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Commentary

Decline in Independent Activity as a Cause of Decline in Children's Mental Wellbeing: Summary of the Evidence

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It is no secret that rates of anxiety and depression among school-aged children and teens in the United States are at an all-time high. Recognizing this, the American Academy of Pediatrics, American Academy of Child and Adolescent Psychiatry, and Children's Hospital Association issued, in 2021, a joint statement to the Biden administration that child and adolescent mental health be declared a "national emergency."[1]

Although most current discussions of the decline in youth mental health emphasize that which has occurred over the past ten to fifteen years, research indicates that the decline has been continuous over at least the last five or six decades.[2,3] Although a variety of causes of this decline have been proposed by researchers and practitioners (some discussed near the end of this commentary), our focus herein is on a possible cause that we believe has been insufficiently researched, discussed, and taken into account by health practitioners and policy makers.

Our thesis is that a primary cause of the rise in mental disorders is a decline over decades in opportunities for children and teens to play, roam, and engage in other activities independent of direct oversight and control by adults. Such independent activities may promote mental wellbeing through both immediate effects, as a direct source of satisfaction, and long-term effects, by building mental characteristics that provide a foundation for dealing effectively with the stresses of life.

We develop the thesis by summarizing evidence for, respectively, (a) a large decline over decades in children's opportunities for independent activity; (b) a large decline over the same decades in young people's mental health; (c) effects of independent activity on children's immediate happiness; and (d) effects of independent activity in building long-term psychological resilience. Then we discuss the relation of independent activity to wellbeing from the perspectives of self-determination theory and evolutionary mismatch. In two final sections, we briefly review the evidence cited, comment on some other putative causes of declining mental health in youth, and offer some suggestions for pediatric practice. Unless otherwise noted or obvious, we use the word "children" throughout this article to refer to people under age 18.

Decline in Children's Opportunities for Independent Activity

Those of us old enough to have been children in the 1970s or earlier know from experience that children then had far more freedom to roam, play, and engage in various activities independently of adults than do children today. Research has confirmed that our memories are not distorted.

For example, Rutherford analyzed hundreds of articles and advice columns about childrearing that appeared in popular magazines from the early 20th century on.[4] She found that earlier articles portrayed a world where children spent much time with other children away from adults, walked or biked to school alone or with friends from as young as age 5, contributed meaningfully through chores to the household economy, and by age 11 or 12 often had part-time jobs, such as babysitting and paper routes performed without direct adult oversight. Over time, however, beginning in the 1960s and accelerating in the 1980s, the implicit understanding shifted from that of children as competent,

responsible, and resilient to the opposite, as advice focused increasingly on children's needs for supervision and protection.[4] Rutherford noted, as have other reviewers,[5] that in some respects—such as freedom to choose what they wear or eat—children have gained autonomy over the decades. What has declined specifically is children's freedom to engage in activities that involve some degree of risk and personal responsibility away from adults.

Books on the history of childhood in America have likewise documented the decline of both free play and children's independent, responsible contributions to family and community. Chudacoff describes the first half of the 20th century as "the golden age of unstructured play" and shows how children's free play, especially outdoors, declined from about 1960 on.[6] Mintz supports the premises that "contemporary children are more regimented and constrained than ever before" and have "fewer socially valued ways to contribute to their family's well-being or to participate in community life."[7] In systematic surveys, parents have reported that their children play independently outdoors far less than they themselves did as children and that they limit their children's freedom outdoors largely because of fears of crime and traffic.[8,9,10]

Considerable research, mostly in Europe, has focused on *children's independent mobility* (CIM), defined as children's freedom to travel in their neighborhood or city without adult accompaniment. That research has revealed significant declines in CIM, especially between 1970 and 1990, but also some large national differences. For example, surveys regarding the "licenses" (permissions) parents grant to their elementary school children revealed that in England, license to walk home alone from school dropped from 86% in 1971 to 35% in 1990 and 25% in 2010; and license to use public buses alone dropped from 48% in 1971 to 15% in 1990 to 12% in 2010.[11] In another study, comparing CIM in 16 different countries (US not included), conducted from 2010 to 2012, Finland stood out as allowing children the greatest freedom of movement.[12] The authors wrote: "At age 7, a majority of Finnish children can already travel to places within walking distance or cycle to places alone; by age 8 a majority can cross main roads, travel home from school and go out after dark alone, by age 9 a majority can cycle on main roads alone, and by age 10 a majority can travel on local buses alone." Although we have found no similar studies of parental permissions for US children, other data indicate that the US is more like the UK concerning children's independent mobility than like Finland. For example, National Personal Transportation Surveys revealed that only 12.7% walked or biked to school in 2009 compared with 47.7% in 1969.[13]

