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Selecting Appropriate Toys for Young Children in the Digital Era

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Play is essential to optimal child development because it contributes to the cognitive, physical, social, and emotional well-being of children and youth. It also offers an ideal and significant opportunity for parents and other caregivers to engage fully with children using toys as an instrument of play and interaction. The evolution of societal perceptions of toys from children's playthings to critical facilitators of early brain and child development has challenged caregivers in deciding which toys are most appropriate for their children. This clinical report strives to provide pediatric health care providers with evidence-based information that can be used to support caregivers as they choose toys for their children. The report highlights the broad definition of a toy; consideration of potential benefits and possible harmful effects of toy choices on child development; and the promotion of positive caregiving and development when toys are used to engage caregivers in play-based interactions with their children that are rich in language, pretending, problem-solving, and creativity. The report aims to address the evolving replacement of more traditional toys with digital media–based virtual "toys" and the lack of evidence for similar benefits in child development. Furthermore, this report briefly addresses the role of toys in advertising and/or incentive programs and aims to bring awareness regarding safety and health hazards associated with toy availability and accessibility in public settings, including some health care settings.

abstract

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Drs Healey and Mendelsohn conducted a thorough literature review on all topics, integrated the most up-to-date data, and synthesized this evidence to create an original authorship with cited references of recommendations for the use of toys in promoting optimal child development; and all authors approved the final manuscript as submitted.

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RATIONALE FOR CLINICAL REPORT

The last 20 years have brought a shift in parental and societal perception of toys, with parents and other caregivers increasingly likely to view toys as being important for children's development, self-regulation, and executive functioning.[1,2] A number of interrelated underlying factors have contributed to this shift, including: (1) increased recognition of early brain and child development as critical to educational success; (2) increased recognition of early experiences in the home and in child care settings as facilitating early brain and child development[3]; (3) increased marketing of so-called "educational" toys as critical for enhancing early

experiences; (4) the perception (perhaps misperception) of toy play rather than interaction with caregivers around toys as important for the child's development, inclusive of self-regulation[3]; and (5) increasing sophistication of digital media–based virtual "toys" replacing physical toys and often incorrectly perceived by caregivers as having educational benefit.[4,5]

Although high-quality toys facilitate child development when they lead to the engagement of caregivers in play-based interactions that are rich in language, pretending, problem-solving, reciprocity, cooperation, and creativity[4] (and potentially for older children in solitary play[1]), many of the claims advertised for toys are not based on scientific evidence. Additionally, there has been increasing recognition of potential for harm in the context of exposure to electronic media, environmental toxins, and safety hazards. In particular, electronic media have been associated with displacement of play-based caregiver-child interactions and reductions in cognitive and/or language[6–10] and gross motor activities,[11] with implications for child development[7] and health outcomes (eg, obesity).[11]

This clinical report addresses the pediatric health care providers' role in advising caregivers about toys in the context of changes in caregivers' perceptions of toys and the evolution of what now constitutes a toy. It complements existing policy from the American Academy of Pediatrics related to play,[4] media,[12,13] school readiness,[14] toxic stress,[15,16] injury prevention,[17] toxicology,[18] and poverty.[4]

AN EVOLVING DEFINITION OF TOYS

In this report, a toy is defined as an object (whether made, purchased, or found in nature) intended for children's play. Developmentally, the importance of toys is strongly supported by the large body of research documenting the role of play in fostering development across all domains (including cognitive, language, social-emotional, and physical).[1,4,19] Although the concept of play has not changed over time, what constitutes a toy at the time of this report is substantially different than what it was during the previous century.[20] This difference is attributable in part to the proliferation of electronic, sensory-stimulating noise and light toys and digital media–based platforms with child-oriented software and mobile applications[1,21] that can be perceived by parents as necessary for developmental progress despite the lack of supporting evidence and, perhaps most importantly, with the potential for the disruption of caregiver-child interactions.[22]

