Stephanie Winterbauer

Screen Time in Early Care and Education Settings: Current Practices, Challenges, and Opportunities

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Capstone Advisors: Lina Pinero Walkinshaw & Cristen Harris

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Chapter I: Introduction

This project, titled Screen Time in Early Care and Education Settings: Current Practices, Challenges, and Opportunities, assesses the present state of screen time practices in Washington's Early Care and Education facilities ("ECE"); and identifies ways in which the Washington State Department of Health (DOH) can support adoption and implementation of screen time best practices.

Excessive screen time has been linked to several public health concerns however this project pays special attention to nutrition-related issues. The project focuses on the practices, perspectives, and needs of ECE providers through the following objectives:

1) Review and assess the research relating to associations between screen time and obesity.
2) Explore local and national screen time guidelines and current practices.
3) Analyze data from the Media Aware Child Care training survey with questions about screen and digital media knowledge, practices, and concerns.
4) Develop recommendations for DOH to support ECE providers' adoption and implementation of screen time best practices.

The ECE environment presents an opportunity to influence the health and well-being of young children across the state. Washington has roughly 5,400 licensed ECE facilities with a combined capacity for approximately 186,000 children.[1] Thus, ECE providers are uniquely poised to influence early childhood behaviors and long-term health outcomes for children across the state.

Nutrition Topic of Interest

This project focuses on the nutrition-related impacts of screen time in early childhood—namely, obesity. Obesity rates are rising globally, and Washington is no exception.[2] Between 2014 and 2016, obesity among adults in Washington rose from 26% to 29%.[3] Obesity is associated with increased risks of several debilitating chronic conditions. In addition to medical complications, high adiposity has been linked to psychological consequences and poorer

academic performance.[4] Unfortunately, methods for sustainable weight reduction are lacking. Therefore, obesity prevention is a public health priority.[5]

The burdens of obesity and related diseases are not shared equally across racial and socioeconomic groups; communities of color and people of lower socioeconomic status face higher rates.[6] In 2016, 12% of 2- to 4-year-old children in Washington receiving WIC services were obese.[3] The expensive and often debilitating conditions associated with obesity further exacerbate racial and socioeconomic inequities. High adiposity may also contribute to poverty cycles as obesity seems to have intergenerational impacts; overweight and obese parents are more likely to have overweight children. [7]

Screen time may contribute to the disproportionate distribution of obesity across racial and socioeconomic groups. Overall, the research to date supports a screen time-obesity association and suggests several potential mechanisms--including displacement of physical activity time, encouragement of poor eating habits, and impairment of sleep quality. The strength of the screen time-obesity association varies by screen time quality. That is, the content of digital media—not just the duration—may exacerbate or attenuate obesogenic effects. Additional study is needed to clarify these mechanisms and further understand the ever-evolving digital world. Higher rates of screen time are reported for children of lower socioeconomic status.[8] Moreover, specific mechanisms that influence the screen time-obesity association are more pronounced among certain racial groups. For example, targeted advertisements amplify the impact of screen time on diet quality; certain advertisements for energy dense snacks and sugar sweetened beverages are specifically directed at young, Black and Hispanic audiences.[9]

For all children, screen time is increasing.[10] No longer are the days of the single television set in the living room—screens have found a place in cars, restaurants, and learning environments, including ECE facilities. Encouraging ECE providers to follow screen time best practices may be one avenue for decreasing risk of obesity and related diseases. Additionally, standardizing screen time practices across ECE facilities may help minimize socioeconomic and racial inequities. By decreasing overall screen time, increasing physical activity time, and educating parents, ECE programs can mitigate the obesogenic potential of screen time.

By understanding current practices and identifying barriers to screen time recommendations, this project may increase provider and parent awareness of screen time best practices, and ultimately decrease child screen time and improve screen time quality. Improved school readiness may be an indirect implication of this project, as excessive screen time has been associated with impaired development, including cognition.[11,12]

Chapter II: Washington Department of Health Organization Overview

DOH receives federal and state funding for public health programs.[13] DOH is led by the governor-appointed Secretary of Health, who enforces public health-related laws and rules established by the State Board of Health.[13] The overarching mission of DOH is to "protect and improve the health of all people in Washington state."[13] With a vision of "equity and optimal health for all," DOH provides programs and services that promote healthy environments, prevent illness and injury, and educate the public on health and safety topics.[13] With the goal of making ECE programs safer and healthier, DOH, in collaboration with the partners listed below, provides trainings and resources to licensed providers.