Another constraint on independent activity derives from the increased time children must spend in school and on schoolwork at home. Between 1950 and 2010, the average length of the school year in the US increased by five weeks.[14] Homework, which was once rare or nonexistent in elementary school, is now common even in kindergarten. One study revealed that the average amount of time that US school children, ages 6-8, spent at school plus school homework increased by 11.4 hours per week between 1981 and 2003, equivalent to adding a day and half to an adult's work week.[15] Increased school time was often accompanied by decreased recess. By 2014, the average time spent in recess (including any recess associated with the lunch period) for elementary schools was just 26.9 minutes a day, and some schools had no recess at all.[16]

Decline in Children's Mental Wellbeing

Over the same decades that children's opportunities for independent activity have declined greatly, so has children's mental health. One line of evidence comes from cross-temporal meta-analyses of scores on clinical assessment questionnaires that were administered to normative or quasi-normative groups of young people in unchanged form over decades. For example, one such analysis revealed that average scores on the Children's Manifest Anxiety Scale, for children mostly ages 9-11, increased by a full standard deviation between 1956 and the late 1980s.[17] A change this large means that roughly 85% of children by the late 1980s were more anxious than the average child in 1956. A change of roughly this same magnitude was found for depression in high school students from 1950 to 2002, as assessed by the Depression scale of the MMPI-A.[18] Looking at the scores another way, Twenge and her colleagues found that over the last half of the 20th century, the percentage of young people who scored above the level that generally signifies an anxiety or depressive disorder, by current DSM criteria, increased five- to eight-fold.[18]

More recent studies using a variety of measures have shown continued increases in children's anxiety and depression in the early 21st century.[19,20] One survey, the Youth Risk Behavior Surveillance System (YRBS), conducted annually by the Centers for Disease Control and Prevention (CDC), revealed that by 2019, 36.7% of high school students ages 14-18 reported persistent feelings of sadness or hopelessness over the past year.[19]

Perhaps the most compelling and disturbing evidence comes from studies of suicide and suicidal thoughts. Data compiled by the CDC indicate that the rate of suicide among children under age 15 rose 3.5-fold between 1950 and 2005 and by another 2.4-fold between 2005 and 2020.[21,22] No other age group showed increases nearly this large. By 2019, suicide was the second leading cause of death for children from age 10 through 15, behind only unintentional injury.[22] Moreover, the 2019 YRBS survey revealed that during the previous year 18.8% of US high school students seriously considered attempting suicide, 15.7% made a suicide plan, 8.9% attempted suicide one or more times, and 2.5% made a suicide attempt requiring medical treatment.[19] We are clearly experiencing an epidemic of psychopathology among young people.

What we have described so far is a correlation over decades between declines in children's independent activity and mental wellbeing. Correlation, of course, does not prove causation, but is a first step in hypothesizing causation. Through most of the rest of this commentary we present converging evidence, from a wide variety of sources, supporting this causal hypothesis.

Immediate Effects of Independent Activity on Mental Wellbeing

A major category of independent activity, especially for young children, is play. Research, as well as everyday observation, indicates that play is a direct source of children's happiness. In one study, for example, 6-8-year-olds were asked to depict activities that made them happy, with the result that almost all the depicted activities were identified as play.[23] Reviews, including one that is part of an official statement by the American Academy of Pediatrics,[24] have summarized evidence for the value of play in promoting children's mental wellbeing. Similarly, a recent review of research on the effects of adding more recess time in elementary schools revealed consistent findings of improved social and emotional wellbeing with no loss and sometimes gain in academic performance.[25] Less well known and discussed, however, is evidence that children's play-like activity appears to be most satisfying and to fit most closely with children's own concept of play when it occurs away from adult oversight and intervention.