Traditional (physical) toys can be categorized in a variety of ways: (1) symbolic and/or pretend (eg, dolls, action figures, cars, cooking and/or feeding implements, etc); (2) fine motor, adaptive, and/or manipulative (eg, blocks, shapes, puzzles, trains, etc); (3) art (eg, clay and coloring); (4) language and/or concepts (eg, card games, toy letters, and board games); and (5) gross motor and/or physical (eg, large toy cars, tricycles, and push and pull toys).[23] High-quality toys in each of these categories can facilitate caregiver-child interactions, peer play, and the growth of imagination. It should be emphasized that high-quality toys need not be expensive. For example, toy blocks, in addition to household objects, can be interesting for a child to examine and explore, especially if the child observes adults using them. Unfortunately, many caregivers believe that expensive electronic toys (eg, sensory-stimulating noise and light toys for infants and toddlers) and tablet-based toys are essential for their children's healthy development[2]; however, evidence suggests that core elements of such toys (eg, lights and sounds emanating from a robot) detract from social engagement that might otherwise take place through facial expressions, gestures, and vocalizations and that may be important for social development.[24,25]

Over the past 2 decades, a number of core elements of traditional toys have been adapted to electronic (virtual) versions, such as laptops, tablets, phones, other mobile devices, and stand-alone electronic game devices, and to toys that substitute for human interaction (eg, toy bear that can read a story aloud).[2,5] In many cases, these have been integrated with new elements not previously available within traditional toys, such as sensory-stimulating toys (especially for infants, for whom the strong visual engagement and neurodevelopmental consequences are not presently known[2]). This blurring of the line between physical and virtual toys has greatly complicated caregiver decision-making when selecting toys, especially because mobile device applications for children have proliferated at an extraordinary pace.[1,21] As a result, pediatric health care providers have an important role in providing guidance for selecting appropriate applications[21] and toys.

TOYS AND CHILD DEVELOPMENT

General Considerations

Toys are important in early child development in relation to their facilitation of cognitive development, language interactions, symbolic and pretend play, problem-solving, social interactions, and physical activity, with increasing importance as children move from infancy into toddlerhood.[1] Pretending through toy characters (eg, dolls, animals, and figures) and associated toy objects (eg, food, utensils, cars, planes, and buildings) can promote the use of words and narratives to

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imitate, describe, and cope with actual circumstances and feelings. Such imaginative play ultimately facilitates language development, self-regulation, symbolic thinking, and social-emotional development.[26] Problem-solving through play with the "traditional favorites," such as blocks and puzzles, can support fine motor skills and language and cognitive development and predicts both spatial and early mathematics skills.[27,28] The use of toys in physical activity (such as playing with balls) has the potential to facilitate gross motor development together with self-regulation and peer interaction because of the negotiations regarding rules that typically take place. The aforementioned are only a few examples of skill development associated with toy play. Play with caregivers is most likely necessary to support skill development. However, solitary play can also have a role (especially for older children, for whom exploration and play with toys on their own time and pace can foster their independent creativity, investigation, and assimilation skills[1]).

In general, the best toys are those that match children's developmental skills and abilities and further encourage the development of new skills. Developmentally advanced toys can be appropriate too, especially when caregivers scaffold (eg, setting up a storyline for pretending together or providing support for the child's learning of a new skill) children in their play. Some toys have the ability to "grow" with the child, in that they can be used differently as children advance developmentally. For example, an 18-month-old child might try to use blocks functionally (eg, stack them), whereas a 2-year-old might use the same blocks to engage in sophisticated symbolic play (eg, by feeding the doll with a block that represents a bottle[1]) or use the same blocks to construct a bridge, demonstrating the development of spatial awareness.

Notably, data in support of a developmental role for toys primarily come from studies of activities in which children play with caregivers[3] rather than alone.[4,27,29] In particular, toys that are most likely to facilitate development are those that are most enjoyably and productively used for play together with an engaged caregiver, because in such contexts play with toys is likely to include rich language experiences, reciprocal ("serve and return"[15,16]) verbal interactions, and scaffolding. Toys can play an especially important role in the promotion of learning and discovery in "guided play," in which children take the lead, but caregivers support their exploration in the context of learning goals.[1,30] The idea that play with toys is enriched by use with a caregiver is consistent with the many studies of early childhood documenting that learning takes place optimally in the context of serve-and-return conversations that build on the child's focus[31] (and are analogous to shared book reading). In general, toys that facilitate imaginative play and problem-solving are most likely to enable such engagement by caregivers, whereas toys that are electronically based (whether traditional or media based) are less likely to do so.[10,32] Therefore, when pediatric health care providers advise parents and caregivers, it is important to stress that toys can serve an important but supportive role in enhancing a child's social development in addition to other domains, such as language, primarily through engaging caregivers in responsive interactions[3] and pretend play. The pace of life in today's society provides limited time available to many caregivers, and solitary play with toys should not be a substitute for caregiver-child interactions during play or other contexts, such as reading aloud. Electronic toys by themselves will not provide children with the interaction and parental engagement that are critical for the healthy development.

