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Pediatric Mental Health in the Emergency Department

The increasing volume of children with mental health conditions across all acute care settings highlights the need for ED providers to be familiar with the most common mental health presentations in the pediatric population to effectively engage with and provide proper care for and disposition to this at-risk population.

—Ann M. Dietrich, MD, FAAP, FACEP, Editor

Introduction

Mental health conditions account for 2% to 7% of emergency department (ED) visits by children and adolescents in the United States.¹⁻⁴ Treatment costs for pediatric mental health conditions are estimated to be \$13 billion annually, surpassing the costs for asthma and all childhood infectious diseases combined.⁵ Anywhere from 10% to 20% of children and adolescents experience mental health conditions, and half of these conditions begin prior to the age of 14 years, with 75% beginning by 24 years of age.⁶⁻⁸ Many of these conditions have some form of prodromal features that may begin even earlier in life and often are difficult to detect.⁹ It is estimated that 50% to 70% of patients with mental health conditions do not receive treatment from a mental health professional; therefore, the ED has become the safety net for this population in times of crisis.^{10,11} More than half of young patients who present to the ED with a new mental health condition have not previously been evaluated by an outpatient provider for psychiatric needs.¹² Earlier treatment has been shown to improve outcomes in first-episode psychosis, major depressive disorder (MDD), bipolar disorder (BD), panic disorder, generalized anxiety disorder, and obsessive-compulsive disorder, highlighting the importance for ED providers to recognize psychiatric symptoms.¹³

The number of ED visits for pediatric mental health conditions has been rising, with estimated increases of up to 60% from 2007 to 2016.¹⁴ This increase tends to be mostly in the adolescent age group, around 12 to 17 years of age, but studies vary on age cutoffs.^{2,14} The proportion of increases in mental health visits outnumbers the general increase in ED visits for nonmental health-related concerns, which also have increased, but by only 5% to 13%.^{2,14} Repeat visits to the ED for mental health conditions within one year have risen 4% annually from 2010 to 2016.³ One half of all mental health visits are repeat visits, suggesting a lack of adequate care and follow-up.^{3,15} One study found that the median wait time for an appointment with a child and adolescent psychiatrist was 50 days, and a recent study published in 2020 found that almost 10% of patients never established outpatient care.^{16,17}

The increase in mental health-related visits disproportionately affects minority children, with a recent study conducted from 2012 to 2016 showing that Black and Hispanic children experienced higher rates of ED visits compared to non-Hispanic white children.¹ Studies show that Black and Hispanic children have lower medical expenditures, have fewer outpatient visits, and receive fewer medication prescriptions compared to white children and, thus, may use the ED as their primary source of

EXECUTIVE SUMMARY

- Involuntary commitment, or a psychiatric hold, is highly state-dependent, but typically is initiated when patients are deemed a danger to themselves or others or are gravely disabled secondary to mental health conditions.
- One agitation scale that has been shown to be most useful in the emergency department (ED) is the Behavioral Activity Rating Scale, which measures activity levels on a seven-point scale, from patients being difficult to rouse, to normal activity, to violence requiring restraint.
- If nonphysical de-escalation is ineffective, the next step is to use pharmacotherapy, with the goal being to calm the patient rather than complete sedation.
- Only after nonphysical and pharmacological de-escalation fail are physical restraints implemented. This is because several complications have been reported from physically restraining patients, including muscle breakdown and rhabdomyolysis secondary to continued struggling against restraints, psychological distress, and even death from asphyxiation, strangulation, and chest compression.
- Telepsychiatry has been shown to significantly reduce the total length of stay for patients not being hospitalized because they are able to see a mental health specialist much sooner.
- Major depressive disorder is defined as two or more weeks with feelings of sadness or anhedonia, plus five of the following symptoms: sleep disturbance, decreased interest, guilt, low energy, decreased concentration, decreased attention, psychomotor agitation or retardation, and suicidal ideation.
- Cognitive Behavioral Therapy is the most widely studied and evidence-based psychotherapy for treatment of depression. It is considered first line to add an antidepressant for moderate to severe depression, and the most effective treatment is a combination of selective serotonin reuptake inhibitors with therapy.
- Studies have shown that regular and heavy drinking in adolescents is associated with an increased risk for developing depressive symptoms and disorders, so providers should screen for both and be aware of co-occurrence.
- Whenever possible and appropriate, alternatives to opioids should be considered. However, opioid prescriptions and use are appropriate in many situations, such as sickle cell pain crises and postoperative pain. Unfortunately, it has been shown that even legitimate use of opioids among adolescents before high school graduation is correlated with a 33% increased risk for future nonmedical opioid use, highlighting the need for safe prescribing strategies by providers.
- If prescribing opioids in the ED to children and adolescents, education of families on proper administration, storage, disposal, and addiction potential is key to preventing opioid misuse and use disorder. Providers should use the smallest dose and duration possible and ensure scheduled follow-up with primary care physicians for reassessment and additional prescriptions.

medical care.¹⁸ Another explanation for the discrepancy in ED visits for mental health conditions is that higher rates of poverty, perceived discrimination, and socioeconomic difficulties contribute to chronic stress, anxiety, and depression in minority children.¹⁹ One example is that Hispanic youth are forced to confront anti-immigration policies, with fears of family separations and deportations.^{20,21} Another example of a psychosocial stressor is the disproportionate amount of police violence Black youth face.²² The lack of outpatient care among minority children and psychosocial stressors likely are contributors to their increased use of the ED for mental health conditions.

Not only is the proportion of children and adolescents seen in the ED with mental health conditions increasing, but their average length of stay (LOS) also has become longer. One report showed a 22% increase in LOS of more than 24 hours.³ Those with inpatient dispositions had an increased LOS, while those being discharged had a stable LOS, suggesting a delay not in ED provider decision-making, but rather delays with patient placement.²

One factor that may contribute to this delay is that inpatient psychiatric beds have decreased since the mid-1960s.²³ A survey done by the National Pediatric Readiness Project revealed that less than half of hospitals are prepared with policies for children with mental health conditions, and, in rural areas, less than one-third have policies in place or mental health transfer agreements, leading to an increased LOS as hospitals scramble to find bed placement for these patients.^{14,24-26} Most children are seen in general EDs (not pediatric-specific), which have been shown to be less prepared to provide optimal pediatric care.²⁷ This highlights the need for ED providers across all hospital EDs to be familiar with the most common mental health presentations in the pediatric population to effectively engage with and provide proper care and disposition to this at-risk population.