Nourished and Active in Early Learning focuses on several areas of child health including nutrition, physical activity, breastfeeding, and media use.[14] Nourished and Active in Early Learning provides free online State Training and Registry System (STARS) credited training and education developed by DOH and the University of Washington's Center for Public Health Nutrition.[14]

Nourished and Active in Early Learning Key Partners:

- Department of Children, Youth and Families
- Department of Agriculture
- The Office of the Superintendent of Public Instruction
- The University of Washington's Center for Public Health Nutrition
- Child Care Aware of Washington
- The Childhood Obesity Prevention Coalition
- Seattle Children's Hospital

This project aligns with the DOH mission and vision. Specifically, the recommendations for DOH to support ECE programs, may improve ECE environments and, ultimately, child health and well-being.

Chapter III: Target Population

ECE Providers

ECE providers in Washington make up the target population of this project. In 2018, there were approximately 5,500 licensed or exempt ECE facilities in Washington.[15] There are three types of ECE programs: Family Home Child Care ("Family Homes"), Child Care Centers ("Centers"), and School-Age Child Care programs.[15] Family Homes function in the home of the provider and serve smaller groups of children, relative to Centers. Nearly two thirds of licensed ECE facilities are Family Homes, however, Centers have greater capacities and, therefore, serve the majority of children in the state.[15] The ratio of Family Homes to Centers varies by region.[15]

Family Homes and Centers tend to serve different populations. According to a 2016 national report, children from households of high socioeconomic status were more likely to attend Centers as their primary ECE arrangement compared to children from households of lower socioeconomic status. Family Homes tend to serve more non-White children, and families of lower socioeconomic status. The same 2016 report found that Hispanic and Native Hawaiian or other Pacific Islander children were less likely to attend Centers as their primary ECE arrangement the year before kindergarten.[16] A 2007 national study that included data from Washington, reported that Hispanic children, children from households with many siblings, children of mothers with lower education levels, and children of immigrants, were more likely to attend Family Homes compared to Centers.[17]

ECE programs are licensed through the Washington State Department of Children, Youth and Families (DCYF).[18] To maintain licensure, providers must follow foundational quality standards as described by the Washington Administrative Code.[19] Additionally, all licensed providers receiving state subsidy payments for non-school age programs are required to enroll in the state Quality Rating and Improvement System (QRIS), Early Achievers, and maintain a Level 3 rating (i.e., "Demonstrating High-Quality").[19] Non-subsidized providers may voluntarily enroll in the QRIS, and many do. As of 2018, nearly 71% of all licensed providers were enrolled in Early Achievers.[15]

Information about nutrition-related practices in ECE facilities is primarily collected through voluntary surveys. In partnership with the University of Washington's Center for Public Health Nutrition, DOH has conducted two Statewide Surveys on Nutrition and Physical Activity in Early Learning.[20,21] These surveys of ECE providers, conducted in 2013 and 2018, revealed important health information, including screen time and media use. Data from these surveys are referenced in Chapter IV of this report.

Children in Washington

Ultimately, this project aims to improve outcomes for children enrolled in ECE programs in Washington. Children in Washington represent various racial and ethnic backgrounds, and a range of socioeconomic statuses. Approximately 79% of Washingtonians are White, 13% are Hispanic or Latino, 10% are Asian, 4% are Black and just 1% are Native Hawaiian or other Pacific Islander.[22]

Washington state demographics vary widely by county and zip code. For example, roughly 49% of Yakima County residents are Hispanic, whereas 90% of King County residents are White.[23] In terms of socioeconomic status, an estimated 27% of the population in Whitman County experiences poverty, while poverty is estimated to affect just 9.5% of the King County population.[23] Relatedly, in Adams County, the percentage of people 25 years and older without a high school degree is three times that in King County.[23]

Rates of obesity and related health and social outcomes also vary by county. In 2018, an estimated 10.3% of Washington residents were food insecure (i.e., lacked consistent access to adequate amounts of nutritious food).[24] Children make up about one third of food insecure residents in Washington.[24] Obesity, which is associated with food insecurity, affects 3 in 10 adults in Washington.[24] Like food insecurity, obesity varies by region. In 2014-2016, relative to the state, obesity was lower among adults in wealthier, Whiter areas, like King County and San Juan County. In counties where incomes are lower, like Adams, Grant, Grays Harbor, Lewis, and Yakima obesity prevalence was higher. Overall, Black and Hispanic adults faced higher obesity rates compared to White adults.[3] Similar racial disparities exist among Washington youth.