Part of the definition of play favored by many if not most play researchers, is that it is activity initiated and directed by the players themselves, not by an outside authority.[26] This also appears to be a major part of children's concept of play. A review of 12 studies in which young children were interviewed about what is or isn't play, concluded that children understood play to be an activity "that took place with other children with little or no involvement from adults."[27] In one study, for example, kindergarteners who were shown pictures of children engaged in activities that looked fun, generally identified the activity as play only if no adult appeared in the picture.[28] They apparently assumed that if an adult was present, the adult was controlling the activity, so it wasn't play.

In another study, young children were induced to engage in an activity under one of two conditions.[29] In the "like play" condition the activity was offered as a choice and no adult was nearby during the activity. In the "not like play" condition, the children were given no choice about participation, and an adult was directly present during the activity. The result was that those in the "like play" condition showed significantly more evidence of engagement and happiness (for examples, they leaned into the activity more and smiled more) than those in the "not like play" condition. Much of what adults call "play" in schools, including closely supervised recesses, fits the pattern that in this study would be the "not like play" condition.

Observational studies in natural settings have likewise documented an inhibiting effect of the presence of adults on children's play.[30] In one, researchers observed children (including teens) on multiple occasions in 20 different parks in Durham, NC.[31] They found, after controlling for other variables (such as age and number of children in the group), that children without an adult caregiver obviously present were far more likely to be involved in vigorous play than children who were being monitored by an adult.

Even more telling is a study conducted in Zurich, Switzerland, in the early 1990s that compared 5-year-olds living in neighborhoods where children of that age were still allowed to play unsupervised outdoors to 5-year-olds living in economically similar neighborhoods where, because of traffic, such freedom was denied.[32] Parents in the latter group were much more likely than those in the former to take their children to parks, where they could play under parental supervision. The main findings were that those who could play freely in neighborhoods spent, on average, twice as much time outdoors, were much more active while outdoors, had more than twice as many friends, and had better motor and social skills than those deprived of such play. The researcher concluded further that trips to the park with parents failed to compensate for lost neighborhood freedom because (a) parents did not have patience or time to stay long at the park, so play was constricted in time; (b) parental monitoring reduced children's freedom to play in vigorous, challenging, risky ways; (c) there were usually no consistent play groups at parks, so opportunities for collaborative play among friends were reduced; and (d) the parks afforded fewer ways of playing than the neighborhoods because of the greater variety of playthings in neighborhoods, where children could bring out equipment from their homes.

Beyond play, other forms of independent activity also appear to promote young people's immediate wellbeing. For example, an Australian study revealed that active travel to school (walking, cycling, or scootering) correlated positively with a measure of psychological wellbeing in primary school children.[33] Another study, also in Australia, concluded that high-school students who held part-time jobs felt more independent and happier, overall, than those without such jobs.[34] These feelings were reported to derive not just from the money earned, but also from improvements in their social lives and enjoyment of the work itself. A recent article in *Nature* summarized evidence that independent adventures and active contributions to the welfare of the family or community increase mental wellbeing in teens.[35]

Other research has compared indices of stress and psychopathology in students during the school year with those during summer vacation, when most students have more opportunity for independent activity. A 2014 study of "Stress in America," conducted by the American Psychological Association, found that teenagers in school were the most stressed people in the United States, and 83% of them attributed their stress at least partly, if not fully, to school.[36] When the survey was conducted during summer vacation, the percentage reporting recent severe stress was cut in half compared with when school was in session. Other research reveals that for young people of school age, but for no other age group, the rates of emergency mental health admissions, attempted suicides, and actual suicides are roughly twice as high during weeks when school is in session compared with vacation weeks.[37,38,39]