Medical Clearance

Providers will “medically clear” a patient by ensuring a patient’s history, physical exam, vitals, labs, and imaging do not suggest an acute medical illness. Not all experts agree that medical clearance is necessary,

and some studies have shown that diagnostic testing is low-yield, is costly, and has minimal effect on disposition.²⁸ When patients are deemed clinically stable (alert, cooperative, normal vital signs, with non-contributory history and physical examination), the American College of Emergency Physicians states that “routine laboratory testing need not be performed as part of the ED assessment.”^{29,30}

For ED pediatric psychiatric patients, one study found that 0.8% of abnormal laboratory results were associated with disposition changes, while 5.7% were associated with management changes.³¹ These authors found that, while protocol testing resulted in a modest number of clinical changes, it often resulted in a longer LOS. Most institutions and facilities will inevitably require a standard set of labs before admission, so some level of laboratory or radiological workup likely will be required.

One argument for protocol screening is that the an ED visit is an opportunity to diagnose and treat illness that may be overlooked or not adequately handled in psychiatric facilities, especially given the high incidence of physical disease among those

with a severe mental illness.³² Sometimes, a psychiatric complaint may be the result of a medical illness, such as in bipolar mania vs. hyperthyroidism. Frequently ordered tests for medical clearance include urinalysis, urine drug screen/pregnancy, serum alcohol, complete blood cell count, electrolytes, blood urea nitrogen, creatinine, serum toxicology screen, an electrocardiogram (ECG), salicylate/acetaminophen levels, and thyroid stimulating hormone.

Another argument for protocol screening is that the selection of psychopharmaceuticals may depend on a patient's laboratory results. For example, a patient who is screened with an ECG that shows a prolonged QT interval should not receive high doses of haloperidol and might be better suited to a less QT-prolonging antipsychotic, such as aripiprazole or lurasidone.³³ A patient with BD and an elevated creatinine should not be started on lithium.³⁴ If laboratory results reveal transaminitis or hyperammonemia, a patient should not be started on valproic acid.³⁵

Involuntary Commitment

Involuntary commitment (IVC), or a psychiatric hold, is highly state-dependent, but typically is initiated when patients are deemed a danger to themselves or others or are gravely disabled secondary to mental health conditions.³⁶ In these cases, patients must undergo mental health or substance use treatment against their will. In some situations, a child who is placed in an IVC may be hospitalized against parents' wishes. This can be a traumatic process for patients and families and should be handled with care and empathy. Because this process can be highly variable depending on the state in which one is practicing, providers should familiarize themselves with their state's individual IVC and treatment over objection procedures.

De-Escalation

It is important that physicians are prepared to treat acute agitation in the ED. One agitation scale that has been shown to be most useful in the ED is the Behavioral Activity Rating Scale, which measures activity levels on a seven-point scale, from patients being difficult to rouse, to normal activity, to violence requiring restraint.^{37,38} Patients with congenital, developmental, neurological, or language deficits are more prone to aggression, since they cannot adequately communicate verbally.³⁹

The first step in taking care of an

agitated patient always is nonphysical de-escalation. Richmond et al proposed a 10-step model for de-escalation.³⁸ First is to respect personal space — always keep two or more arm's lengths away from a patient both to protect yourself and because standing too close may seem threatening or cause past traumatic memories to reemerge in the patient. Second is to avoid being provocative — stand with knees bent and angled to not be directly facing the patient, and present with a calm demeanor, relaxed facial expression, and hands visible, not clenching or concealing anything. Third is to establish verbal contact — have only one person talk to the patient to avoid overstimulation; introduce yourself, state your title, and explicitly state that you are there to keep the patient safe. Fourth is to be concise — use short sentences and simple vocabulary to avoid adding confusion or generating frustration. Fifth is to identify wants and feelings — ask for the patient's requests and emphasize that you want to work on making things better, even if you cannot accomplish the patient's specific request. Sixth is to listen closely — use verbal and physical acknowledgement to show that you are paying attention and repeat back what the patient is saying. Seventh is to agree or agree to disagree — find something about the patient's position that you can agree upon, even if it is only that you can believe that the patient is experiencing his or her current emotions. Eighth is to set clear limits — explicitly state that harming anyone is unacceptable and that the patient may be arrested or prosecuted if he or she does so. Ninth is offering choices and optimism — choices empower the patient, and something as simple as offering to dim the lights or provide blankets, food, phone calls, or beverages can appease and calm the patient. Tenth is to debrief the patient and staff — if an intervention was necessary, explain why it was used, let the patient explain his or her point of view, and do the same with the patient's family and with staff.

If nonphysical de-escalation is ineffective, the next step is to use pharmacotherapy, with the goal being to calm the patient rather than complete sedation.³⁷ Gerson et al cover the most common drugs used with the agitated pediatric population and lay out an algorithm for selecting psychotropic interventions.⁴⁰ (See Table 1. View the algorithm online at <https://bit.ly/2YyZktF>.)

It is advised to first try giving a dose of the patient's home medication by mouth

(because of the increased agitation with injection pain), but sometimes, alternative psychotropic medications are required.⁴¹ Diphenhydramine, a first-generation H1-antihistamine, has been found to be the safest medication to use with agitated pediatric patients. This is because, with most antipsychotics in young patients, there is an overall increased risk for extrapyramidal side effects (EPS) (parkinsonism, dystonia, akathisia), and with benzodiazepines, there is an increased risk for paradoxical agitation in very young or developmentally delayed patients.⁴¹ Diphenhydramine can counteract EPS in patients who develop it, which is why it often is given in conjunction with antipsychotics, if they are needed.

First-generation antipsychotics, which are D2 receptor antagonists, such as haloperidol, are more likely to cause EPS and QTc prolongation than second-generation antipsychotics, which are 5HT2A/D2 antagonists, such as olanzapine, ziprasidone, aripiprazole, or quetiapine, with a similar overall efficacy.^{37,42}

Benzodiazepines, such as midazolam and lorazepam, are gamma-aminobutyric acid (GABA) agonists that have sedating effects. It has been shown that haloperidol and benzodiazepines used together achieve better sedation compared to either one alone with no increase in adverse effects.^{37,43} For this reason, these often are given together with diphenhydramine to prevent EPS.^{37,42}

Ketamine, an N-methyl-D-aspartate acid (NMDA) antagonist, commonly is used in pediatric sedation and has a rapid onset but relatively short duration. While one study showed more successful sedation in patients as compared to haloperidol, benzodiazepines, or both used together, it is important to note that ketamine wears off more quickly and may require re-dosing.⁴⁴ Although no long-term effects have been associated with ketamine use in schizophrenia, it has been shown to increase acute agitation with potential worsening of psychosis and generally is advised against.³⁷

Only after nonphysical and pharmaceutical de-escalation fail are physical restraints implemented. This is because several complications have been reported from physically restraining patients, including muscle breakdown and rhabdomyolysis secondary to continued struggling against restraints, psychological distress, and even death from asphyxiation, strangulation, and chest compression.^{37,45} Five staff are recommended to restrain a patient (one for the

