Chapter 2
Pediatric Medicine for the Child Psychiatrist

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Introduction

A functional knowledge of general pediatric principles is essential for pediatric consultation-liaison (C-L) providers. While a review of the full breadth of pediatrics is beyond the scope of this textbook, this chapter endeavors to cull relevant issues often encountered in a pediatric C-L service and to examine them through a general pediatrics lens. Familiarity with the pediatrician's rationale and approach adds depth to the pediatric C-L providers' care and provides insight and allows for more collaboration with pediatric colleagues. Links and references to convenient charts, tables, and patient handouts are provided throughout the chapter. Current treatment guidelines (e.g., for obesity and diabetes), with acknowledgement that they can and will change over time, are referenced with links to principal regulating agencies for the most up-to-date information available to the reader.

Growth

Case Vignette 2.1 As part of your work with a primary care integration team, you collaborate with and provide psychiatric consultation for a local pediatric group practice. One of your pediatric colleagues calls regarding her new patient, Sam, a 10-year-old male who was previously diagnosed with severe oppositional defiant disorder (ODD) and other specified attention-deficit/hyperactivity disorder (ADHD) and who has been taking risperidone 1 mg twice daily for the past year. The pediatrician is concerned that Sam is being treated with an atypical antipsychotic despite having no psychotic disorder and is eager to have you provide a second

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opinion on his diagnoses and management before she prescribes the medication. She forwards the collateral information she has received from the previous treating psychiatrist, and you schedule an appointment to assess the child.

You meet with Sam and his stepmother Susan via a video teleconference (VTC) connection to the pediatric clinic. They both report that the patient's symptoms have improved dramatically on risperidone. This history is corroborated by the previous psychiatrist's notes. Susan enthuses, "We tried everything with him, and nothing worked, but now he's like a different kid!" She goes on to describe the high levels of aggressive and disrespectful behavior across all settings that led to constant conflict with his parents and school personnel, a series of school suspensions and failing grades prior to beginning the medication. A review of the past medical records reveals two failed trials of stimulants as well as an α-agonist to treat the patient's diagnosis of other specified ADHD, with rating scales documenting several persistent symptoms of distractibility, interrupting others, and difficulty sitting still without meeting full criteria for a more specific ADHD presentation. His aggressive and disruptive behaviors were rated as very impairing, and rating scales from both parents and teachers reveal high levels of disruptive behavior symptoms. "He got in too much trouble and he was going to be expelled; that's when his old doctor suggested we try this medication." The patient and stepmother deny trials of family or individual therapy, aside from meeting with a school counselor through his individualized education program (IEP). Susan states unequivocally that she desires continuing the risperidone given the positive changes she has observed in her son's behavior. On individual interview, Sam is ambivalent about his medication, but willing to continue taking it as it has been "helpful for keeping calm." They both note that Sam's appetite has been "very large" since beginning the medicine, but otherwise deny side effects. Susan has no concern about the increased appetite and notes that "growing boys eat a lot." They recall bloodwork being done at the initiation of the risperidone roughly 1 year ago, but report that no labs have been done since. You obtain vital signs today. Sam's vital signs appear unremarkable at first glance. His height is 57 inches and his weight is 100 pounds. His past medical history is unremarkable, without developmental delays or medical problems. His family history is positive for maternal postpartum depression and a cousin with ADHD.

With evidence-based child psychiatry practice guidelines in mind, you conduct a thorough assessment and conclude that ODD is indeed the most appropriate diagnosis for the patient, confirm that he does not currently meet full criteria for ADHD, conduct disorder, or a mood disorder. There is no history of exposure to trauma; however, the patient's biological parents divorced when he was in kindergarten. He has little contact with his biological mother and appears to have a conflicted relationship with both his father and stepmother. In school, he has a history of oppositionality with authority figures and poor relationships with peers. These problems have detracted from his performance and enjoyment of school. However, he was able to pass all his classes and was promoted to the sixth grade. Everyone, including Sam, is hoping for a fresh start at his new middle school.

As you discuss your assessment and treatment options, Susan interrupts nervously to ask, "You're going to refill his risperidone, aren't you? I am going to have to find another doctor if you won't. It is the only thing that has helped, and we just can't go back to how it was before." While you recognize the risks of atypical antipsychotic treatment and are knowledgeable of the evidence-based, non-pharmacologic interventions for disruptive behavior disorders (in particular, multi-systemic therapy, parent management training, and functional family therapy), you also recognize the need to establish rapport with the patient and family and to gather important information such as laboratory studies, to best care for the patient. You agree to refill the patient's risperidone prescription once with a follow-up appointment scheduled for next month. Sam and his stepmother are willing to get the fasting bloodwork that you order, and are amenable to your recommendation to return with Sam's father for the follow-up, to review the lab results and discuss additional treatment options.

While entering your note in the electronic health record (EHR), you are somewhat surprised to see that Sam's body mass index (BMI) is in the 95th percentile for his age and diagnostic of obesity. On presentation, he seemed slightly older than his age, but he did not strike you as obese at the time of the visit. You are somewhat embarrassed that you did not recognize his obesity at the initial encounter and you wonder how best to address it with the family. You plan to collaborate with the pediatrician, as you are unaware of the current assessment and treatment recommendations for overweight and obese children.

What are the recommendations for monitoring growth parameters in children, both in general and when using medications that may impact growth? What is the child psychiatrist or primary care provider's responsibility in tracking growth?

In pediatrics, growth parameters (height, weight, and BMI) for healthy toddlers, school-aged children, and adolescents are generally tracked annually and are best assessed using comparative age and gender norms. They are frequently plotted on a growth curve, comparing the values with those of other children of the same age and gender, yielding a percentile for age (% for age). The most commonly utilized growth charts are produced by the Centers for Disease Control and Prevention (CDC) and the World Health Organization (WHO): https://www.cdc.gov/growthcharts/cdc_charts.htm. Since the growth of children with certain conditions, such as prematurity, Down syndrome, and achondroplasia, is known to deviate substantially from the general population, several specialized growth curves are available for these subpopulations.