Long-Term Effects of Independent Activity on Mental Wellbeing

Beyond promoting immediate mental wellbeing, children's independent activity may also help build mental capacities and attitudes that foster future wellbeing. One way of thinking about this involves the concept of internal versus external locus of control (LOC). Internal LOC refers to a person's tendency to believe they have control over their life and can solve problems as they arise, in contrast to external LOC, which is a tendency to believe their experiences are ruled by circumstances beyond their control. Many research studies, mostly cross-sectional but some longitudinal, have shown that a low internal LOC, assessed by a standard questionnaire, is highly predictive of anxiety and/or depression in both children and adults.[40,41,42,43,44] In addition to documenting dramatically increased anxiety and depression among young people over the last four decades of the 20th century, Twenge and her colleagues also documented a dramatic decline in internal LOC among them over that same period.[45] Logically, it seems likely that a decline in internal LOC was a mediating cause of the decline in mental wellbeing.

It also seems likely that play and other independent activities, where young people must make their own decisions and solve their own problems, would promote the development of a strong internal LOC. If children have little experience taking control of their own lives, they are unlikely to develop a strong sense that they can exert such control. And so, we have a cause-effect sequence that plausibly contributes to the relationship between children's independent activity and their mental well-being: Experiences of having control → internal LOC → mental well-being.[2] The only study we know of directly assessing the relationship between children's experiences and LOC is one in which young children whose mothers were more autonomy supportive (as assessed by observing them as their child worked on a problem-solving task) scored higher on internal LOC than did children whose mothers were more controlling or provided unsolicited help.[46]

Several studies have examined relationships between the amount of time young children have for self-directed activities at home and psychological characteristics predictive of future wellbeing. These have revealed significant positive correlations between amount of self-structured time (largely involving free play) and (a) scores on two different measures of executive functioning;[47,48] (b) indices of emotional control and social ability;[49] and (c) scores, two years later, on a measure of self-regulation.[50] There is also evidence that risky play, where children deliberately put themselves in moderately frightening situations (such as climbing high into a tree) helps protect against the development of phobias and reduces future anxiety by increasing the person's confidence that they can deal effectively with emergencies.[30,51]

Studies with adults involving retrospections about their childhood experiences provide another avenue of support for the idea that early independent activity promotes later wellbeing. In one such study, those who reported much free and adventurous play in their elementary school years were assessed as having more social success, higher self-esteem, and better overall psychological and physical health in adulthood than those who reported less such play.[52] In another very similar study, amount of reported free play in childhood correlated positively with measures of social success and goal flexibility (ability to adapt successfully to changes in life conditions) in adulthood.[53] Also relevant here are studies in which adults (usually college students) rated the degree to which their parents were overprotective and overcontrolling (a style that would reduce opportunity for independent activity) and were also assessed for their current levels of anxiety and depression. A systematic review of such studies revealed, overall, positive correlations between the controlling, overprotective parenting style and the measures of anxiety and depression.[54]

The Problem from the Perspective of Self-Determination Theory

A useful perspective for thinking about the relation between independent activity and mental wellbeing is that of *Self-Determination Theory* (SDT), a rapidly growing domain of psychological research and theory pioneered by Richard Ryan and Edward Deci. The theory's fundamental premise is that people of all ages perform better and live happier, more satisfying lives when they experience themselves as living in accordance with their own internal desires and decisions rather than being driven from outside sources by rewards, punishments, and demands from others. Hundreds of studies support this premise and elaborate on it.[55,56]

Much research within SDT has focused on the psychological foundations that enable self-determination. This has resulted in a sub-theory of SDT referred to as *Basic Psychological Needs Theory* (BPNT), which posits that a prerequisite for a healthy sense of self-determination and, hence, for mental wellbeing, is the fulfillment of three basic psychological needs: those for *autonomy*, *competence*, and *relatedness*.[55] The logic of the theory is straightforward. To feel in charge of one's life, one must feel free to choose one's own paths (*autonomy*); feel sufficiently skilled to pursue those paths (*competence*); and have friends and colleagues for support, including emotional support (*relatedness*).