Table 1. Medications for Agitated Pediatric Patients

Medication	Dose	Peak Effect	Max Daily Dose	Notes/Monitoring
Diphenhydramine (antihistaminic)	PO/IM: 12.5-50 mg 1 mg/kg/dose	PO: 2 hours	<ul style="list-style-type: none"> Child: 50-100 mg Adolescent: 100-200 mg 	<ul style="list-style-type: none"> Avoid in delirium Can be combined with haloperidol or chlorpromazine if concerns for EPS Can cause disinhibition or delirium in younger or DD youth
Lorazepam (benzodiazepine)	PO/IM/IV/NGT: 0.5-2 mg 0.05-0.1 mg/kg/dose	IV: 10 minutes PO/IM: 1-2 hours	<ul style="list-style-type: none"> Child: 4 mg Adolescent: 6-8 mg Depending on weight/prior medication exposure 	<ul style="list-style-type: none"> Can cause disinhibition or delirium in younger or DD youth. Can be given with haloperidol, chlorpromazine, or risperidone. Do not give with olanzapine (especially IM because of risk of respiratory suppression).
Clonidine (alpha2 agonist)	PO: 0.05-0.1 mg	PO: 30-60 minutes	<ul style="list-style-type: none"> 27-40.5 kg: 0.2 mg/day 40.5-45 kg: 0.3 mg/day > 45 kg: 0.4 mg/day 	<ul style="list-style-type: none"> Monitor for hypotension and bradycardia. Avoid giving with BZD or atypicals due to hypotension risk.
Chlorpromazine (antipsychotic)	PO/IM: 12.5-60 mg (IM should be half PO dose) 0.55 mg/kg/dose	PO: 30-60 minutes IM: 15 minutes	<ul style="list-style-type: none"> Child < 5 years: 40 mg/day Child > 5 years: 75 mg/day 	<ul style="list-style-type: none"> Monitor hypotension. Monitor for QT prolongation.
Haloperidol (antipsychotic)	PO/IM: 0.5-5 mg (IM should be half a dose of PO) 0.05-0.1 mg/kg/dose	PO: 2 hours IM: 20 minutes	<ul style="list-style-type: none"> 15-40 kg: 6 mg > 40 kg: 15 mg Depending on prior antipsychotic exposure 	<ul style="list-style-type: none"> Monitor hypotension. Consider EKG or cardiac monitoring for QT prolongation, especially for IV administration. Note EPS risk with MDD > 3 mg/day, with IV dosing having very high EPS risk. Consider AIMS testing.
Olanzapine (antipsychotic)	PO/ODT or IM: 2.5-10 mg (IM should be half or 1/4 dose of PO)	PO: 5 hours (range 1-8 hours) IM: 15-45 minutes	<ul style="list-style-type: none"> 10-20 mg Depending on antipsychotic exposure 	<ul style="list-style-type: none"> Do not give with or within one hour of any BZD given risk for respiratory suppression
Risperidone (antipsychotic)	PO/ODT: 0.25-1 mg 0.005-0.01 mg/kg/dose	PO: 1 hour	<ul style="list-style-type: none"> Child: 1-2 mg Adolescent: 2-3 mg Depending on antipsychotic exposure 	<ul style="list-style-type: none"> Can cause akathisia (restlessness/agitation) in higher doses.
Quetiapine (antipsychotic)	PO: 25-50 mg 1-1.5 mg/kg/dose (or divided)	PO: 30 minutes to 2 hours	<ul style="list-style-type: none"> > 10 years: 600 mg Depending on prior antipsychotic exposure 	<ul style="list-style-type: none"> More sedating at lower doses Monitor hypotension.

PO: by mouth; IM: intramuscular; IV: intravenous; NGT: nasogastric tube; EPS: extrapyramidal symptoms; DD: developmental disability; BZD: benzodiazepines; EKG: electrocardiogram; AIMS: Abnormal Involuntary Movement Scale; MDD: major depressive disorder; ODT: orally dissolving tablet

Reprinted with permission from Gerson R, Malas N, Feuer V, et al. Best practices for evaluation and treatment of agitated children and adolescents (BETA) in the emergency department: Consensus statement of the American Association for Emergency Psychiatry. *West J Emerg Med* 2019;20:409-418.

head, and one for each extremity) to ensure the safety of the patient and all involved. The Centers for Medicare and Medicaid Services states that the maximum time an adolescent should be restrained is two hours, and for children younger than 9 years of age, a maximum of one hour is advised.³⁰ The ED provider should perform frequent reassessment to reevaluate the need for restraints and remove them as soon as it is safe. Policies for physical

restraint recommended by the American Academy of Pediatrics include: an explanation to children why the use of physical restraints were necessary with the opportunity for response; a physician's written or verbal order specifying the type of restraint, its indication, and an estimated duration that should be reviewed on an ongoing basis; an immediate, documented explanation to the patient's family as to why the restraints were necessary; and

an assessment of those who have been restrained, assuring that restraints are applied correctly, that skin integrity and neurovascular status remain intact, that the goals of restraint are being met, and that the need for restraint continues.³⁰

Boarding

In the 1960s, there was a push for deinstitutionalization of psychiatric patients. Patients were displaced from state-run

facilities toward sparsely equipped, poorly funded community facilities.⁴⁶ From 1955 to 1994, the United States went from a mental hospital population of about 560,000 to around 70,000, despite the total population more than doubling.⁴⁷ This decrease in inpatient psychiatric beds has led to an increase in boarding for patients with mental health conditions. Although the definition of boarding varies widely, The Joint Commission defines it as “the practice of holding patients in the ED or another temporary location after the decision to admit or transfer has been made.”⁴⁸

Boarding disproportionately affects psychiatric patients and creates strain on staff and nonpsychiatric patients.⁴⁹ One survey revealed that, at any given time, 21.5% of all psychiatric ED patients were boarding, with odds for boarding 4.78 times higher for psychiatric as compared to nonpsychiatric patients.⁴⁹ It has been found that pediatric patients with mental health conditions experience boarding 23% to 58% of the time, and that being a child or adolescent is associated with a longer LOS and boarding overall.⁵⁰⁻⁵² One review found that one-fourth to one-half of pediatric patients with mental health conditions requiring inpatient hospitalization boarded in the ED on average two to three days prior to placement.⁵⁰

Boarding is a major issue, since EDs are not equipped with the proper providers, therapeutic programming, or interventional strategies to care for patients with mental health conditions.⁵¹ Boarding is associated with increased morbidity and mortality, decreased quality of care, and increased adverse outcomes for all patients in the ED.⁵¹⁻⁵⁴ This likely is because boarding consumes ED resources, such as beds, nursing, and staff, since patients often require constant supervision. Boarding also can lead to increased agitation as patients become frustrated with long wait times and inadequate treatment.⁵⁵ While inpatient bed shortages are a major contributor to boarding, other factors affecting boarding include insufficient funding for community resources, outpatient psychiatrists, crisis stabilization units, and outpatient programs.⁵¹

Observation Units

ED observation units have long been used for medical complaints, such as chest pain and syncope, and their use is becoming increasingly popular for the

care of psychiatric patients. One recent study showed that the implementation of a psychiatric observation unit resulted in decreased ED LOS and psychiatric admission rates.⁵⁶ Another study found implementation resulted in a significantly shorter overall ED LOS, with a median decrease of 114 minutes, and shorter boarding time, with a median decrease of 189 minutes. Additionally, this study found that implementing a psychiatric observation unit saved an additional \$861,065 annually.^{57,58}

Psychiatric observation units are staffed by nurses, social workers, and mental health specialists who are trained in crisis reduction and are overseen by an attending psychiatrist.^{56,57} Transferring patients with mental health conditions from a busy ED to a specialized unit with staff equipped to treat their needs leads to expedited care and allows ED staff to see and treat additional nonpsychiatric patients, leading to superior care for all patients.