Appropriateness of Toys for Children With Special Needs

Children with developmental delays or disabilities may face a variety of difficulties or obstacles in their play because of factors such as intellectual limitations or physical restrictions. One of the greatest difficulties is when the play itself becomes atypical in nature. For example, they may play with objects repetitively (eg, stacking blocks in the same way over and over again but not constructing anything per se) or nonfunctionally (eg, tapping a toy phone on the floor versus talking into it) or engage with toys at a significantly different developmental level than that of peers of a similar age (eg, 3 toddlers are having their toy dinosaurs chase one another, whereas a fourth is standing aside chewing on the toy dinosaur's tail). Furthermore, atypical behaviors among children with disabilities may themselves disrupt social interactions in addition to the play itself. These differences in developmental capacities are exhibited across domains,[3] and in turn, how children play with their toys may limit their ability to learn and develop maximally from parent-child and peer play opportunities.

The choice of toys may be especially complex for children with special needs given that recommendations on packaging are usually based on age and not developmental capacities. For instance, caregivers of children with special needs may be more likely to choose functional toys (eg, toys that are easily activated and often respond with lights and sounds)[33] over symbolic toys that encourage pretend play, creativity, and interactions (eg, toy animal farm).[34] Thus, caregivers of children with special needs may benefit from additional guidance from specialty therapists (eg, speech,

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occupational, or physical therapists) in choosing which toys, activities, and interactions are most appropriate for the developmental age of their child to ensure continued growth and skill mastery.

Adaptations of toys to accommodate a motor, visual, or other disability can be important for children with special needs. This can be accomplished by combining easy access with multisensory feedback,[35] such as light and sound when a toy is powered on. Examples of adaptations in design include Velcro strips to help a child hold a toy,[36] adding a piece of foam around a marker or paintbrush to make the art utensil easier to hold for a child with an inability to grasp the utensil independently,[37] and the use of a larger push button to activate a toy for a child with fine motor difficulties who cannot easily manipulate a small switch.[35] Technology has played a particularly important role in supporting the use of toys, and it is anticipated that the role of technology in addressing developmental interventions will increase over time with the guidance of research. As with children who are typically developing, children with special needs maximally benefit from play with toys in the context of caregiver interaction.

Toys can be used as a mode of incentive in the context of early intervention services and physical therapy more generally. For example, therapists often use toys to stimulate the use of a nondominant hand by placing the toy on that side of the body. Alternatively, using a toy as a reward may help elicit verbalizations in a child with a language disability. Novel or preferred toys can be held near an adult's face to encourage eye contact for a child with autism spectrum disorder.[38,39]

Toys and the Promotion of Parenting, Positive Caregiving, and Child Development

There has been a broad range of scientific- and policy-based efforts to enhance early development by promoting caregivers and children to play together with toys. These efforts are especially important for children growing up in poverty, for whom there is both reduced access to developmentally appropriate toys and barriers to caregiver-child interaction.[4,14,15] Such initiatives complement existing programs seeking to enhance early literacy within the pediatric medical home (eg, Reach Out and Read[40]). Efforts to promote play with toys have taken place across diverse platforms, including in (1) preschools (eg, Tools of the Mind[41]), (2) home visiting (eg, Parent-Child Home Program and Play and Learning Strategies[42]), (3) public health (eg, Building Blocks[29] and Blocktivities[43]), and (4) pediatric primary care (eg, Video Interaction Project[29]), to name a few. Findings from these programs strongly suggest that toys are most likely to facilitate developmental advances in the context of interactions[3] with and support by caregivers (including scaffolding and guided play rather than as a result of the toy itself[31]), early childhood educators, and other providers.[44] Pediatric health care providers' knowledge and awareness of these programs can inform anticipatory guidance to parents, provide opportunities for integration within the medical home enhancement, and function as potential sources of referral depending on availability within the communities they serve. Furthermore, the selection of toys offered to children should reflect the diverse and multicultural world we live in (ie, selecting dolls of various ethnicities in the pediatric office waiting area).[45]