Empirical evidence for BPNT derives from dozens of studies, across cultures and with children as well as adults, showing that fulfillment of these basic needs is highly predictive of mental wellbeing and success in various life pursuits.[57] Research with children has supported the view that the influence of autonomy-supportive parenting on mental wellbeing is mediated by increases in self-perceived autonomy, competence, and relatedness.[58,59] Again, this is consistent with what we would expect logically. Play and other self-directed activities are, by definition, autonomous; such activities build skills in endeavors that the children care about, so they promote competence; and such activities are a primary means by which children make friends, so they support relatedness.

The Problem from an Evolutionary Perspective

Another way to understand the link between the decline in children's independent activity and decline in their mental wellbeing involves the concept of *evolutionary mismatch*, the contrast between the ancestral conditions in which children's innate tendencies and needs would have

evolved and the conditions provided for children's development today.[60] A survey of hundreds of ethnographic accounts of children in indigenous communities, which are likely more similar to the communities of our ancestors than are our developed communities, revealed that normal childhood in such communities always entailed much independent activity, personal responsibility, and self-initiated exploration and learning.[61]

Children's freedom to travel independently in such communities is endemic to the roles they are expected to play. Toddlers, after weaning, are typically passed on to regular care by older siblings and cousins, who bring them along in their own active and geographically wide-ranging play. A toddler's introductions to the animal corrals, fields, nearby river, forest, and whole village commonly occur under the eye of a sibling caregiver, not an adult. Indigenous pedagogy is driven by the child's eagerness to acquire useful skills and become an integral part of the community, abetted by the adults' granting the child full access to the community.[62] Parents acknowledge the risks in such hands-off childrearing, but see it is as essential to the child's education.[63]As Hewlett noted regarding one foraging society, "Aka mothers express regret when their infants cut themselves while playing with knives, but they don't want to restrain their exploration and learning."[64]

In many indigenous societies, children as young as age 5 are expected to contribute to the domestic economy and are eager to do so, and there is widespread acknowledgment by observers that children's psychological well-being is enhanced by these opportunities.[65],[66], [67] Children are typically assigned chores consistent with their level of development. Some of the early assignments involve running errands, to ever greater distances. The errand-runners will need to navigate, and thereby learn about, their own neighborhood, the larger community, and the surrounding bush (to fetch water, firewood, and edible and medicinal plants).

Assuming that conditions in indigenous groups today are similar to ways of living that predominated throughout human biological history, it is no wonder that natural selection would have created in children strong drives to become involved in the real activities of the community, to learn through direct experience, and to seek increasing levels of trust and independence as they grow, beginning in early childhood. Decades ago, in the United States and other modern nations, children still had reasonable opportunities to satisfy such drives, but that has changed as children have become ever-more-closely monitored and supervised by adults. Children have remarkable capacities to adapt to prevailing conditions, but for many this may occur at considerable psychological cost, including increased anxiety, depression, and a reduced sense of agency.

Discussion

We have provided here evidence from a wide variety of sources that independent activities promote children's immediate and future mental wellbeing. Most of the studies are necessarily correlational and cannot, by themselves, prove causal direction. The power of the argument lies in the converging findings from such a large variety of studies.

We have reviewed research showing correlations between children's independent activity and mental wellbeing over decades, across cultures, across neighborhoods, across context (school vs. out of school), across parenting styles, and across immediate conditions of control vs freedom. It is reasonable to suggest that many of these correlations involve two-way causation, with increased freedom promoting increased wellbeing and increased wellbeing promoting increased freedom, but it would be hard to argue that this is true for all of them (some were experimental in design) or that the reverse causal direction accounts for the bulk of the findings. Moreover, as we have shown, the findings are consistent with expectations from Self-Determination Theory and from anthropological research supporting the idea of an evolutionary mismatch between the conditions in which children's natural tendencies would likely have evolved and conditions today.