Telepsychiatry

There is strong evidence for the effectiveness of telepsychiatry in child and adolescent psychiatry.⁵⁹⁻⁶¹ In 2016, all U.S. EDs were surveyed for telepsychiatry usage, with an 84% response rate. Of respondents, 20% reported using telepsychiatry services.⁶² Most EDs that use telepsychiatry had no other emergency psychiatric services, with 25% of these EDs using telepsychiatry at least once per day. The most common uses were admission and discharge decisions (80%) and transfer coordination (76%).⁶² Telepsychiatry has been shown to significantly reduce the total LOS for patients not being hospitalized because they are able to see a mental health specialist much sooner.^{61,63} Both providers and patient caregivers report high satisfaction with telepsychiatry in terms of effectiveness, acceptability, and efficiency. It also has been associated with lower total patient charges.⁶¹ While limitations in the outpatient community setting exist because of a lack of access to digital care and internet, telepsychiatry meets a critical need in the ED.

Common Presentations

Unlike other fields of medicine, which rely heavily on biological and radiological markers, psychiatric diagnostic criteria depend heavily on patient-reported symptoms and clinical presentations. Specific

criteria for psychiatric diagnoses are described in the *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* (DSM-V). Having a general understanding of the most common mood, psychotic, and behavioral disorders is worthwhile, since early detection is essential, and their workups and management can differ. A family history is important, since many psychiatric diseases have strong heritability, and up to 2.7 million U.S. parents (3.8%) have a serious mental health disorder.⁶⁴

The most common pediatric mental health disorders encountered in the ED include mood disorders (bipolar and depression), substance-related disorders, anxiety disorders, disruptive emotional and behavioral disorders, and schizophrenia and psychotic disorders, with up to 26% of patients being suicidal on presentation and 44% attempting suicide.^{65,66} Differing ages present more commonly with different issues. One study found that adolescents ages 12 to 17 years old were more likely to present with psychiatric diagnoses compared to children ages 6 to 11 years old, who presented more with behavioral issues.⁴

Major Depressive Disorder (MDD)

Prevalence and Definition. MDD is a psychiatric illness that has a lifetime prevalence of approximately 16% to 20%, with a prevalence of 3% prior to age 13 and 8% during adolescence.⁶⁷ MDD is defined as two or more weeks with feelings of sadness or anhedonia, plus five of the following symptoms: sleep disturbance, decreased interest, guilt, low energy, decreased concentration, decreased attention, psychomotor agitation or retardation, and suicidal ideation. Importantly, depression in the pediatric population often can present as irritability rather than sadness or anhedonia.⁶⁷ Any prior or current manic episode excludes a diagnosis of MDD and is defined as a bipolar spectrum disorder.

Pathophysiology. Several hypotheses behind the pathophysiology of depression exist. The monoamine hypothesis is one of the earliest and most investigated theories and suggests that monoamines, such as serotonin, noradrenaline, and dopamine, are at decreased concentrations in synaptic gaps during episodes of depression. However, this theory does not address the latency of response to antidepressants. If it were simply a matter of replenishing synaptic concentrations, antidepressants should be effective immediately.

An alternative theory is the neurotrophic hypothesis, which suggests that a reduction in neurotrophins, such as brain-derived neurotrophic factor (BDNF), leads to neuronal and glial cell loss and decreased neurogenesis in regions such as the hippocampus, with studies showing significant hippocampal volume shrinkage.^{68,69} Antidepressants have been shown to increase BDNF levels, prevent hippocampal volume loss, and increase neurogenesis in the hippocampus after long-term treatment, although recent research has shown this is not uniform throughout all antidepressants.^{68,70}

In addition to neuroanatomical regions, there has been evidence to suggest that increased stress responses in severe depression lead to an overall enlargement of the hypothalamic-pituitary-adrenal axis because of high levels of corticotropin-releasing hormone and adrenocorticotrophic hormone.⁷¹

Screening and Treatment. The United States Preventive Services Taskforce recommends routine screening for depression in adolescents > 12 years old, as do the Guidelines for Adolescent Depression in Primary Care, endorsed by the American Academy of Pediatrics.^{72,73} Both guidelines recommend having adequate resources in place to ensure effective management and treatment for those who screen positively, which is not always the case for EDs. Still, several EDs do offer routine screening and are able to refer patients to care. In a systematic review of studies that included children > 11 years old, several common depression screening tools were evaluated, and two were determined to be the most accurate: the Patient Health Questionnaire for Adolescents (sensitivity 89.5%, specificity 77.5%) and the Beck Depression Inventory (sensitivity 84%, specificity 81%).⁷³ Each of these tools takes < 10 minutes to complete.

Cognitive Behavioral Therapy (CBT) is the most widely studied and evidence-based psychotherapy for treatment of depression.⁷⁴ It is considered first line to add an antidepressant for moderate to severe depression, and the most effective treatment is a combination of selective serotonin reuptake inhibitors (SSRIs) with therapy.⁶⁷ Food and Drug Administration (FDA)-approved drugs include fluoxetine for children ≥ 8 years old and escitalopram for children ≥ 12 years old, with fluoxetine having the strongest evidence for use.^{75,76} Medications should be initiated at low

doses and titrated every one to two weeks until therapeutic or adverse effects occur.

Compared to adults, pediatric patients are at an increased risk for behavioral activation and disinhibition (restlessness, jitteriness, hyperactivity), hypomania or mania, decreased height and weight, and new-onset suicidal thoughts or behaviors. For these reasons, heavy caution should be used if prescribing these medications for the first time from the ED, and the provider should ensure they are prescribing to patients who will be able to follow up with a pediatrician or psychiatrist.⁶⁷

Bipolar Disorder (BD)

Prevalence and Definition. The bipolar spectrum, which encompasses bipolar I disorder (BD I), bipolar II disorder (BD II), cyclothymic disorder, and bipolar disorder not otherwise specified, has a lifetime prevalence of up to 1.02%.⁷⁷ Data on the prevalence and age of onset of bipolar are controversial because of the way in which bipolar historically has been diagnosed in children. It is now generally agreed upon that the mean age of onset of BD is around 20 years old.⁷⁸

BD I is defined by a manic episode, which is an elevated, expansive, or irritable mood and abnormally or persistently increased goal-directed activity with three or more of the following symptoms for at least one week, most of the day, nearly every day (or any duration if hospitalization is necessary): distractibility, irresponsibility, grandiosity, flight of ideas, activity increase, sleep deficit, and talkativeness. In BD II, one must meet criteria for a hypomanic episode, which is similar to a manic episode, with the key difference being that the patient is not hospitalized, and the episode lasts at least four days. Patients also must experience a major depressive episode. (See Table 2.) Cyclothymic disorder is mood cycling over a two-year period that does not meet diagnostic criteria for BD I, BD II, or depressive disorder.

