at greater risk/liability
  – Other factors?
Special issues to consider for youth in foster care

- Continuity of care
  - Youth are mobile, county to county, placement to placement
  - Still working on ways to ensure that appropriate information gets to any new providers
  - Caregivers need to advocate for information transfer
  - Youth should be involved this

- Many people, many roles
  - DHS/Placement Agency caseworker
    - Continuity, advocacy, sometimes “decider”
  - Foster parent
    - Source of information, cannot consent for psychotropic medication
  - Birth parent
    - Source of information, consents for psychotropic medication if youth is temporary ward

- Adoptive parent – once adoption final
  - Has all rights of parent, also source of information
  - Providers (physicians/therapists/residential staff)
    - Assessment (initial and ongoing), treatment recommendations, obtaining informed consent, ongoing care
Special issues to consider for youth in foster care

• Current DHS policy for psychotropic medications
  – Reviews principles that should be followed in recommending/prescribing
  – New informed consent documentation for physicians to complete
  – DHS also providing oversight but not prior authorization

http://www.mfia.state.mi.us/dlmweb/ex/fsm/802-1.pd

Special issues to consider for youth in foster care

• Supports:
  – County community mental health agencies
    • SED waiver (available in many counties)
      – Intended for children and youth with high intensity needs, several services/approaches offered
    • Other access incentives for DHS youth are available pretty widely
  – Advocacy organizations
    • National Alliance on Mental Illness (NAMI)
    • Association for Children’s MH (ACMH)
    • Michigan Adoption Foster & Kinship Parents (MAFAK)

Medications: Disorders

Attention Deficit Hyperactivity Disorder
  – Problems with attention, focus, concentration, planning, impulse control
  – Connected to frontal lobe functioning
  – Connected to dopamine (DA) and norepinephrine (NE) neurotransmitter systems
Medications: Disorders

Attention Deficit Hyperactivity Disorder

• Psychostimulants – increases dopamine and norepinephrine
  – Types
  • Methylphenidate (Ritalin, Ritalin SR, Metadate ER, Metadate CD, Concerta, Focalin, Daytrana patch)
  • Amphetamine (Dexedrine, Adderall)

• Psychostimulants
  – What to expect
  • Improve target symptoms of ADHD
  • Generally pretty quick onset of action
  • In and out of body within hours
    – Can make for ups and downs during day
    – Can make flexible dosing possible

• Psychostimulants
  – Side effects
  • Decreased appetite
  • Jitteriness/irritability
  • Wear off difficulties (sad/grouchy/hyperactive)
  • Insomnia
  • Tics
  • Increase in anxiety/compulsive behaviors
**Medications: Disorders**

**Attention Deficit Hyperactivity Disorder**

- **Norepinephrine Reuptake Inhibitor**
  - **Types**
    - Atomoxetine (Strattera)
  - **Mechanism**
    - Prevents nerve cell “vacuum” from sucking up norepinephrine, so more around between nerve cells

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**Medications: Disorders**

**Attention Deficit Hyperactivity Disorder**

- **Norepinephrine reuptake inhibitors**
  - **What to expect**
    - Improve target symptoms of ADHD
    - Generally pretty quick onset of action (not as quick as stimulants – days to weeks)
    - Builds up to steady state in a few days, more evenly throughout day

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**Medications: Disorders**

**Attention Deficit Hyperactivity Disorder**

- **Norepinephrine reuptake inhibitors**
  - **Side effects**
    - Decreased appetite
    - Jitteriness/irritability
    - Sedation/fatigue
    - Insomnia
    - Carries “black box” warning about suicidal thoughts

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**Medications: Disorders**

**Attention Deficit Hyperactivity Disorder**

- **Norepinephrine reuptake inhibitors**
  - **Mechanism**
    - Prevents nerve cell “vacuum” from sucking up norepinephrine, so more around between nerve cells
Medications: Disorders

Attention Deficit Hyperactivity Disorder

• Alpha agonists
  – Types:
    • clonidine (Catpres, Kapvay), guanfacine (Tenex, Intuniv)
  – Mechanism:
    • Not precisely known, may reduce arousal level, “fight or flight”

Medications: Disorders

Attention Deficit Hyperactivity Disorder

• Alpha agonists
  – What to expect
    • Improvement in target symptoms of ADHD
  – Side effects
    • Light headed (drop in blood pressure)
    • Sedated
    • Irritable/moody
    • NOTE: should not stop suddenly (BP)

Medications: Disorders

Attention Deficit Hyperactivity Disorder

• Miscellaneous agents (not FDA approved)
  – Wellbutrin (dopamine)
  – Effexor (serotonin and norepinephrine)
  – Tricyclic antidepressants (some more norepinephrine, some more serotonin)
Medications: Disorders

Attention Deficit Hyperactivity Disorder
• Treatment: needs to focus on environment too
  – Behavior management
  – Problem solving
  – Parent training

Medications: Disorders
Depressive Disorders
Anxiety Disorders
• Emotional symptoms, cognitive symptoms, body symptoms (changes in sleep/appetite/energy)
• Seems connected to serotonin (5-HT) and norepinephrine (NE) regulation