ELECTRONIC MEDIA EXPOSURE AND PLAY WITH TOYS

A 2013 study revealed that 38% of US children younger than 2 years and 80% of 2 to 4 year-old children[11,46] have used a mobile electronic media device; this has more than doubled when compared with data collected in 2011.[4,11,32] More recent data presented in 2015 suggests that 96.9% of children have used mobile devices, and most started using them before 1 year of age.[47] For young children, the increase in screen time, which has evolved over the past decade, has taken place in association with a decrease in play, including both active play and play with toys.[11] This is especially significant for young children's development because screen time directly interferes with both play activities and parent-child interactions,[48] and even educational media is typically watched without caregiver input.[11,21,48] Furthermore, virtual toys (ie, screen games and/or applications) are increasingly designed to emulate and even replace physical toys. This potentially increases known risks of electronic media exposure, such as the promotion of aggressive behavior[49] and obesity.[50] The potential for these risks is especially great in the context of violence portrayed as humorous or justified, which can reinforce aggressive behavior and desensitize children to violence and its consequences.[51] Although it has been suggested that there may be learning benefits in association with interactive media,[46,52,53] there is presently no evidence to suggest that possible benefits of interactive media match those of active, creative, hands-on, and pretend play with more traditional toys.[4,9] In particular, children need to use their hands to explore and manipulate to strengthen those areas in the brain associated with spatial and mathematical learning.[54,55] Recent investigations have revealed that during children's play with electronic toys, there were fewer adult words, fewer conversational turns, fewer parental responses, and fewer productions of content-specific words than during play with traditional toys or books. Children, themselves vocalized

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less during play with electronic toys than with books.[8] Newer smartphone applications are focused on addressing the lack of social and physical interactivity; however, long-term risk and benefit studies are necessary to determine their actual impact and sustainability.[56] It is ironic that at a time when psychologists and other developmental scientists are recognizing the role of the body in learning, toys for children are becoming increasingly two-dimensional.[57]

ADVERTISING AND TOYS

A great deal of marketing in both traditional and new media is used to encourage caregivers to view technologically driven toys as critical for development. Such marketing has led to increasing exposure by children to enrichment videos, computer programs, specialized books with voice-recorded reading, and "developmental" toys beginning in early infancy.[4,58] It is important to note that claims for such toys on packaging and advertising are largely unsubstantiated[59–61] by credible studies, and thus, it is important for pediatric health care providers to aid caregivers in deciphering such advertisements.

Toys are also used extensively as a mechanism for marketing. For example, there has been a trend over the past decade of coupling food consumption with a toy incentive. Many fast food restaurants offer a toy incentive with particular meal purchases (many of which are energy dense and nutrient poor) to increase sales; such incentives are thought to have contributed to childhood obesity.[62] Promotions and incentives are an especially important consideration for children younger than 8 years, who are unaware that promotions and advertisements are actually designed to persuade them to have their caregivers buy specific products.[59] Recent initiatives at the federal (Federal Communications Commission and Federal Trade Commission) and local levels have sought and continue to develop regulations to guide and reduce such suggestive content in advertisements. One example is the US toy ordinance piloted in Santa Clara County, California, which prohibited the distribution of toys and other incentives to children in conjunction with meals, foods, or beverages that do not meet minimal nutritional criteria. This ordinance, in turn, positively influenced the marketing of healthful menu items with the toy incentive, and children then requested their parents to purchase the healthier meal options. The trial period provided data revealing the effects of marketing through toy incentives on children's food choices and, furthermore, the effects of their requests on the parental purchase of the meal.[62] The initiative was later expanded to similar changes in a number of major US cities (San Francisco and New York City).