As children's fat and muscle mass ratios vary considerably at different ages and stages of development, simple measurements of weight, height or even BMI do not tell the full story. Preschoolers, for example, are not only shorter, but generally thinner and leaner than babies or school-aged children, and the average BMI for a 4-year-old female is just 16 kg/m^2. In fact, a BMI of 25 kg/m^2, the upper range for "normal" body mass index in adults, would be considered obese for any female <12 years of age. With the increasing obesity epidemic, there are now charts

denoting how many standard deviations above normal range a child's BMI has become. Prior to this epidemic, percentile for age was the only clear reference point, which becomes less meaningful in parsing out risk level in a population with high rates of obesity. Height or weight parameters above the 95 percentile or below the 5 percentile for age are considered abnormal, and providers may wish to begin an investigation or treatment. In addition to monitoring for growth parameters outside of the normal range, providers also track changes in the percentiles for age over time. Changing from 90 percentile to 40 percentile for age in height over the course of 2 years would be concerning, as the child is not growing as his or her previous measurements would predict. Pediatricians often refer to "crossing growth curves" or failing to track along the growth curve as expected, when discussing a child's growth. An example of this would be moving from the 90 percentile to the 50 percentile for age curves for weight from one well-child visit to the next. For psychiatrists monitoring children on medications that may affect growth parameters, such as stimulants or atypical antipsychotics, current guidelines recommend monitoring height, weight, and BMI at least quarterly and more often upon initiation of the medication or if the provider detects changes in growth. Risks and benefits, including those related to growth, should be discussed with patients and families prior to initiating medications.

How is obesity diagnosed in children and adolescents? Are there evidence-based weight-management interventions for children and teens?

In children, obesity is measured using the BMI (weight in kg/height in meters squared), which varies markedly by age and gender. The BMI is then plotted on a growth curve and evaluated according to % for age.

Underweight: BMI <5 percentile for age
Normal weight: BMI 5 percentile to <85 percentile for age
Overweight: BMI 85 percentile to <95 percentile for age
Obese: BMI ≥95 percentile for age

The American Academy of Pediatrics (AAP) recommends that the evaluation for obesity includes laboratory testing for comorbidities such as diabetes mellitus and dyslipidemia for children ages 10 and older and those with clinical indicators of impaired glucose tolerance or other risk factors for morbidities related to obesity. These recommendations are in flux, as the current obesity epidemic worsens, and more children are diagnosed with type 2 diabetes. *Current guidelines for evaluation and treatment of obesity from the AAP Institute for Healthy Childhood Weight can be found at https://ihcw.aap.org*. As might be expected, those patients who develop young onset diabetes suffer higher rates of medical complications and poorer outcomes over the course of their lifetime (Wilmot and Idris 2014). Data support the commonly held belief that overweight children grow up to be overweight adults and that pediatricians must take a proactive approach to overweight children. It is generally believed that lifelong eating patterns and behavioral habits are established in childhood, and accordingly, diet and activity patterns are standard subjects evaluated at every well-child visit starting from birth.

Effective, evidence-based weight-management programs exist for children and teens, and the interventions with the highest level of evidence support for improving BMI involve the whole family. These programs are typically intensive, and they address multiple aspects contributing to obesity in a comprehensive fashion. They often include sessions focused on nutrition, cooking, exercise, activity, and psychological factors and may involve the use of motivational interviewing, mindfulness, and cognitive and behavioral techniques to promote and facilitate change.

Lower-intensity interventions, often employed in the pediatric setting as first-line strategies for overweight children without obesity or weight-related comorbidities, include referral to a dietician/nutritionist; regular follow-up with the primary care provider (PCP) to provide support, to set goals, and to monitor progress; and recommendations for diet and exercise changes. As mentioned, interventions that involve the entire family are generally most effective, and pediatricians will often recommend that extended family members become involved for success. For example, a PCP may recommend that parents hold a meeting with the extended family to discuss their concerns regarding their child's health and request that all family members support a "no soda or candy" rule with the preschooler. Motivational interviewing techniques are often employed, with a brief, primary care focused approach. One example of a broad-based recommendation for lifestyle modification is the 5-2-1-0 strategy (http://www.live5210.ca/about-live-5-2-1-0/the-live-5-2-1-0-message/Accessed 1/1/2018). This guideline lists four goals for a healthy lifestyle: consume five servings of fruits and vegetables daily, spend less than 2 h in front of a screen per day (including television and Internet-connected devices such as computers, smartphones, and tablets), be active for 1 h daily, and have 0 sugary drinks per day.

Over time, there have been some positive developments in public health efforts. As the childhood obesity epidemic continues to grow, public knowledge regarding obesity is also increasing, motivating some families to make changes. In many locations, schools now send parents information regarding a student's BMI and make efforts to remove "junk food" and increase access to healthy options on campus. Public health campaigns aimed at encouraging exercise and healthy diets are becoming commonplace in many areas.

Case 2.1 (continued) On review of your pediatric colleague's initial assessment of Sam, you learn that he has a family history of diabetes on both sides of the family, including his father. According to your colleague's assessment, laboratory tests are indicated based on the patient's BMI. The pediatrician has reviewed the patient's prior records and plotted his weight gain on a growth chart. You are dismayed to discover that Sam has gained 25lbs over the past year. While he also underwent a 3-inch growth spurt during that time, his BMI increased from 18 (84% for a 9-year-old boy) to 22 (95% for a 10-year-old boy). While his BMI is considered normal for adults, you can clearly see that he has become obese since initiating risperidone 1 year ago. Additionally, you note the greater than 10% increase in Sam's weight early during treatment and recall that this increase is a predictor of poor metabolic outcomes with atypical antipsychotics.

On further review of the initial pediatric evaluation, you note a pattern of delayed immunizations, well-child visits, and dental care. He has severe dental caries. It appears that the patient has not seen a pediatrician or dentist over the past 2 years. Because of multiple cancelations, he was only seen every few months by his previous psychiatrist. With this additional history, you wonder about Sam's future treatment adherence and overall health.

What is the recommended schedule for well-child checks in the pediatric setting? How are growth abnormalities assessed and treated in the pediatric setting?

Most children in the US are cared for in a pediatric setting (with a portion managed by family or internal medicine providers). The AAP recommends well-child checks every year from the ages of 2 to 10 years and every 2 years thereafter. These visits include a comprehensive assessment of physical, emotional, and social health and development. Most pediatricians (and insurance providers) recommend yearly well care visits even during the preteen and teen years to monitor growth, physical and mental health, school achievement, social concerns, and safety issues. Frequency of visits to a medical provider vary widely both individually and regionally, but 2012 data from the United States reveals only 1/3 of children ages 6–17 years old are seen for an annual well-child assessment (Uddin et al. 2016).