Medications: Disorders
Depressive Disorders
Anxiety Disorders
• Selective Serotonin Reuptake Inhibitors
  • Types
    – Fluoxetine (Prozac)** - Paroxetine (Paxil)
    – Fluvoxamine (Luvox)** - Sertraline (Zoloft)**
    – Citalopram (Celexa) - Escitalopram (Lexapro)**
Note: * approved in kids for depression, ^ approved in kids for OCD
Medications: Disorders

Depressive Disorders
Anxiety Disorders
– Selective Serotonin Reuptake Inhibitors
  • What to expect
    – Side effects early, planned effects later
    – Improvement might be as early as a week or two, sometimes takes several weeks

Medications: Disorders

Depressive Disorders
Anxiety Disorders
– Selective Serotonin Reuptake Inhibitors
  • Side effects
    – GI - motor restlessness
    – Sedation - sexual side effects
    – Jitteriness - suicide thoughts

Medications: Disorders

Depressive Disorders
Anxiety Disorders
– Mixed NE/5-HT Reuptake Inhibitors
  • Types
    – Venlafaxine (Effexor)
    – Duloxetine (Cymbalta)
  • Similar expectations as for SSRI
  • Similar side effects as for SSRI
  • Note: neither FDA approved for kids
Medications: Disorders

Depressive Disorders
Anxiety Disorders

- Other 5-HT, NE enhancing medications
  - Mirtazapine (Remeron)
- Similar expectations for SSRI
- Side effects
  - Sedation
  - Increased appetite
  - Increased weight
  - Increased blood fats
- Note: not FDA approved for kids

Medications: Disorders

Depressive Disorders
Anxiety Disorders

- Other medications
  - Buproprion (Wellbutrin)
    - Mechanism of action not clear (DA?/NE?)
    - Can cause jitteriness
    - Used for combination of depression/ADHD (off label)
- Note: not FDA approved for kids

Medications: Disorders

Depressive Disorders
Anxiety Disorders

- Tricyclic Antidepressants
  - Not as often used (higher risk, more side effect)
  - Increase NE and Serotonin
  - Need to check heart rhythm during use (EKG)

Note: clomipramine (anafranil) approved for OCD in youth (≥10)
Medications: Disorders

**Depressive Disorders**

**Anxiety Disorders**

- Treatment with psychotherapy has a good evidence base
  - Cognitive Behavioral Therapy
  - Support and Problem solving
  - Education for kids, families and other supports

**Bipolar Disorder**

- Mood symptoms include both depression and mania
- Can present in multiple forms
- Continues to be somewhat controversial in terms of how commonly it occurs
- Biological underpinnings not fully understood

- Lithium approved for bipolar disorder ≥12
  - Mechanism is not clear
    - Might work directly at the cell membrane
    - Might work to alter the regulation of neurotransmitters
  - What to expect:
    - Can take a few weeks to see effect
    - Needs to be monitored carefully, including regular laboratory studies
    - Can be difficult to adjust
Medications: Disorders

Bipolar Disorder

- Lithium
  - Side effects
    - Thirst
    - Weight gain
    - Nausea
  - Toxicity (toxic range close to therapeutic range)
    - Coarse tremor
    - Stumbling gait/coordination
    - Confusion

- Anticonvulsants
  - Types
    - Valproate (Depakote)
    - Carbamazepine (Tegretol)
    - Lamotrigine (Lamictal)
    - Gabapentin (Neurontin)
    - Topiramate (Topamax)
    - Oxcarbazepine (Trileptal)
  - Mechanism
    - Not really understood
    - Possibly reduces “irritability” of the neurons
    - Some data indicating act by increasing an inhibitory neurotransmitter

- What to expect
  - Can take some time to establish the best dose
  - Will require laboratory monitoring

- Side effects – general
  - Sedation
  - Nausea
  - Tremor
  - Irritability

- Note: none are FDA approved for kids
Medications: Disorders

Bipolar Disorder
- Anticonvulsants
  - Side effects – specific
    - Depakote: low blood counts, liver inflammation, pancreatitis, polycystic ovary disease
    - Tegretol: low blood counts, liver inflammation
    - Lamictal: autoimmune rash
  - Topamax: word finding difficulty
- Antipsychotics
  - Will discuss a few slides from now

Medications: Disorders

Bipolar Disorder

- Treatment: important to add other elements to medication treatment
  - Stress management and reduction
  - Maintain regular sleep schedule
  - Work to maintain adherence to medication with support and management of side effects

Medications: Disorders

Psychotic Disorders (Schizophrenia)
- Characterized by loss of reality testing
  - Delusions
  - Hallucinations
- Characterized by additional problems
  - Lack of motivation
  - Limited flexibility
  - Emotionally flat
- Leading hypotheses relate to excess dopamine activity
Medications: Disorders
Psychotic Disorders (Schizophrenia)
• Treatment: needs to focus on DA and other neurotransmitters
• Antipsychotic medications
  – Types (2nd generation, 1st generation)
    - Abilify
    - Geodon
    - Seroquel
    - Invega
    - Risperdal
    - Zyprexa
    - Clozaril
    - Saphris
    - Latuda
    - Fanapt
    - Haldol
    - Prolixin
    - Trilafon