TOY SAFETY CONSIDERATIONS

Government regulations, improved safety standards for the manufacture and use of toys, and product testing have made most toys safe when used appropriately for recommended ages and stages of development. However, just because a product is on the market does not mean that it is safe. In determining toy safety, the characteristics of the toy should be considered as well as how the toy might be used or abused and the amount of supervision or help needed for safe play. In a recent example of potential dangers, ingestion of high-powered magnetic objects (eg, rare earth magnets and strong permanent magnets) sometimes used in toys resulted in significant child morbidity.[63] Button batteries are ubiquitous as energy sources in electronic toys and have been associated with gastrointestinal hemorrhage and death when ingested.[60] The US Consumer Product Safety Commission (CPSC) Web site (www.cpsc.gov/) contains information regarding toy safety and can be a resource for pediatric providers and caregivers.[17,64] Two CPSC initiatives of particular relevance are SaferProducts (www.saferproducts.gov/), which allows anyone to report safety concerns, and the Recalls.gov Web site (www.recalls.gov), which provides information about safety recalls. In addition to physical safety characteristics, close attention should be paid to a toy's contact with harmful substances that may be used to treat its materials (eg, arsenic used to treat some wood products, lead paint, or chemicals such as bisphenol A[18]). *Caring for Our Children, Third Edition*, includes detailed information regarding potential hazards.[65]

TOYS AND THE OUTPATIENT PEDIATRIC SETTING

Toys provided in the waiting rooms of pediatric offices and other medical settings can serve as a model for caregivers and thereby aid in their decision-making about toys. Such toys can also help reduce child anxiety regarding visits and procedures. However, toys in pediatric settings also have the potential to become a vehicle for transmitting viruses and other pathogens among pediatric patients. Clear, easy-to-follow recommendations for the use and cleaning of toys in the pediatric office have been made by the Centers for Disease Control and Prevention and others.[66–69] For example, the sanitization of toys can be safely accomplished by washing with soap and water and then disinfecting by using a freshly prepared solution (1:100 dilution of household bleach; soak for at least 2 minutes) or by using an Environmental Protection Agency–registered sanitizing solution (according to the manufacturer's

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instructions) and then rinsing and air drying.[66–68] Toys should be cleaned between uses to avoid the transfer of infectious agents.[67] Also, caregivers can be given the option to bring their child's own toys for office visits to minimize the sharing and transmission of infectious disease. Although some available toys are marketed as incorporating antibacterial agents in their construction, it is important to note that such construction is currently unproven to be "antibacterial."[66] Further guidance of cleaning and disinfecting toys can be found in *Caring For Our Children, Third Edition*.[65] Although adequate infection control measures may seem daunting, recommendations tend to be straightforward to implement and should not be considered a barrier to the use of toys in the outpatient setting.

CONSIDERATIONS FOR PEDIATRIC HEALTH CARE PROVIDERS IN THE OFFICE SETTING

1. Advice regarding toys and/or play with toys can be offered together with guidance in 5 related areas: social-emotional development through social interactions, literacy promotion, block and puzzle play in relation to science and/or math and spatial skills, imaginative and creative play in relation to make-believe and/or free play, and electronic media exposure.
2. Pediatric health care providers can advise parents and caregivers regarding toys that are appropriate for young children in terms of stage of development, learning opportunities, and safety. For families for whom the literacy level of the caregivers is of concern, handouts with example toy pictures may be created by the practitioner.
3. If toys are available for children in waiting and examination rooms, they may be viewed as models for toys that are appropriate for the home.
4. Pediatric health care providers may choose to give parents information about developmentally appropriate toys, which are those that promote language-rich caregiver-child interactions, pretend play, physically active play, problem-solving, and creativity. Lists of appropriate toys can be found through many resources, including books, pamphlets from organizations such as Zero to Three, and instruments for assessment of the provision of toys in the home. Pediatric health care providers can also recommend books that provide guidance about interacting with children, including in the context of toy play to encourage language development (see Resources).
5. If pediatric health care providers make toys available in the office, they may consider whether they are safe for all children of all ages according to the following recommendations:
   - do not provide small toys or toys with easily dislodged parts that fit in an infant's or toddler's mouth;
   - do not provide toys with loose string, rope, ribbons, or cord;
   - do not provide toys with sharp edges;
   - do not provide toys that make loud or shrill noises;
   - provide only toys made of nontoxic materials;
   - always store toys safely and avoid toy chests with lids; and
   - be extremely cautious of toys with button batteries; ensure that they are not accessible to children so that they cannot be accidentally ingested.
6. Although pediatric health care providers can make toys available in their offices, those who do so should choose toys that are easily and routinely cleaned. When possible, each time a toy has been in contact with saliva or other bodily fluids, it should be sanitized.
7. Displaying notices in the office about product recalls of toys is important to inform parents of product dangers.
8. Take available opportunities to counsel caregivers regarding dangers associated with high-powered magnet toys as well as button batteries that are ubiquitous in electronic toys.