Depending on whether growth abnormalities are identified during well-child care or acute visits, the differential diagnosis can be wide, encompassing genetic, endocrine, central nervous system, gastrointestinal (GI), infectious, or psychosocial problems. Common screening done in primary care can include assays of thyroid-stimulant hormone/free thyroxine (T4) to screen for thyroid dysfunction or electrolyte or inflammatory markers. Assessments may include other hormone levels, such as sex hormone levels in suspected pituitary dysfunction, or insulin-like growth factor/fasting growth hormone in gigantism. Imaging studies can be considered, such as a bone scan to determine bone age, or a brain magnetic resonance imaging (MRI) to rule out a tumor if pituitary dysfunction is suspected, as in the case of pediatric growth hormone deficiency. Specific screening for infectious processes (e.g., purified protein derivative (PPD) skin test for suspected tuberculosis, stool ova/parasite examination for parasitic disease) or GI dysfunction (e.g., celiac panel, complete blood count (CBC), erythrocyte sedimentation rate) can help rule out additional causes. Turner syndrome (45, XO) is associated with short stature and delayed puberty in females and can be determined by karyotype analysis. After narrowing the differential via history and initial investigation, the provider can refer to specialists to help determine or confirm a suspected diagnosis and guide treatment options.

What are the implications of treatment nonadherence for a patient's overall health and prognosis?

Delaying or not following the recommended schedule for general pediatric care is a form of treatment nonadherence that may be associated with delayed dental and specialty care as well as financial and social stressors and that may lead to poorer outcomes, especially in children (Strickland et al. 2004). Thus, in the above case,

the family's nonadherence with recommended medical care and screenings could be considered a negative prognostic indicator for Sam's overall health. However, it should be noted that this conclusion is rooted in the context of Western medicine's biomedical culture. Indeed, one of the tenets of providing culturally competent care is to create a treatment plan in conjunction with the patient and family. The phrases "compliance with medication" and "adherence to the schedule" underscore Western medicine's emphasis on following a medical professional's prescribed plan, oftentimes without input from the patient and family. Additionally, with less than half of school-aged children in the United States completing the recommended well-child visits every year, while Sam's medical care may not be ideal, it is, unfortunately, typical.

Case 2.1 (continued) Following up on Sam's labs, you are relieved to note his fasting glucose is within normal limits, but disappointed to learn he has developed hypercholesterolemia and his hemoglobin A1c (HbA1c or A1c) places him at increased risk for diabetes. The stakes are high, as you recognize the patient's current medication has likely caused this increase in weight, dyslipidemia, and impaired glucose tolerance, but you are also cognizant of the dysfunction and impairment in all areas of his life associated with his untreated psychiatric symptoms. Both the metabolic and the psychiatric concerns have huge implications for your patient's future, so you resolve to learn what you can to address the issue at the follow-up visit.

What are the criteria for diagnosing diabetes or pre-diabetes in young people? Is type 2 diabetes mellitus considered a disease of adults, or can it develop in children?

Once considered a disease of adults, type 2 diabetes is becoming more prevalent in children and adolescents as the obesity epidemic worsens. Diagnostic criteria for diabetes and pre-diabetes apply to people across all ages, including children. In fasting (defined as 8 h without calorie consumption), a blood glucose of ≥126 mg/dL is consistent with diabetes. A fasting glucose <100 mg/dL is considered normal, and results between 100 and 125 mg/dL are consistent with "pre-diabetes," also known as impaired glucose tolerance or IGT. HbA1c, which estimates the average blood glucose level over the 3-month lifespan of hemoglobin molecules, may also be used for diagnosis. A HbA1c of 6.5% or greater (normal <5.7%) is consistent with diabetes, and values between 5.7 and 6.4% reflect "pre-diabetes," with higher values representing a higher risk for the development of diabetes. The 2016 American Diabetes Association guidelines list an oral glucose tolerance testing (OGTT, where the patient ingests a 75-gram glucose load after fasting) value of ≥200 mg/dL measured 2 h after the glucose load or any non-fasting blood glucose of ≥200 mg/dL with symptoms of hyperglycemia as alternate diagnostic criteria. The guidelines recommend repeating the testing to confirm diabetes when hyperglycemia is equivocal. Testing in special populations can vary somewhat, such as the modified two-step OGTT often given to pregnant women who fail a one-step

OGTT. *Updated guidelines are available through the American Diabetes Association: www.diabetes.org/diabetescare.*

Are young people more at risk for growth-related side effects? Which psychiatric medications are most frequently associated with abnormal growth and weight-related laboratory test abnormalities in children and adolescents? What is the recommended frequency of laboratory testing for youth taking these medications?

Unfortunately, it has been demonstrated that children are at increased risk for growth-related side effects (Overbeek et al. 2010) and metabolic changes (Dori N and Green T 2011). Among prescription psychotropic medications, the atypical antipsychotics are most frequently associated with increased weight gain and metabolic abnormalities in youth. Meta-analyses of studies conducted with youth taking atypical antipsychotics report metabolic risks that vary with the medication used and that are similar to findings reported in adults (Almandil et al. 2013). Clozapine and olanzapine are consistently associated with significant weight gain, and multiple studies have noted statistically significant increases in triglycerides (TG), cholesterol, and prolactin (Correll et al. 2009). Risperidone has been associated with statistically significant weight gain (Loy et al. 2017) and increased prolactin. Although aripiprazole often causes less weight gain compared to the previously named antipsychotic medications, in meta-analysis it has still been consistently associated with statistically significant weight gain in children and adolescents. Although it is clear that children and adolescents on atypical antipsychotics are at risk for weight gain, determining their level of risk for developing weight-related laboratory abnormalities is more challenging. Many of the studies conducted with young people on antipsychotics do not have statistically significant data to report on changes in metabolic parameters. This absence is to be expected, as many of these studies were of short duration (e.g., 12 weeks). Longer-term studies examining the metabolic effects of atypical antipsychotics in youth are rarer and often limited by small sample size (Goeb et al. 2010). However, they have consistently demonstrated an increased risk for substantial weight gain, which is linked to many metabolic abnormalities including insulin resistance, diabetes, and dyslipidemia (Correll and Carlson 2006). Further research is clearly needed in this area.

Considering the substantial evidence regarding the risk for weight gain and metabolic changes, current guidelines recommend obtaining baseline weight, height, BMI, and fasting glucose and lipid panel for all youth prior to starting an atypical antipsychotic and repeating these laboratory studies at 3 months and every 6 months thereafter. Weight, height, and BMI measurements are recommended at every visit. Youth whose BMI becomes ≥95% for age, or who are at elevated risk for metabolic complications, should be monitored closely, including youth who experience an increase of >5% in weight during the first 3 months of treatment.

Additional medications associated with weight gain and metabolic abnormalities in youth include mood stabilizers such as lithium and divalproex sodium, and antidepressants such as mirtazapine. One meta-analysis of mirtazapine found a 15% rate of significant weight gain and an equal potential for liver enzymes or lipid level increases, which rarely but importantly can be rapid and substantial.