We are not suggesting that a decline in opportunities for independent activity is the sole cause of the decline in young people's mental wellbeing over decades, only that it is *a* cause, possibly a major cause. The decline in mental wellbeing may have resulted from a variety of social changes, some of which are intertwined with the decline in independent activity. As noted earlier, students themselves report that their schooling experiences are a major cause of their psychological distress.[36] That is further supported by evidence that teens in what have been labeled "high achievement schools," where pressure for high test scores and ultimate acceptance into elite colleges is especially high, suffer from anxiety and depression at higher levels than is true for teens in schools where such pressures are lower.[68],[69] The increase in school time and pressure over decades may have impacted mental health not just by detracting from time and opportunity for independent activities but also because fear of academic failure, or fear of insufficient achievement, is a direct source of distress.[69]

It is also possible that societal changes in childcare other than constraints on children's independent activity may have contributed to declines in mental wellbeing. From the perspective of evolutionary mismatch, it is noteworthy that childcare among hunter-gatherers included not only much freedom for independent activity as children grew beyond toddlerhood, but also highly intensive caregiving of infants and toddlers, which included almost continuous holding, immediate responsiveness to signs of distress, and prolonged breastfeeding on demand in a community of caretakers, beyond just the mother.[70] There is evidence that departures from such care in modern societies can, through epigenetic mechanisms, alter physiological processes in ways that predispose the child for heightened reactions to stressors and mental disorders throughout life, depending on the degree of such departures.[71],[72],[73] The question of whether such departures have increased over the decades considered in this article is worthy of study.

Much recent discussion of young people's mental health has focused on the role of increased use of digital technologies, especially involvement with social media. However, systematic reviews of research into this have provided little support for the contention that either total screen time or time involved with social media is a major cause of, or even correlate of, declining mental health. One systematic review concluded that research on links between digital technology use and teens' mental health "has generated a mix of often conflicting small positive, negative and null associations" (Odgers & Jensen, 2020).[74] Another, a "review of reviews" concluded that "the association between digital technology use, or social media use in particular, and psychological well-being is, on average, negative but very small" and noted some evidence, from longitudinal research, that negative correlations may result from declining mental health leading to more social media use rather than the reverse (Orben, 2020).[75]

Implications for Pediatric Practice

All in all, the evidence convinces us that the decline in children's independent activity and, hence, in mental wellbeing is a national and international health crisis and should be treated as such. Unlike other crises, such as the COVID epidemic, it has crept up on us gradually, over decades, so many have barely noticed it. Some young parents are unaware that five or six decades ago, when their own parents were children, those as young as 5 or 6 were largely free to explore and play away from direct adult oversight, and children and teens suffered far less than they do today from anxiety and depression. Moreover, unlike other health crises, this one is not the result of a malignant virus or unsanitary conditions but is the result of good intentions carried too far—intentions to protect children and provide what many believed to be better (interpreted as more) schooling, both in and out of actual schools.

Parents today are regularly subject to messages about the dangers that might befall unsupervised children and the value of high achievement in school.[76] But they hear little of the countervailing messages that if children are to grow up well-adjusted, they need ever-increasing opportunities for independent activity, including self-directed play and meaningful contributions to family and community life, which are signs that they are trusted, responsible, and capable. They need to feel they can deal effectively with the real world, not just the world of school. Even parents who recognize that their children are capable of and would benefit from more independence, and would not be seriously endangered, are often reluctant to allow it because of realistic fears that they might be accused of negligence by neighbors or, worse, by police and child protective services.[77,78]

What can pediatricians do to ameliorate this crisis? They might talk with parents about their children's opportunities for independent, confidence-building activities. They might present an overview of the findings of studies such as those described in this report, explain concepts such as locus of control and basic psychological needs, and ask parents about their children's independent activities and the constraints and fears that limit those freedoms. They might brainstorm with parents about how to overcome the constraints and dampen the fears, given the child's maturity, the neighborhood, and the family's living conditions. Parents in some neighborhoods have worked together to create places and times where children can play freely with other children, with an adult present just for safety, not to manage the play.[79]

Pediatricians might also talk with parents about how to teach children to be safe in their independent activities—how to cross streets, the safety rules for bicycling, the advantages of moving about with siblings or friends rather than alone (there is safety in numbers), how to ask for help when needed, and the like—as an alternative to depriving them of such activities. Children as young as 5 or 6 are capable of understanding and abiding by such rules and even developing new safety rules of their own.