ADVICE FOR PARENTS AND CAREGIVERS

1. Recognize that one of the most important purposes of play with toys throughout childhood, and especially in infancy, is not educational at all but rather to facilitate warm, supportive interactions and relationships.
2. Scientific studies supporting a developmental role for toys primarily come from studies of activities in which children play with caregivers rather than alone. The most educational toy is one that fosters interactions between caregivers and children in supportive, unconditional play.
3. Provide children with safe, affordable toys that are developmentally appropriate. Include toys that promote learning and growth in all areas of development. Choose toys that are not overstimulating and encourage children to use their imaginations. Social-emotional and cognitive skills are developed and enhanced as children use play to work out real-life problems (see Zero to

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Three: Tips for Choosing Toys for Toddlers in Resources).

4. Make a thoughtful selection of toys and remember that a good toy does not have to be trendy or expensive. Indeed, sometimes the simplest toys may be the best, in that they provide opportunities for children to use their imagination to create the toy use, not the other way around. Choose toys that will grow with the child, foster interactions with caregivers, encourage exploration and problem-solving, and spark the child's imagination.
5. Use children's books to develop ideas for pretending together while playing with toys; use of the library should be routine for all parents regardless of socioeconomic status. A list of community library locations for the office should be considered.
6. Keep in mind that toys are not a substitute for warm, loving, dependable relationships. Use toys to enhance interactions between the caregiver and child rather than to direct children's play.
7. Seek the pediatric health care provider's advice in distinguishing between safe and unsafe toys (see Resources).
8. Be aware of the potential for toys to promote race- or gender-based stereotypes.
9. Limit video game and computer game use. Total screen time, including television and computer use, should be less than 1 hour per day for children 2 years or older and avoided in children 18 to 24 months of age. Children younger than 5 years should play with computer or video games only if they are developmentally appropriate, and they should be accompanied by the parent or caregiver. The use of media together with caregiver interaction is essential to minimizing adverse media effects on the young mind.
10. Seek out toys that encourage the child to be both mentally and physically active.

RESOURCES

• For information on toy safety concerns or questions, refer to the US Consumer Product Safety Commission Web site (www.cpsc.gov) and *Caring for Our Children, Third Edition*.

• For questions or concerns regarding infection control guidelines, refer to Centers for Disease Control and Prevention guidelines (http://www.cdc.gov).

• For guidance in identifying appropriate toys for young children, refer to the following resources:

1. Zero to Three, "Tips for Choosing Toys for Toddlers" (https://www.zerotothree.org/resources/1076-tips-for-choosing-toys-for-toddlers);
2. The National Association for the Education for Young Children (NAEYC) (http://www.naeyc.org/ecp/resources/goodtoys); and
3. StimQ (http://www.med.nyu.edu/pediatrics/developmental/research/belle-project/stimq-cognitive-home-environment).

• For suggestions on how caregivers can use toys, play, and other activities to encourage language development, refer to the following Web sites:

1. Too Small to Fail (http://toosmall.org/), and
2. Bridging the Word Gap (http://bwgresnet.ku.edu/).

• For a resource list of suggestions on toys, play, and recreation for children with disabilities, refer to the following Web sites:

1. The Northwest Access Fund Web site (http://washingtonaccessfund.org/toys-play-for-children-with-disabilities-resource-list/), and
2. How We Play! A Guidebook for Parents and Early Intervention Professionals. Birth through Two (https://eric.ed.gov/?id=ED447660).

• For information regarding the promotion of physical activity, refer to the following resources:

1. Let's Move (https://letsmove.obamawhitehouse.archives.gov/get-active), and
2. National Resource Center for Health and Safety in Child Care and Early Education (http://nrckids.org/index.cfm/products/videos11/motion-moments1/).

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ABBREVIATION

CPSC: Consumer Product Safety Commission

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