Vital Signs Are…Vital!

Case Vignette 2.2 Brittany is a bright 8-year-old girl whose medical home is a pediatrics practice that you collaborate with to provide integrated behavioral health (BH) services. Brittany's PCP diagnosed her with ADHD, combined presentation, helped the family to request an evaluation for school accommodations, and continued to provide medication management services. There is a family history of ADHD in Brittany's father and brother, but no history of learning disorders or other psychiatric comorbidities. The patient is overall healthy, without mental health or other comorbidities. Brittany has done very well with the combination of behavioral interventions at home, educational accommodations in school through *a 504 plan*, and the long-acting stimulant methylphenidate ER.

Near the end of the school year, it was noted that the patient's response to the medication was less robust than in the past, despite all interventions remaining unchanged and no additional stressors being identified. Thinking that the medication's decreased effectiveness was likely due to Brittany's growth, the PCP increased the long-acting stimulant's dose to the next available strength. Now, however, the patient complains of a significantly decreased appetite and two-pound weight loss over the past 2 months, so the PCP has consulted you for medication recommendations. Upon review of the case with the PCP, you note the patient's stimulant is currently dosed above the U.S. Food and Drug Administration's recommended maximum limit for her age. Given the patient's suboptimal response and adverse effect with the maximum recommended dosage of methylphenidate you recommend discontinuing it and starting a trial of mixed amphetamine salts (MAS). As the PCP has never prescribed other stimulants and expresses significant discomfort, you agree to temporarily manage the medication titration.

What is failure to thrive? When does a child or teen's weight loss or failure to gain weight become a concern?

Failure to thrive is the medical term for decelerated or arrested physical growth, often defined as height and weight below the 3 percentile or 5 percentile for age or a decline across two major growth percentiles. However, data points alone do not diagnose a growth problem. For example, 5% of all children would be expected to have heights in the 5% or less range, and only a fraction of them would have a pathological cause. Constitutional short stature is a common etiology for decreased height, so pediatricians will routinely ask for parental heights and monitor a patient's growth across time to determine if they are growing in an "expected" pattern (i.e., consistently tracking along the same growth curve and maintaining the increased height velocity normally seen during growth spurts). True failure to thrive is important to differentiate from nonpathologic causes of decreased growth, as it implies significant medical, psychological, social, or economic concerns that can impact a child's development, and it is sometimes associated with neglect or abuse. It is worth noting that in pediatric patients, acquired growth difficulties are often noted first in the weight (as opposed to height or head circumference) parameter.

The point at which weight loss in a child or teen becomes a concern depends on the specific circumstances. Acute weight loss (e.g., within days, as commonly seen with acute gastroenteritis) is most concerning for dehydration and should be evaluated by a medical provider if significant clinical findings are present, especially in young children. More commonly seen in psychiatric settings is subacute or chronic weight loss that develops over weeks to months, often after interventions such as the stimulant prescription described in this case. It is important to remember that it is not absolute weight that providers must monitor for decline, but weight and BMI percentiles, as all children would be expected to increase in weight as their height increases, until cessation of linear growth in late adolescence or, for some boys, early adulthood. Always consider prescription misuse or presence of an eating disorder as a potential cause of excessive weight loss in a patient being treated with stimulants. Failure to maintain at least 85% of expected/ideal weight for age and height is a concerning finding, which may be consistent with an eating disorder or other medical comorbidity and which indicates need for medical evaluation.

Patients who experience decreased appetite with weight loss or relative weight loss for age, but who are not underweight, are frequently encountered in the psychiatric setting. Unfortunately, clear guidelines for intervention in these situations are lacking. If no medication or intentional lifestyle changes are responsible for the weight loss, review of diet, inquiry into food security (defined as access to adequate, healthy food), and referral to the pediatrician should be considered. Interestingly, food insecurity has been frequently associated with being overweight, which is thought to relate to the availability of inexpensive and unhealthy foods in many industrialized countries. When medication is the likely cause of inadequate weight gain, a discussion of the weight changes and an updated discussion with the patient and family about the benefits, risks, and alternatives to the current treatment is indicated. In such cases, possible interventions include a trial of medication schedule adjustments (e.g., take after breakfast), formulation changes (e.g., multiple doses of short-acting medication to be taken after mealtimes), decrease in dosage, augmentation with (or switch to) a non-stimulant, medication holidays, or dietary changes (e.g., incorporation of healthy, high-calorie snack foods) to offset the side effect of decreased appetite in an otherwise effective treatment regimen. Consultation and collaboration with the patient's pediatrician or a nutritionist can be helpful in managing inadequate weight gain. Increasingly, children in all practice settings may commonly be overweight at baseline, and assessing weight loss in these cases is more nuanced. Most providers agree that weight loss in a significantly overweight child is not in and of itself a problem (indeed, it can be a positive finding in terms of overall health), unless the weight loss is significant or precipitous. Screening for eating disorders should not be overlooked, if indicated, at any weight, and weight loss should be evaluated to ensure that appropriate nutrition is provided to support continued growth and development and optimal functioning.

How is weight loss addressed in the pediatric setting? What are the basic nutritional guidelines for children, and how do they differ from adults?

When weight loss is evaluated in pediatric settings, the initial investigation involves determining the significance, etiology, and need for intervention. To ascertain significance, weight loss is quantified relative to previous measurements, age, height percentile for age, BMI percentile for age, and risk category. Pediatricians will inquire how much weight was lost, and over what timeframe? What is the change in BMI % for age? Is the problem restricted to weight, or has the height been affected? In infants and toddlers, is the head circumference also affected? Has the patient moved from obese to overweight? Normal weight to underweight?

To investigate etiology, medical providers will typically inquire about intentional versus unintentional weight loss, lifestyle changes, medication use, and food security, among other factors. Additionally, they will conduct a focused history and physical examination and potentially order laboratory studies, especially if a pathological cause is suspected (e.g., inflammatory bowel disease, malnutrition, eating disorder, thyroid dysfunction, depression, cancer, substance use).

Nutritional needs of children vary with age. Relative caloric intake requirements to maintain growth and proper nutrition are estimated at 1000 kcal/day from age 2–3 years and then in girls 1200 kcal/day from ages 4–8, 1600 kcal/day from 9–13, 1800 kcal/day from 14–18, and 2000 kcal/day for young adults. In boys, estimates of caloric needs are slightly higher: 1400 kcal/day from ages 4–8, 1600 kcal/day from 9–13, 1800 kcal/day from 14–18, and 2400 kcal/day for young adults. The above figures represent averages for sedentary children and adults and will increase by 200–600 kcal/day for highly active individuals (Dietary Guidelines for Americans 2005). Caloric intake requirements also vary by individuals' overall size and metabolism. Pregnancy, lactation, and chronic or acute illness also change an individual's nutritional needs, sometimes dramatically. Serving sizes for young children are smaller, for example, one fruit or vegetable serving is a quarter to a third cup for a toddler and half a cup for a preschooler. A broadly applicable guideline is that one serving size is roughly equal to the area of the palm of an individual's hand.