Those with childhood-onset BD II manifest with less frequent manic symptoms and are more likely to present with depression. About 20% to 25% of these individuals eventually convert to BD I.⁷⁹ Both are important to recognize, especially given the high rates of suicide associated with these disorders, which have been found to be as high as 32.4% in BD I and 36.3% in BD II.⁸⁰

Pathophysiology. Although there are several theories for the pathophysiology

of BD, with evidence for disruptions in circadian rhythms, dopamine concentrations, inflammation, and developmental brain connectivity, there remains no conclusive theory.⁸¹ Some experts suspect that increased intracellular calcium signaling is associated with the disease, which may explain why many antiepileptic medications work as effective mood stabilizers, given their action on calcium channels.⁸²

BD is among the most heritable of psychiatric conditions, with children of parents with BD having an almost 10 times increased risk of developing the disease themselves.⁸³ Twin studies of BD estimate a heritability of 60%.⁸⁴ Children of a parent with BD have an increased risk of developing any mental illness.⁸⁵ It is essential to take a psychiatric history to find out if there is any family history of BD before starting someone on an SSRI, since SSRIs are contraindicated in BD because of their potential to precipitate mania.⁸⁶ A seemingly depressed patient could very well be in the depressive or prodromal phase of emerging BD.⁸⁷

Screening and Treatment. Several screening tools exist, including the Mood Disorder Questionnaire — modified for adolescents, the Child Mania Rating Scale, which can be filled out by parents, and semistructured interviews with the 11-question Young Mania Rating Scale.^{89,89} It is important to consider that psychiatric presentations can be secondary to substance use. Amphetamine and/or cocaine intoxication can mirror mania, so a urine drug screen is essential.⁹⁰

FDA-approved treatments for BD in youth include lithium and the anti-psychotics aripiprazole, risperidone, olanzapine, lurasidone, asenapine, and quetiapine. Anticonvulsants, such as valproate, lamotrigine, and carbamazepine, are not FDA-approved in youth but often are used off label.⁹¹ Although the ED provider likely will not prescribe these medications for the first time, a lithium and valproic acid level should be obtained for patients maintained on these drugs to assess for toxicity and therapeutic levels.⁹¹ Lithium toxicity is most severe with chronic ingestion and can present with symptoms ranging from nausea to coma. (See Table 3.) Severe toxicity is treated with dialysis. Valproic acid toxicity may manifest as central nervous system depression, coma, or respiratory depression with potential cerebral edema. Treatment is supportive, with a focus on the airway

and controversial adjunctive therapies, including dialysis and L-carnitine supplementation.

Substance Use Disorders

Prevalence and Definition. ED presentations for pediatric substance use disorder are increasing, with one study conducted from 2007–2016 showing an increase of 159%.¹⁴ The DSM-V includes 11 criteria for substance use disorders: taking the substance in larger amounts or for longer periods than intended; unsuccessful attempts to cut down or stop the substance; spending abundant time obtaining, using, or recovering from the use of the substance; experiencing cravings and urges to use the substance; not accomplishing tasks at work, home, or school because of substance use; continuing to use, even when it causes relationship problems; giving up important social, occupational, or recreational activities because of substance use; using substances repetitively even when it leads to danger; continuing to use despite knowledge that it is causing physical or psychological harm; needing more substance to obtain the desired effect (tolerance); and experiencing withdrawal when the substance is stopped. Mild disorder is characterized by two to three of the mentioned symptoms, moderate disorder is characterized by four to five symptoms, and severe disorder is characterized by six or more symptoms.

Pathophysiology. While substance use in the adolescent population is not always a result of true addiction, the pathophysiology and underlying mechanism of substance use and reward is similar. Recent studies suggest a three-stage addiction cycle framework: binge/intoxication, withdrawal/negative affect, and preoccupation/anticipation.⁹² Substance use increases dopamine levels in these circuits, and it is thought that the rate by which dopamine increases is related to the level of reward that individual experiences.⁹²

Screening. The American Academy of Pediatrics recommends the validated screening to brief intervention scoring tool, which is an efficient method to assess for substance use disorders and to determine when treatment is appropriate.⁹³ It addresses the most commonly used drugs (tobacco, alcohol, and marijuana), and, if screening is positive, the provider is cued to continue asking about prescription, illegal, inhalant, and synthetic drugs. Based on patient responses, the

interviewer provides brief advice, motivational interviewing, or referral to treatment centers. Treatment programs include outpatient services (individual, group, and family therapy) and inpatient programs and are recommended for children and adolescents of all ages if screening is positive. Another widely used and validated screening tool is CRAFFT, which stands for Car, Relax, Alone, Forget, Friends, and Trouble.⁸⁹ One study of pediatric ED patients found that CRAFFT scores of ≥ 2 were significantly associated with problematic substance use or mild to severe substance use disorder.⁹⁴

Alcohol. Alcohol is one of the three leading causes of adolescent and young adult mortality. Nearly four in five people in treatment for alcohol use disorder report drinking during adolescence.⁹⁵ In addition to the screening tools mentioned previously, studies have shown that adolescents who answered yes to either of the following questions were eight times more likely to be diagnosed with alcohol use disorder:

- “In the past year, have you sometimes been under the influence of alcohol in situations where you could have caused an accident or gotten hurt?”
- “Have there often been times when

you had a lot more to drink than you intended to have?”⁹⁶

Studies have shown that regular and heavy drinking in adolescents is associated with an increased risk for developing depressive symptoms and disorders, so providers should screen for both and be aware of co-occurrence.⁹⁷ Treatment for alcohol use disorder includes motivational interviewing and referrals to outpatient or inpatient treatment programs. Pharmacologic agents, such as disulfiram and naltrexone, have been shown to be safe in the adolescent population, but more data are needed to conclusively state their efficacy in reducing alcohol use, and, thus, likely will not be prescribed in the ED.⁹⁸

Cannabis/Marijuana. Cannabis (marijuana) is soon to become legal for those ≥ 21 years of age in a quarter of the United States.^{99,100} Both motor vehicle accidents and unintentional cannabis ingestion by children and adolescents have increased in states that have legalized cannabis.^{101–103} Modes of ingestion include smoking, vaping, or consuming orally. Recent data show that 19.8% of high school-age youth reported use in the past month and 35.6% had tried marijuana at least once.¹⁰⁴ National surveys have found that