Medications: Disorders
Psychotic Disorders (Schizophrenia)
• Treatment: needs to focus on DA and other neurotransmitters
• Antipsychotic medications
  – Mechanism
    • Block dopamine receptors
    • Variable degree of action on other neurotransmitter systems (accounts for side effects and maybe for main effects)

Medications: Disorders
Psychotic Disorders (Schizophrenia)
• Antipsychotic medications
  – What to expect
    • Few days to weeks to effectiveness
    • Broad range of dosing and effectiveness
  – Side effects
    • Parkinson-like symptoms (variable)
    • Sedation
    • Weight gain (variable)
    • Extreme restlessness
Medications: Disorders

Psychotic Disorders (Schizophrenia)
• Treatment: needs to include other supports
  – Education about the disorder, what to expect over time
  – Likely to need part time work because of cognitive limitations
  – Supportive therapy, reality checks

Antipsychotics and FDA indications in kids
• Haloperidol (Haldol) – approved for schizophrenia, tic disorders ≥ 3
• Risperidone (Risperdal) – approved for schizophrenia ≥ 13, acute mixed/manic bipolar ≥ 10, autism agitation 5-16
• Quetiapine (Seroquel) – approved for schizophrenia ≥ 13, acute mixed/manic bipolar ≥ 10
• Olanzapine (Zyprexa) – approved for schizophrenia ≥ 13, acute and maintenance bipolar >13
• Aripiprazole (Abilify) – approved for schizophrenia > 10, acute mixed/manic bipolar ≥ 10, autism agitation 6-17

• Iloperidone (Fanapt) – not approved yet
• Asenapine (Saphris) – not approved yet
• Clozapine (Clozaril, Fazaclo) – not approved yet
• Ziprasidone (Geodon) – not approved yet
• Paliperidone (Invega) – not approved yet
• Lurasidone (Latuda) – not approved yet
Sleep Disorders – Insomnia

• The only medication approved in kids is an old med Chloral Hydrate – not often used
• All others not approved
  – Benzodiazepines
  – Clonidine
  – Melatonin
  – Trazodone
  – Seroquel

Medications: Special Topics

Suicidality:
• Recent reports of increased risk of suicidal thoughts and self harm in adolescents on SSRI/SNRI/Strattera
• Some data to support this for most SSRI (not Prozac)
• FDA did not ban, recommend very careful monitoring

Medications: Special Topics

FDA approval and “off-label” use:
• Approval results from company application to FDA and sufficient evidence of safety and efficacy
• Lack of formal approval does not mean ineffective – just less sure
Medications: Special Topics

Special populations:
Autistic Spectrum Disorders
– Autism - Asperger’s
– PDD NOS
• Multiple symptom clusters
  – Anxiety/OCD-like - Anger/aggression
  – Mood instability - Perception/sensory

Medications: Special Topics

Special populations:
Autistic Spectrum Disorders
• Very few studies specifically looking at medication treatments
• Tend to look to symptom clusters
  – Anxiety: SSRI
  – Aggression: antipsychotics (some FDA approved)
  – Mood instability: anticonvulsants
  – Hyperactivity: stimulants or alpha agonists

Medications: Special Topics

Special populations:
Disruptive Disorders
– Oppositional Defiant Disorder
– Conduct Disorder
• Also show symptom clusters
  – Anger - Aggression - Little empathy
  – Mood instability
Medications: Special Topics

Special populations:
• Disruptive Disorders
  – Some evidence for:
    • Aggression: 2nd generation antipsychotics
    • Aggression: Lithium
    • Aggression/mood instability: antipsychotics, anticonvulsants
    • Aggression/impulsivity: stimulants

Medications: Special Topics

Special populations:
• Cognitive-Adaptive Impairment (e.g. Mental Retardation/Intellectual Disability)
  – Can have associated aggression, repetitive self-injury, and co-existing mood disorder, psychotic disorder, seizure disorder
  – Limited data, but anticonvulsants and antipsychotic medications sometimes used

Medications: Special Topics

Special populations:
• Pregnancy
  – Need to think about in any female after puberty
  – Best to talk about this before a pregnancy and to consider contraception alternatives
  – Once pregnancy happens need full discussion of:
    • Risks to pregnant woman on and off medication
    • Risks to developing fetus on and off medication
FINAL SUMMARY

• Neurobiological Principals
  – The brain is separated into functional regions, with coordinated and regulated neurotransmitter systems
  – Medication treatments are based on current understanding of brain and behavior relationships

FINAL SUMMARY

• General Treatment Principles
  – Decisions about treatment of all kinds must depend on careful and thorough assessment
  – It is important to approach treatment with clear expectations and communication
  – It is possible (and optimal) for all members of the treatment team to work together

FINAL SUMMARY

• Medication Use
  – Medication use and diagnoses do not have a one to one correspondence
  – We have much to learn about medication use for psychiatric problems in pediatric age groups
  – Medication treatment will always involve balance of benefits and risks
  – Medications are one part of treatment