Regarding micronutrients, the recommended daily allowance (RDA) for most vitamins and minerals grows closer to adult requirements by age 14 years but is not fully equivalent until the age of 19 years. It is important to note that the RDA for various vitamins and minerals does not necessarily increase in linear fashion with age. For example, humans' requisite calcium intake increases in children with age, peaks in preadolescence/adolescence, declines during adulthood, and rises again after the age of 50 years to near peak levels.

Which psychiatric medications are most frequently associated with decreased weight velocity or weight loss?

Stimulants are the psychiatric medications most often associated with weight loss and, to a lesser extent, other medications that act on dopamine or norepinephrine, such as bupropion, atomoxetine, and venlafaxine. Similarly, medications that affect the gut, cause GI side effects or affect satiety signals can also cause weight loss.

Case 2.2 (continued) You titrate the dose of the MAS to the optimal dose, maximizing its positive impact while minimizing side effects. At her next follow-up appointment, Brittany and her parents report that they are very pleased with the effects on this dose of the medication. She can focus appropriately in class, and homework completion is very manageable after school. They have not noted any side effects. You note that her height and weight are appropriate. When you log in to your EHR to document the visit, you notice that the patient's blood pressure (BP) of120/78 mm/Hg is highlighted in a red font. Wondering why this seemingly normal BP has been flagged, you review her past vital signs, and you notice that her previous readings tended to be around 100/60 mm/Hg. Her pulse, while still within normal limits, is also higher today at 98 beats/minute (bpm) compared to previous pulse readings ranging 60–80 bpm. As a busy provider, you have time for only a quick internet search, and discover blood pressure charts for children developed by the National Institutes of Health. For your patient, an 8-year-old female of average height, a BP of 102/61 mm/Hg represents the 95% for age, and her current reading of 120/78 would be considered abnormal. Concerned, you decide that the best course of action is to contact the patient's pediatrician to ask a few questions.

Do normal vital signs (VS) vary by age?

Normal VS certainly vary by age, especially for young children (https://www.pedscases.com/pediatric-vital-signs-reference-chart). As a general guideline, adolescents typically have BP, pulse, and respiratory rates similar to adults. BP ranges consistent with hypertension in children are defined by age, gender, and height percentile for age (Falkner 2010). Hypotension for school-aged children is roughly defined as systolic BP <70 + (age ×2) and <90 for children aged 10 and older. For young people, BP is interpreted normed by age, sex, and height % for age. BP charts for boys and girls are freely available (http://pediatrics.aappublications.org/content/early/2017/08/21/peds.2017-1904), and some EHRs now include automatic interpretation of a child's BP with % for age/gender/height. For school-aged children, and even more so for preschool children, pulses of greater than 100 bpm may be normal. Bradycardia varies by age as well, and although athletic, older teens may have pulses as low as 50 bpm at baseline, school-aged children's usual pulse ranges from 70 to 115 bpm while awake. As with adults, VS ranges are presented merely as guidelines, and individual variation is important to acknowledge. Clinical response and patient presentation directs treatment. Symptoms of orthostasis that develop in a patient after initiating clonidine, for example, are more clinically significant than the isolated systolic BP value in an asymptomatic patient.

How is BP interpreted for children and adolescents?

In children, as in adults, BP is most accurately measured using a properly sized BP cuff, whose bladder length is ideally 80%, and width ≥ 40%, of the patient's arm circumference, with the patient seated and resting quietly. For overweight and obese children and teens, the most appropriate cuff may be the large child, small adult, adult or even large adult BP cuff. Use of an undersized BP cuff can result in a falsely

high BP, while use of an oversized cuff results in the opposite. Young, uncooperative, or hyperactive patients that move or flex their arm muscles during assessment can also have inaccurate BP readings (frequently higher than actual). Anxiety and white coat hypertension (elevated BP values noted in doctor's office, but not outside of it) are additional causes of increased BP readings in patients without true hypertension.

What are the causes of elevated BP in youth? What are the criteria for diagnosis of hypertension (HTN) in a child? How is it evaluated, and how prevalent is it?

In addition to measurement errors, there are several medical causes for increased BP and HTN in youth. In preadolescent children, secondary HTN (HTN caused by a specific pathologic process) is most common and is usually related to renal disease. In addition, secondary HTN can be seen with cardiovascular abnormalities, adrenal and thyroid disease, sleep apnea, hyperaldosteronism, mineralocorticoid excess, and tumors. Like adults, adolescents more often have primary HTN, with obesity and family history of HTN among the main risk factors. As with adults, a single elevated BP does not constitute a diagnosis of HTN. HTN is diagnosed after a patient is found to have three separate, properly measured BPs for age/gender/height > 95 percentile. An assessment for pediatric HTN may include urinalysis (UA), CBC, blood chemistries, and/or blood hormones (e.g., plasma renin) to evaluate for renal disease and, if indicated, drug testing for substances that increase BP. Additional evaluation for less common but clinically important etiologies of hypertension may include laboratory screens for pheochromocytoma or neuroblastoma. Blood tests for lipids and glucose tolerance are recommended for all overweight children with HTN, as is polysomnography for overweight children with HTN and symptoms suggestive of sleep pathology. For youth in the United States, the prevalence of prehypertension (i.e., BP ≥ 90 percentile for age/gender/height, but <95 percentile) has been estimated to be 14% in boys and 6% in girls, while the prevalence of HTN (BP ≥95 percentile for age/gender/height) is estimated to be 3–4% (George et al. 2014).

Which psychiatric medications are most frequently associated with changes in blood pressure and pulse? What is the recommended frequency of monitoring VS *of patients taking psychotropic medications?*

Tachycardia and elevated BP are most commonly associated with medications that affect norepinephrine, such as stimulants, atomoxetine, and serotonin-norepinephrine reuptake inhibitors (SNRIs). Small increases in heart rate and BP, of 3–6 bpm and 2–4 mmHg, respectively, are common side effects of stimulants. Uncommonly, patients taking stimulants, atomoxetine, or SNRIs may have clinically significant increases in pulse and BP and may require a reconsideration of the risks and benefits of the agent and potential discontinuation of the medication. The α-agonists clonidine and guanfacine increase α-2 activity, thereby reducing peripheral muscle tone and causing the associated side effects of decreased pulse and BP. These medications can be dangerous if used in patients with very low pulse rates (<50 bpm) or BP. Discontinuing α-agonists can be associated with significantly

elevated pulse and BP, especially with the abrupt discontinuation of a long-standing, high-dose regimen. If a patient's BP and pulse are noted to become elevated as the α-agonist is discontinued, the previous dose should be resumed then tapered more slowly. In patients taking both a stimulant and α-agonist, while it is theoretically possible that the side effects of each will "cancel each other out," the potential combinations for medication dosages and time of action are innumerable, and careful monitoring of vital signs is still warranted.