Table 2. Manic vs. Hypomanic Episodes

Mania	Hypomania
<ul style="list-style-type: none">• Lasts at least 7 days• Causes severe impairment in social or occupational functioning• May necessitate hospitalization to prevent harm to self or others• May have psychotic features	<ul style="list-style-type: none">• Lasts at least 4 days• No marked impairment in social or occupational functioning• Does not require hospitalization• No psychotic features

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Table 3. Lithium Toxicity

Plasma Lithium Concentration (mmol/L)	Severity (Hansen & Amdisen Classification)
1.5–2.5	Grade 1 (mild): nausea, vomiting, tremor, hyperreflexia, agitation, ataxia, muscle weakness
2.5–3.5	Grade 2 (moderate): stupor, rigidity, hypertonia, hypotension
> 3.5	Grade 3 (severe): coma, convulsions, myoclonus, collapse

Reprinted with permission from Baird-Gunning J, Lea-Henry T, Hoegberg LCG, et al. Lithium poisoning. *J Intensive Care Med* 2017;32:249–263.

substance use disorders are more common in children and adolescents who use cannabis recreationally at ≤ 17 years old, and cannabis use has been linked to increased use of prescription pain medications, with a 2.78 increased risk for having an opioid use disorder.^{105,106}

ED providers should warn patients and their parents about the detrimental side effects cannabinoids have on the developing brain. Studies have shown that cannabis use has adverse effects on IQ and executive functioning and is associated with declines in neural connectivity over time.^{107,108} While natural cannabinoids have not been linked to death, synthetic cannabinoids have been found to be associated with cardiac abnormalities, myocardial infarction, coagulopathies, and neurologic and psychiatric abnormalities.^{100,109} There is no pharmacologic treatment for cannabis use disorder, and patients should be referred to counseling according to the screening tools previously mentioned.

Opioids. One study found that opioid misuse was reported in 3.8% of adolescents, with 55.7% of opioids obtained from friends or relatives, 25% from the healthcare system, and 18.9% through other means. This study also found that those reporting opioid misuse were more likely to have used tobacco, alcohol, and/or cannabis in the past month.¹¹⁴ There is a strong association between nonmedical opioid use and heroin initiation, and data from the Centers for Disease Control and Prevention showed that deaths from opioid use among adolescents ages 15 to 19 years increased from 1999–2015, with a rate three times higher in 2015 than in 1999.^{111,112}

While alternatives to opioids always should be considered, opioid prescriptions and use are appropriate in many situations, such as sickle cell pain crises and postoperative pain. Unfortunately, it has been shown that even legitimate use of opioids among adolescents before high school graduation is correlated with a 33% increased risk for future nonmedical opioid use, highlighting the need for safe prescribing strategies by providers.¹¹³

If prescribing opioids in the ED to children and adolescents, education of families on proper administration, storage, disposal, and addiction potential is key to preventing opioid misuse and use disorder. Providers should use the smallest dose and duration possible and ensure scheduled

follow-up with primary care physicians for reassessment and additional prescriptions.¹¹⁴ Avoid meperidine because of its toxic metabolite, normeperidine, which can cause central nervous system toxicity, including seizures. There also is a black box warning against oxymorphone use in pediatric patients because of respiratory depression and risk for addiction, abuse, misuse, overdose, and death.¹¹⁵

If patients are using intravenously and are unwilling or unlikely to quit, ED providers should educate patients about safe injection practices and refer them to local needle exchange programs if they exist nearby to reduce complications.¹¹⁶ Despite the lack of large randomized controlled trials for the efficacy of pharmacotherapy for opioid use disorder in youth, they should receive the same evidence-based treatments that adults receive, including buprenorphine, extended-release naltrexone, and (rarely) methadone, in addition to counseling.^{98,115,116}

Anxiety

Prevalence. Anxiety disorders have a prevalence of 7.1% in youth ages 3 to 17 years and 31.9% in adolescents ages 13 to 18 years.^{117,118} Common anxiety disorders that occur in children and adolescents include generalized anxiety disorder (GAD), panic disorder, social anxiety disorder, separation anxiety disorder, and phobias. This review will focus on GAD and panic disorder, since they are more likely to appear in the ED setting, with panic disorder being the most common presentation in the ED for noncardiac chest pain.¹¹⁹

Generalized Anxiety Disorder (GAD)

(GAD). The DSM-V defines GAD as difficult to control, excessive anxiety and worry that is present on more days than not for at least six months. The symptoms must cause significant distress or impair social or school functioning and must be accompanied by at least one of the following: restlessness or on-edge feeling, fatigability, difficulty concentrating, irritability, muscle tension, or sleep disturbance. Children often present with difficulty paying attention or with psychomotor agitation, which is one reason it is sometimes confused with attention-deficit/hyperactivity disorder (ADHD).¹²⁰ A key difference is that children with ADHD have difficulty with attention regardless of their anxiety level.

Children with GAD often present with

several vague somatic symptoms, such as poor sleep, sweating, abdominal pain, muscle aches, headaches, or poor attention.¹²¹ If the medical workup is negative, consider GAD on the differential. Youth who are diagnosed with anxiety disorders are at an increased risk of suicide attempts, since anxiety and depression often coexist.¹²² In such patients, it is important to screen for suicidal ideation. While some suicidal patients may present with self-harm as their chief complaint, many will endorse vague somatic complaints masking their underlying mental health condition, such as GAD.¹²³

Panic Disorder. Most common in adolescents, panic disorder and panic attacks are frequently seen in the emergency setting. Symptoms of a panic attack include a sudden feeling of impending doom or intense fear and anxiety accompanied by somatic symptoms, such as palpitations, chest pain, nausea, dizziness, diaphoresis, trembling, shortness of breath, or paresthesia. Panic attacks can be spontaneous, occur anytime and anywhere (including during sleep), and often lead to the development of panic disorder, where individuals not only have recurring attacks, but also have anxiety and fear of future attacks.

Pathophysiology. While fear is the sympathetic response (fight vs. flight) to imminent danger, anxiety is an anticipatory response to perceived threats.¹²⁴ The dysregulation of the neurotransmitters norepinephrine, serotonin, dopamine, and GABA is associated with anxiety, hence the role of benzodiazepines (GABA agonists) in the short-term management of acute anxiety. Anxiety disorders are moderately heritable, so a family history should be obtained.¹²⁵

Screening. The Spence Children's Anxiety Scale is a 38-question screening tool for children with anxiety and has both a child and parent version. Recent studies have evaluated shortened versions of the screening tool that have been shown to be as accurate and valid and that may be more appropriate for the ED.^{126,127}

Treatment. Patients with either disorder should be treated with an SSRI or SNRI and psychotherapy, such as CBT, for long-term management, since the combination has been shown to be most effective.^{122,128} For panic disorder, a short-acting benzodiazepine, such as alprazolam, can be used for treatment of an acute panic attack in the ED, but prescribing benzodiazepines from the ED as

treatment in the outpatient setting is not recommended because of their potential for addiction and misuse.