At the broader societal level, pediatricians might bring their stature and knowledge to bear in discussions with educators, social workers, city planners, legislators, and community leaders about policies and programs that limit or expand children's opportunities for independent activities. The nonprofit organization Let Grow has been working effectively for several years, with some success, to bring free play and other independent adventures into public schools, to alter state laws to give parents more freedom to make their own reasoned judgments about what is safe for their children, and to provide a catalog for parents and teachers of ways and reasons to allow children more independence.[80] (For full disclosure, we note that the lead author of this article is on the board of directors of Let Grow.) Pediatricians might introduce this resource as well as others to policy makers and parents.

Table 1. Summary of Data and Outcomes for Children Receiving Pediatric Subspecialty Care

Adolescent	• Comprehensive treatment for pelvic inflammatory disease is higher with multidisciplinary adolescent care compared with ED encounters. 68, 69 [70]
Allergy-Immunology	• Patients with asthma use less rescue medications and take more long-term controller medications with referral to an allergist. 10, 11, 13, 71
Cardiology	• Adults requiring surgery for congenital heart disease have lower mortality rates when performed by a pediatric heart surgeon. [72]
Child Abuse	• Access ensures the correct diagnosis (abuse vs not abuse) is made. 73, 74 [75]
Critical Care	• Critically ill children with medical complexity or young age (<12 years) should be treated in pediatric intensive care units due to equipment and supply needs, as well as etiological differences in chronic disease (e.g., chronic kidney disease, congenital heart disease,

	and malignancies). [76]
Dermatology	• Patients who traveled ≥20 miles to receive pediatric dermatology care for infantile hemangioma were >7 times more likely to be non-adherent to treatment compared with those who traveled ≤10 miles. [77] • Children evaluated by a pediatric dermatologist have a change to the correct diagnosis up to 40% of the time when seen in the pediatric emergency department and therapy is changed in most (80%) children diagnosed with chronic skin graft versus host disease. 78, 79
Developmental-Behavioral	• DBPs complete comprehensive assessments and recognize coexisting developmental and learning diagnoses in children with attention deficit hyperactivity syndrome and autism spectrum disorder. [80]
Emergency Medicine	• There is decreased mortality and improved outcomes for critically ill children in Pediatric EDs and in hospitals with higher pediatric readiness scores. [81 82 83]
Endocrine	• The number of trainees choosing pediatric endocrinology is declining and type 1 and 2 diabetes in youth is increasing, resulting in large referral volumes and reduced access to care. [84 85]
Gastroenterology	• Ulcerative colitis (UC) in children is typically more aggressive than adult-onset disease. Treatment algorithms for children with UC have an expanded focus, to include growth, puberty, emotional development, and body image.[18]
Hematology-Oncology	• Adolescents and young adults with pediatric cancers treated at Children's Oncology Group (COG) centers have higher survival rates compared with those treated at non-COG institutions. [40 41]
Hospital Medicine	• Hospitalized children cared for by pediatric hospitalists have shorter lengths of stay (LOS), lower costs, and higher adherence to evidence based therapies than children cared for by non-hospitalist physicians. [86 87 56 57]
Infectious Diseases	• Antimicrobial stewardship programs with ID consult led to decreased carbapenem use and decreased *Pseudomonas* resistance, LOS, and mortality. [88] • Survey data has shown the importance of ID physician involvement in antimicrobial restriction policies and approval processes. [89]
Neonatal-Perinatal Medicine	• Facilities should be uniformly classified by their capabilities which includes required equipment, trained specialty personnel, variety of available services, and transport capabilities. This allows for standardization of which neonates a facility is equipped to provide care, leading to improved patient outcomes particularly for very low birth weight infants. [14]
Nephrology	• Mortality is 2 times higher in children with end stage kidney disease who live ≥78 miles from a transplant center compared with those who live closer. [90]
Pulmonology	• Post-transplant survival is higher for older children and adolescents treated at pediatric centers compared with adult centers.[42]
Rheumatology	• Barriers to access lead to more invasive procedures and missed uveitis, as well as increased joint damage & involvement of more joints with diagnostic delays. [21] • Children with a suspected rheumatologic diagnosis are often referred to alternative specialists (e.g. pediatric ID or adult rheumatologist) or not referred due to distance to travel to a pediatric rheumatologist. [91]

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