Orthostatic hypotension is a potential side effect of atypical and conventional (especially low potency) antipsychotics and is thought to be due to α-1 antagonist activity. This side effect has been reported with increased frequency with clozapine and quetiapine, and it is one of the primary reasons cited for recommending slow titration of iloperidone, which has a relatively high affinity for α-1 receptors. In patients who have been stable on clozapine but experience a lapse in treatment of three or more days, slow re-titration is also recommended, in part due to the risk of orthostasis with rapid return to high dosages. Prazosin, an α-1 antagonist, also carries a risk of orthostatic hypotension, and it is prudent to monitor BP and query patients regarding symptoms of orthostatic hypotension upon medication initiation and with each subsequent visit.

Children taking psychotropic medications should have pulse and BP checked at least quarterly and more often if doses are changed, if high-risk medications are used, or if the patient experiences symptoms or has any other risks for side effects.

Development

Case Vignette 2.3 You serve as a BH consultant working closely with local pediatricians. Dr. Young, one of the PCPs, asks you about a 12-year-old patient whom she recently evaluated. This patient's father complained about his son's immature and clingy behavior and frequent avoidance of socializing with other kids. The PCP used the GAD7 (Generalized Anxiety Disorder 7-item scale) and PHQ9A (Patient Health Questionnaire-9 modified for Adolescents) to screen for anxiety and depression. Both were negative, and the boy denied having any difficulties with anxiety or socialization. He did acknowledge his preference to stay at home but denied any problem with school attendance, bullying, or peer interactions. His mother and maternal aunt have anxiety disorders, but there are no other mental health problems in the family. The patient is introverted, quiet, and high-achieving academically, but does not participate in organized sports, which is something that his parents value. He reports having a couple friends, and he spends a fair amount of time playing video games. The PCP stated, "I feel he is immature; after all, he is still Tanner stage one and short for his age, but I wanted to get your advice on any further questions or screenings to help rule out anxiety. Should I refer him to a therapist? He seems to be doing alright, but I don't feel entirely confident that I could assess him fully on my own without backup. His parents are concerned that there's something wrong with him, but he denies any problems." You note that anxiety is under-recognized in children and can be quite impairing. You inform her of more detailed anxiety screen-

ers, including the open access Screen for Child Anxiety Related Emotional Disorders (SCARED). Additionally, you discuss some helpful questions to investigate the possibility of separation, social, generalized anxiety, and panic disorders, as well as community resources that are available. With the mismatch between the parent and patient concerns regarding socialization, you mention the possibility of an autism spectrum disorder (ASD) and encourage Dr. Young to review the patient's history and assess for signs of this diagnosis as well.

You ponder what the implications of physical development are for this young patient and mentally compare him to several similar aged boys in your own practice. You realize that you are not entirely confident in assessing pubertal development (psychiatry's lack of physical exam aside). You wonder if knowledge regarding puberty has changed since you were in medical school, and you recall hearing that puberty has been beginning earlier and that some articles have discussed the potential negative consequences for delayed puberty in boys. You ask the PCP about any updates on pubertal development in boys and girls.

What are the stages and timing of typical pubertal development for boys and girls? Have they changed over time, and do they vary across cultures? What are the ramifications for early or delayed pubertal development for children of both genders?

Over time, and despite longer lifespans, pubertal development in boys and girls has begun earlier across all cultures. Currently, girls in the United States enter puberty on average at 10.5 years old, compared to the average ages of 12 in 1980 and 13 in 1950. In the United States, the average age of menarche is 12.5 years old. There continues to be substantial individual variation in timing of pubertal onset and progression, as well as variation across cultures. For example, on average, African-American girls enter puberty earlier than Caucasian girls. Currently in the United States, boys typically begin puberty around 12 years old, an age which has also declined gradually over time. Early pubertal development compared to peers has been correlated with negative psychosocial effects on girls.

What about physical development in transgender, transsexual, and gender nonconforming children? What interventions are accepted as medical treatment for these individuals? What role do pediatricians and child psychiatrists play in advocating for lesbian, gay, bisexual, and transgender (LGBT) youth?

Current pediatric models of care for transgender youth emphasize the importance of supporting the child or teen's wishes regarding self-identification and transition to another gender and providing appropriate medical care and support for the patients and their families. Following standards in behavioral health, pediatricians use the patient's preferred name and gender pronouns in communication and use currently accepted terms (e.g., F2M or "female to male") in documentation. Due to the highly stigmatized and complicated nature of the issues that gender nonconforming youth face, referral to a physician who has experience working with transgender youth is ideal, and involvement of a BH specialist is also recommended. The process of gender affirming treatment or gender transition is not delayed until

a patient reaches adulthood or late adolescence, as the physical changes associated with puberty can be very distressing for the individual, and delays make the transition process more complicated. For prepubertal children, gender transition is social, with the child adopting a preferred name and style. Clinicians can assist schools and families in affirming and supporting the child during this process. Medical stages of gender transitioning can be broadly broken down into three stages, the first of which is fully reversible, consisting of puberty-suppressing hormones (i.e., gonadotropin-releasing hormone analogs) also used in the treatment of precocious puberty (Hembree et al. 2017). The second stage consists of cross-gender hormone administration and is considered partially reversible. The last, "irreversible" stage, consists of transition surgery (Human Rights Campaign 2017). Desire of a youth to transition genders is respected and medical supervision strongly recommended. Youth without access to appropriate medical care may turn to hormones obtained illegally, which is a dangerous alternative.

As behavioral health providers trained in LGBT issues are aware, these youths are at higher risk of several psychiatric comorbidities, including suicidality, bullying, abuse, exploitation, and homelessness. An LGBT youth with psychiatric comorbidities faces the double stigma of mental illness and their sexuality and may face barriers accessing quality care. From a pediatric perspective, they are at risk for suboptimal medical care, with provider assumptions and implicit biases potentially contributing to gaps in care. Striking examples of this public health problem exist. For example, the clinician needs to ensure that adolescent women who identify as lesbian (and patients transitioning from female to male gender) who present with gynecologic symptoms are appropriately screened for pregnancy and sexually transmitted infections (Care for transgender adolescents 2017).