Disruptive Emotional and Behavioral Disorders

Prevalence and Definition. Disruptive emotional and behavioral disorders include oppositional defiant disorder (ODD), conduct disorder (CD), intermittent explosive disorder, pyromania, and kleptomania. Patients may have poor impulse control and often will present to the ED with aggression and agitation. Children generally will have an overlap of diagnoses, and CD and ODD are among the most common.

ODD is estimated to have a prevalence of 3.3% and often is seen as a milder form of or precursor to conduct disorder.¹²⁹ It generally is defined as a pattern of angry or irritable mood, argumentative or defiant behavior, or vindictiveness that lasts at least six months.

CD is estimated to have a prevalence of 3% of school-age children.¹³⁰ It generally is defined as a repetitive and persistent pattern of behavior in which the basic rights of others or major age-appropriate societal norms or rules are violated, potentially including aggression and physical abuse toward people or animals.

Pathophysiology. The pathophysiology behind the disruptive emotional and behavioral disorders involves an interplay of genetic and environmental factors affecting multiple pathways in the brain.

Screening. While several screening tools for these disorders exist, ED providers generally will leave diagnosis and treatment to primary care and psychiatric services, since management generally is complex and multifactorial. It is the role of the ED provider to determine if these patients meet inpatient admission criteria, especially because CD specifically is associated with a high rate of suicide, and these patients often present to the ED for acute emotional outbursts and crises.¹³⁰

Treatment. Treatment of these disorders relies heavily on mental health and social services to improve emotional regulation, reduce aggression, and enhance social skills so that youth have greater success in education and employment while reducing criminal behaviors. Many of these interventions involve training parents or caregivers and improving home life. Pharmacologic interventions lack robust evidence, but they can involve

the antipsychotic risperidone to control aggression and/or psychostimulants to manage comorbid ADHD.¹³⁰ The ED provider should be aware of ongoing treatment or be able to encourage families to seek treatment if one of these disorders is suspected based on the patient's presentation and history.

Schizophrenia

Prevalence and Definition. Schizophrenia has a lifetime prevalence around 1%.¹³² The onset of schizophrenia generally is between the ages of 14 and 35 years, with 50% of cases diagnosed before the age of 25 years and with males presenting at younger ages on average.⁹ If it is diagnosed between the ages of 13 and 18 years, schizophrenia is referred to as early-onset schizophrenia, and, although incredibly rare (< 0.0025%), schizophrenia diagnosed prior to age 13 years is called very early-onset schizophrenia. Onset at younger ages is associated with a poorer prognosis.^{9,131}

Schizophrenia is defined in the DSM-V as two or more of the following for at least six-months: delusions, hallucinations, disorganized speech, grossly disorganized or catatonic behavior, or negative symptoms. At least one of these must be delusions, hallucinations, or disorganized speech. Schizophrenia generally is divided into positive (hallucinations, delusions, disorganized thought and speech) and negative (flat affect, social withdrawal, poverty of speech, anhedonia) symptoms. Delusions are fixed, false beliefs that are unable to accommodate any evidence that contradicts them. They most commonly manifest as paranoia. Hallucinations are perceptions or sensorium experienced without external stimulus and, in the case of schizophrenia, typically are auditory. Classic speech changes include incoherence, loose associations, tangentiality, thought-blocking, echolalia (repeating what others say), palilalia (repeating oneself), or neologisms (making up new words).

Pathophysiology. After the success of the first dopamine receptor antagonist antipsychotic, chlorpromazine (Thorazine), was discovered in the 1950s, the dopamine hypothesis of schizophrenia became the paradigm by which psychiatrists understood the disease.¹³² This hypothesis suggests that hyperactive dopamine receptors in the subcortical and mesolimbic pathways of the brain contribute to "positive

symptoms" (hallucinations, delusions, etc.) and that hypofunctioning or understimulated dopamine receptors in the mesocortical pathway contribute to "negative symptoms" (flat affect, social withdrawal, cognitive problems).

Screening. Up to 20% of adults who carry the diagnosis of schizophrenia become ill before the age of 18 years. Therefore, screening for prodromal symptoms in the ED is crucial in the pediatric population.¹³³ Classic findings of a prodromal state include withdrawal from social life, family, and friends. Patients may become more isolated or develop atypical interests and beliefs. Concentration and motivation often decrease, and patients may start to neglect personal hygiene.

Treatment. Patients with schizophrenia generally are treated with lifelong courses of antipsychotic medications. FDA-approved treatments for children 13 years of age and older include risperidone, aripiprazole, quetiapine, paliperidone, olanzapine, haloperidol, and molindone.¹³⁴ Second-generation antipsychotics generally are better tolerated and have fewer side effects in children and adolescents. As with adults, clozapine, with its high adverse effect profile, is reserved and most effective for treatment-resistant patients.¹³⁵ In general, it has been found that side effects often were more severe in children compared to adults for all antipsychotic medications.¹³⁵ ECT may be used for severely impaired adolescents if medications are not helpful or cannot be tolerated.¹³⁴ ED providers generally will not prescribe these medications for the first time, but they should be aware of their side effects, as discussed in the de-escalation section, and may provide refills in some cases.

Conclusion

Although there has been an overall rise in pediatric mental health presentations to the ED, facilities generally are ill-equipped to manage this population despite often being their first point of contact. ED physicians are tasked with a multitude of responsibilities in assessing and caring for this patient population. Despite its controversial utility, ED physicians often are tasked with medically clearing potential psychiatric admissions. When children are a danger to themselves or others or are gravely disabled, IVC is indicated, even if it is against parents' wishes. ED physicians should be prepared to de-escalate agitated

patients, prioritizing verbal de-escalation over pharmacologic interventions, and reserving physical restraints as a last resort. These interventions have become ubiquitous in the ED, given the increase in psychiatric boarding. While development of creative solutions to improve boarding is ongoing, psychiatric observation units and telepsychiatry have shown promising results. This paper discussed the most common diagnoses encountered by ED physicians and their prevalence, pathophysiology, screening, and treatment. While it is not a comprehensive analysis of all mental health conditions, this review aims to provide general information and tools for understanding and caring for this patient population.

References

To see the references, visit <https://bit.ly/3irKYCc>.