What are the general stages of cognitive, social, emotional, and motor development recognized in pediatrics (https://www.cdc.gov/ncbddd/actearly/pdf/checklists/all_checklists.pdf)?

From the pediatric perspective, what is the workup for delayed development?

In pediatrics, development is reviewed at every well-child check. Developmental screening, commonly done via parent-completed reports such as the Ages and Stages Questionnaire (ASQ) or the Parents' Evaluation of Developmental Status (PEDS), is conducted regularly throughout the child's life. Specific ASD screening is also recommended for all toddlers. Communication delay always warrants a formal audiological evaluation, which is available in various forms for all ages of children. Failed development screens should lead to further inquiry; continued monitoring; referral for early intervention services providing speech, occupational, and/or physical therapy; school referral; or referral to a developmental-behavioral pediatrician, pediatric neurologist, child psychiatrist, child psychologist, or other specialist for further assessment. Delayed pubertal development is a trigger to search for medical etiologies including hormonal or genetic causes. Consideration and/or assessment for Turner syndrome should occur in females without menarche by 16 years of age.

Case 2.3 (continued) In follow-up, Dr. Young has discovered that the patient prefers to be alone and has a very limited range of interests. He is obsessed with Pokémon, a multiplayer card game that is popular with much younger children, but he rarely plays with anyone else. Overall, he has difficulty with transitions, for which reason he often stays home and frequently gets upset when his parents insist that they dine as a family at a restaurant. His speech, while appropriate and without history of delay, is somewhat monotonous, and his father endorses a history of the patient speaking in a didactic tone even as a young child. Some family members nicknamed him "the little professor," and he does not seem to grasp his cousins' jokes. The additional screenings for anxiety and depression were negative, and considering these new findings, Dr. Young is now mainly concerned about the possible diagnosis of ASD. You agree that this possibility needs to be evaluated further, and you inquire about the PCP's plans.

What are currently recommended diagnostic tests for autism spectrum disorder (ASD) and intellectual disability (ID)?

Current guidelines recommend incorporating laboratory studies including chromosomal microarray and Fragile X testing for all individuals diagnosed with autism or intellectual disability. If the patient appears to have syndromic features, has additional comorbidities suspicious for a specific syndrome, or a history consistent with known etiologies of developmental impairment (e.g., fetal alcohol syndrome), additional referrals or studies may be warranted. Additional investigations such as MRI or electroencephalogram (EEG) are indicated only if there are additional neurological concerns such as seizures or tuberus sclerosis. In some cases, the specific etiology is linked to comorbidities that warrant additional testing for common comorbidities (e.g., annual screening for hypothyroidism in Down syndrome). *Current Centers for Disease Control and Prevention (CDC) and American College of Medical Genetics (ACMG) Guidelines can be found at https://www.cdc.gov/ncbddd/autism/hcp-recommendations.html & https://www.acmg.net/docs/pp-g-ASD-schaffer-aop-gim201332a.pdf.*

Acute and Chronic Illness

Case Vignette 2.4 Katie is a 17-year-old girl who has complex psychiatric and other medical comorbidities, who takes multiple medications, and who requires close follow-up. Katie was diagnosed with DiGeorge syndrome, schizophrenia, and congenital heart disease (Tetralogy of Fallot, status post-surgical repair). Her diagnosis was confirmed with genetic testing for the 22q11.2 deletion, and she has a full team of medical, educational, and social work professionals working with her and her family to meet her needs. She has an IEP, does well at school in an intensive learning center (ILC) setting, and has a skills trainer at home. Her nuclear family is supported by the extended family, friends, and twice monthly respite care. She is

being treated with olanzapine for psychotic symptoms and aggressive behavior and has had a positive response. She also takes polyethylene glycol 3350 for chronic constipation, cetirizine for allergic rhinitis, fluticasone and albuterol for moderate asthma, and iron supplements for iron-deficiency anemia.

At her monthly follow-up appointment, Katie's parents report that she has had progressively worsening aggressive behaviors over the past three to 4 weeks. She is more often non-compliant and will yell when her parents insist that she do something that she is refusing. Additionally, she has been hitting herself in the head and is very difficult to redirect. Sleep, which has been a chronic struggle, has become even more problematic over the past couple of weeks. There have not been any overt signs of psychosis observed, but determining whether Katie is experiencing any psychotic symptoms is challenging because she is mostly nonverbal. Her parents admit that she misses taking her medications once or twice a week, but this pattern is no different than in the past. You inquire about any recent changes to the patient's schedule, school, or home life. The family shares that they adopted two kittens. The pet adoption has been a positive experience for the whole family, and the patient enjoys playing with them. The family notes that there have been no changes to Katie's activities, schedule, or providers both at home and school. As you think through the differential for this worsening behavior and the possible adjustments to Katie's medications, you conduct a general review of systems and learn that Katie has had continual nasal congestion and cough, with intermittent fever, for the past 4 weeks. In fact, you now recall that the whole family has been ill over the last several months. "We just keep passing these colds around," says Katie's father. They share that the illness appears to have triggered Katie's asthma, and they have been giving her albuterol twice per day over the past few weeks with some temporary improvement in her respiratory symptoms and acetaminophen as needed for fever. As you think about the possibilities and wonder why the patient has been sick for so long with a common cold, Katie begins to hit herself in the head. You are concerned that the patient has been ill for such a long period of time, and you recommend that Katie be evaluated by her pediatrician. You wonder if there is a medical problem causing an increase in her behavioral symptoms, and you wonder what the best approach would be to address them. After discussing the available options with the family, they agree to take Katie to her pediatrician as soon as possible and to subsequently follow up with you to evaluate the need for medication adjustments.

Later that week, you receive a note from Katie's pediatrician, Dr. Ray. He has diagnosed her with acute otitis media in both ears and an asthma exacerbation, secondary to an upper respiratory tract infection, further complicated by allergic rhinitis and conjunctivitis. It seems that on top of the infections, the family's newly adopted kittens are also triggering the patient's asthma and allergy symptoms. Dr. Ray prescribed a seven-day course of amoxicillin/clavulanate for the patient's ear infection, acetaminophen and ibuprofen as needed for fever or pain, and albuterol four times daily (delivered via spacer and mask, because of refusal of the nebulizer) for the asthma exacerbation. Dr. Ray has placed non-compliance on the patient's problem list, specifically with the fluticasone and cetirizine, and recommends their

regular use to decrease overall atopy symptoms. Dr. Ray also recommends getting rid of the cats, or at least not allowing them in the patient's bedroom. Pediatrics follow-up has been scheduled in 1 week to reevaluate the patient.

You call Katie's mother and learn that the patient seems to be slowly improving since starting the medication regimen a few days ago. Katie is breathing more comfortably and is more compliant with requests compared to in prior weeks. She still hits herself in the head, but the frequency is decreasing, and overall, her parents feel that the medical interventions are working. Together, you decide to schedule the patient's next appointment after her medical treatment and pediatric follow-up, to reassess the patient's behavioral issues.

What medical ailments can masquerade as behavioral health problems?

The general challenge of other common medical considerations for behavioral symptoms is discussed in Chap. 9. In the context of developmental disability, medical problems can present as worsening behavioral or emotional symptoms. Time course and symptom type can be helpful to determine or localize the source of an illness. Rapid changes suggest an acute process such as development of acute otitis media or urinary tract infection. Symptoms such as increased self-harm may indicate pain, and consultation with a pediatrician is highly recommended in patients with limited communication to rule out other medical causes for psychiatric decompensation. Other potential causes of behavioral symptoms include painful menstrual cycles in female patients, exacerbations of chronic medical problems such as allergies, or medical interventions including invasive procedures. Chronic conditions can also cause or contribute to psychiatric symptoms: obstructive sleep apnea or hypothyroidism may mimic depression, or Graves' disease may be incorrectly diagnosed as generalized anxiety or panic disorder. Seizures, encephalitis, and other neurologic disorders can masquerade as primary psychiatric disorders.

How do pediatricians approach management of chronic illness?

Pediatricians typically emphasize the family's role and the developmental impact of chronic illness more often than their adult medicine counterparts. The medical home model, held as the ideal for pediatric care, establishes a primary care physician as the central hub for coordinating a patient's care. This is an especially important concept for children with special healthcare needs who see multiple specialists.

Case 2.4 (continued) You receive a call from the pediatric hospitalist, informing you that Katie has been admitted for complications secondary to her congenital heart defect. You learn that, despite the surgical repair done early in her life, Katie has developed pulmonary backflow requiring another surgical correction. You provide consultation to the inpatient pediatric team regarding her psychiatric medications and provide suggestions to minimize agitation in the immediate postoperative period and while recovering in the hospital. Katie's surgery goes well, and with the coordinated efforts of the medical team, child life unit, her family, and yourself, her hospital stay is relatively uneventful. On the day Katie is to be transferred from the pediatric intensive care unit to the regular pediatric floor, her

mother stops you and shares that she is very anxious to get home to the rest of her children. "She's doing so great, when do you think they will discharge her?" You admit to yourself that you were wondering the same thing, and tell the mother honestly that while you do not know the answer, you will work to find out and get back to her as soon as possible.

What are general criteria for pediatric hospital admission and discharge?

Knowledge of the pediatric thought process regarding hospital admission and discharge can provide valuable information for a consulting psychiatrist and can increase empathy with children receiving inpatient care and their families. Although admission and discharge decisions are always evaluated in the context of each individual patient and family, there are overarching principles and practices that apply more generally. In practice, there are several triggers for pediatric admission that differ substantially from those for adults. General criteria for hospitalization include lower thresholds for admission in younger patients, such as infants with fever or a toddler with a limp, who are admitted not only on basis of the clinical picture and physiologic increased risk for negative outcomes but also, in part, because of their developmentally limited capacity for accurate communication of history. An adolescent or adult with average communication skills is assumed to be able to communicate with the medical provider regarding the development of their symptoms. These skills are not automatically assumed to be present for younger children. This assumption relates to many aspects of a medical history, such as a child's communication of their pain level, localization of symptoms, and description or timing of symptom development. Even simple, concrete communication of circumstances, such as a child reporting (or denying) that he put an object in his ear, is checked with a physical examination and not necessarily accepted as fact. Additionally, histories are often provided by caregivers, who are one layer removed from the patient and not necessarily optimally reliable.

In terms of practical considerations, for children with respiratory conditions, respiratory effort is an important indicator for admission, as is lowered oxygen concentration. Oxygen saturation of <90% alone is criteria for admission in many pediatric centers. For children with infectious conditions, important indicators for admission and intravenous antibiotics include current level of infection and potential for complications or further progression (e.g., sepsis or infection of adjacent vital organ). In general, the risk for a potentially negative impact on a child's development or outcome is also considered, especially when the exact cause is not known (e.g., for a brief unresponsive episode in an infant). Although the social environment affects treatment outcomes for patients of all ages, medical problems are always evaluated within a child's social context. This approach highlights one overarching principle of balancing autonomy and beneficence. Autonomy is often given more weight in adult cases compared to pediatric patients. In contrast, pediatrics often places more weight on the potential risk to the child. An example would be a patient with an infection, thought to be treatable with oral antibiotics and outpatient follow-up if good compliance could be guaranteed; in many settings, admission

would likely be recommended more often for a homeless child as compared to a homeless adult. Admissions such as these are sometimes referred to as "social admissions," as they are not based purely on clinical assessment of illness severity, but in part on the physicians' assessment of the level of risk posed by the patient's social environment. In the United States, an extreme example of the differing balance between autonomy and beneficence would be the ability for adults to decline, based on their religious beliefs, a life-saving blood transfusion for themselves, but not for their dependent children. Similarly, a discharge from the hospital or emergency department to the street would rarely if ever be considered acceptable for a minor patient, while a competent adult may readily choose to decline shelter placement or other offers of assistance despite a medical provider's evaluation of potential negative impact on medical outcomes.

Regarding discharge, hospitals will usually require documentation and demonstration that caregivers have the necessary skills and means to provide for appropriate follow-up care post-discharge and will arrange for help if difficulties are foreseen. In adult patients, although post-discharge needs are also assessed, the assumption of competence after instruction is the default. Postoperative patients such as in case vignette 2.4 are assessed for level of recovery, risk of complications, post-discharge needs, and potential comorbidities. For example, if a patient such as Katie has severe behavioral difficulties, limited cognition, or significant aggressive/self-harming behaviors, precautions would need to be taken to ensure that complications could be prevented or minimized (e.g., by removing stitches and IV lines) and to confirm that the patient's needs can be met in the outpatient setting. Following cardiac or other complicated surgery, pediatric patients will most often be "stepped down" from intensive care to a regular ward for observation prior to discharge. As previously mentioned, public health nurses or care coordinators are often utilized for children with special healthcare needs or complicated social situations, to prevent negative developmental impact/outcomes, reduce readmission rates, and improve follow-up care.

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