CME/CE Questions

- What is the correct order for de-escalation of an agitated patient?
 - Physical, chemical, verbal
 - Verbal, physical, chemical
 - Chemical, verbal, physical
 - Verbal, chemical, physical
- What is the most effective treatment for depression?
 - Selective serotonin reuptake inhibitors (SSRIs)
 - Cognitive behavioral therapy
 - A combination of SSRI + cognitive behavioral therapy
 - A combination of SSRI + lithium
- Over the past two decades, the number of pediatric presentations for mental health conditions has:
 - increased.
 - remained the same.
 - decreased.
 - increased for adolescents, decreased for children.
- In which of the following situations should a patient be placed under involuntary commitment?
 - A child who presents after smoking marijuana for the first time
 - A child who skips school
 - A child who gets into several fights at school
 - A child who posted on social media that she is going to

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overdose on her mother's medication

- What is one solution proposed to improve boarding in the emergency department?
 - Admit to medicine service while awaiting placement.
 - Transfer to a psychiatric observation unit.
 - Discharge patients deemed medically clear with a plan to return when an inpatient bed opens.
 - Allow patients to remain in the waiting room while waiting for a bed to open.
- A 17-year-old male presents to the emergency department with his mother, who is concerned about his behavior over the past six months. He has begun to spend much of his time

in his room, withdrawn from family and friends, has stopped showering and brushing his teeth, and believes the television has been sending secret messages specifically to him. These symptoms are suggestive of the development of which condition?

- Bipolar disorder
- Depression
- Oppositional defiant disorder
- Schizophrenia

- Which of the following is true regarding telepsychiatry services?
 - Telepsychiatry services, while useful, often result in higher patient costs.
 - Telepsychiatry has been shown to significantly reduce the total length of stay for patients not being hospitalized.

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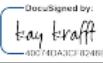
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- c. The majority of hospitals in the United States currently use telepsychiatry services.
- d. Patients tend to report low satisfaction with telepsychiatry.
8. Which of the following is true regarding boarding of psychiatric patients?
 - a. Over the past decade, psychiatric boarding has decreased as inpatient psychiatric beds have increased.
 - b. Boarding affects nonpsychiatric patients more than psychiatric patients.
 - c. Children and adolescents tend to experience increased boarding and length of stay.
 - d. Boarding tends not to affect other patients in the emergency department.

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Upon completion of this educational activity, participants should be able to:

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- apply up-to-date therapeutic techniques to address conditions discussed in the publication;
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Pediatric Mental Health in the Emergency Department

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PEDIATRIC EMERGENCY MEDICINE REPORTS

Practical, Evidence-Based Reviews in Pediatric Emergency Care

Pediatric Mental Health in the Emergency Department

Medications for Agitated Pediatric Patients

Medication	Dose	Peak Effect	Max Daily Dose	Notes/Monitoring
Diphenhydramine (antihistaminic)	PO/IM: 12.5-50 mg 1 mg/kg/dose	PO: 2 hours	<ul style="list-style-type: none"> Child: 50-100 mg Adolescent: 100-200 mg 	<ul style="list-style-type: none"> Avoid in delirium Can be combined with haloperidol or chlorpromazine if concerns for EPS Can cause disinhibition or delirium in younger or DD youth
Lorazepam (benzodiazepine)	PO/IM/IV/NGT: 0.5-2 mg 0.05-0.1 mg/kg/dose	IV: 10 minutes PO/IM: 1-2 hours	<ul style="list-style-type: none"> Child: 4 mg Adolescent: 6-8 mg Depending on weight/prior medication exposure 	<ul style="list-style-type: none"> Can cause disinhibition or delirium in younger or DD youth. Can be given with haloperidol, chlorpromazine, or risperidone. Do not give with olanzapine (especially IM because of risk of respiratory suppression).
Clonidine (alpha2 agonist)	PO: 0.05-0.1 mg	PO: 30-60 minutes	<ul style="list-style-type: none"> 27-40.5 kg: 0.2 mg/day 40.5-45 kg: 0.3 mg/day > 45 kg: 0.4 mg/day 	<ul style="list-style-type: none"> Monitor for hypotension and bradycardia. Avoid giving with BZD or atypicals due to hypotension risk.
Chlorpromazine (antipsychotic)	PO/IM: 12.5-60 mg (IM should be half PO dose) 0.55 mg/kg/dose	PO: 30-60 minutes IM: 15 minutes	<ul style="list-style-type: none"> Child < 5 years: 40 mg/day Child > 5 years: 75 mg/day 	<ul style="list-style-type: none"> Monitor hypotension. Monitor for QT prolongation.
Haloperidol (antipsychotic)	PO/IM: 0.5-5 mg (IM should be half a dose of PO) 0.05-0.1 mg/kg/dose	PO: 2 hours IM: 20 minutes	<ul style="list-style-type: none"> 15-40 kg: 6 mg > 40 kg: 15 mg Depending on prior antipsychotic exposure 	<ul style="list-style-type: none"> Monitor hypotension. Consider EKG or cardiac monitoring for QT prolongation, especially for IV administration. Note EPS risk with MDD > 3 mg/day, with IV dosing having very high EPS risk. Consider AIMS testing.
Olanzapine (antipsychotic)	PO/ODT or IM: 2.5-10 mg (IM should be half or 1/4 dose of PO)	PO: 5 hours (range 1-8 hours) IM: 15-45 minutes	<ul style="list-style-type: none"> 10-20 mg Depending on antipsychotic exposure 	<ul style="list-style-type: none"> Do not give with or within one hour of any BZD given risk for respiratory suppression
Risperidone (antipsychotic)	PO/ODT: 0.25-1 mg 0.005-0.01 mg/kg/dose	PO: 1 hour	<ul style="list-style-type: none"> Child: 1-2 mg Adolescent: 2-3 mg Depending on antipsychotic exposure 	<ul style="list-style-type: none"> Can cause akathisia (restlessness/agitation) in higher doses.
Quetiapine (antipsychotic)	PO: 25-50 mg 1-1.5 mg/kg/dose (or divided)	PO: 30 minutes to 2 hours	<ul style="list-style-type: none"> > 10 years: 600 mg Depending on prior antipsychotic exposure 	<ul style="list-style-type: none"> More sedating at lower doses Monitor hypotension.

PO: by mouth; IM: intramuscular; IV: intravenous; NGT: nasogastric tube; EPS: extrapyramidal symptoms; DD: developmental disability; BZD: benzodiazepines; EKG: electrocardiogram; AIMS: Abnormal Involuntary Movement Scale; MDD: major depressive disorder; ODT: orally dissolving tablet

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Manic vs. Hypomanic Episodes

Mania	Hypomania
<ul style="list-style-type: none"> Lasts at least 7 days Causes severe impairment in social or occupational functioning May necessitate hospitalization to prevent harm to self or others May have psychotic features 	<ul style="list-style-type: none"> Lasts at least 4 days No marked impairment in social or occupational functioning Does not require hospitalization No psychotic features

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Lithium Toxicity

Plasma Lithium Concentration (mmol/L)	Severity (Hansen & Amdisen Classification)
1.5-2.5	Grade 1 (mild): nausea, vomiting, tremor, hyperreflexia, agitation, ataxia, muscle weakness
2.5-3.5	Grade 2 (moderate): stupor, rigidity, hypertonia, hypotension
> 3.5	Grade 3 (severe): coma, convulsions, myoclonus, collapse

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