Tenth graders who identify as Native Hawaiian or Other Pacific Islander, Hispanic, American Indian, Alaskan Native, or Black were more likely to be obese compared to their White peers.[3]

Race and wealth related health disparities must be considered in resource development. ECE providers' needs may vary depending on the communities they serve.

Chapter IV: Literature Review

This review seeks to clarify the link between early childhood screen time (i.e., time spent using screen-based technology like televisions, computers, and tablets) and obesity; and to understand how early care and education (ECE) providers can support child well-being through healthy screen time practices. The findings from this review will inform recommendations for the Washington Department of Health in support of their mission to promote screen time best practices in ECE centers. Four research questions guided this review: (1) Is screen time in early childhood associated with negative nutrition-related health outcomes? (2) What guidelines exist for screen time best practices in ECE settings? (3) What is the current state of screen use in early childhood and in ECE settings? (4) What are common barriers and facilitators of screen time best practices in ECE settings? Primary, secondary, and grey literature sources were used for this review.

Summary of Key Findings

- Screen time has been associated with obesity, inadequate sleep, and poor academic performance. Screen time may be a modifiable risk factor for obesity.
- The health risks associated with screen time are mediated by content, context, and duration.
- Within the ECE setting, child screen time is inversely related to total physical activity.
- In ECE facilities, the purpose of screen time ranges from child entertainment to administrative tools.
- Inconsistent screen time practices across ECE programs reflect inconsistent information, resources, and training.
- Knowledge, resource, and training gaps are barriers to ECE screen time best practices.
- Screen time-related training, technical assistance, and QRIS standards may promote ECE providers' adoption of and adherence to screen time best practices.

Introduction

Over the last few decades, digital media has exploded. From televisions to tablets, screens have become ubiquitous. In 2011, just 52% of US households had a mobile touch-screen device; in 2017 handheld screens had a place in 98% of homes.[25] Screens have become integral to nearly all facets of life, and digital literacy is a valued skill in the modern world.

In recent years, technological advancements like touch-screen interfaces have made digital devices more accessible to young children and infants.[25] Unfortunately, early screen time has been linked to a slew of developmental issues and long-term health impacts. For example, infants exposed to screens before they begin talking may experience delays in language development.[11] These delays may be due to structural impacts of screen time on the growing brain. A recent study using brain imaging revealed a correlation between increased screen time (i.e., screen time exceeding the American Academy of Pediatrics guidelines) and lower microstructural integrity of white matter tracts in prekindergarten children.[12] The structural changes were most prominent in the brain areas responsible for language and emergent literacy skills.

These negative cognitive impacts may be compounded by another consequence of excessive screen time: inadequate sleep.[26–29] Screen time has been associated with reduced sleep duration and perceived inadequate sleep in children.[26,27] In a 2019 systematic review of the association between screen time, physical activity, and sleep, screen time was associated with poorer sleep outcomes in infants, toddlers, and preschoolers.[29] In addition to diminished sleep time, screen use has been associated with more night awakenings and worse sleep stability in toddlers and preschoolers.[7] However, high quality studies on this topic are lacking.[7] Poor sleep may also disrupt cognitive development. A recent prospective study of children from infancy through age 7 revealed significant associations between insufficient sleep in early life and poorer executive- and social-emotional-functioning later in childhood.[30] Impairing sleep is one likely mechanism by which screen time may harm child development.

Early screen time may ultimately hinder school readiness by impeding language skill development and otherwise disrupting cognitive development. These effects are moderated by socioeconomic status; the association between screen time and school readiness is strongest

for Black and Hispanic children, and children in low socioeconomic groups.[8] Screen time, thereby, contributes to disparities in school readiness across racial and socioeconomic lines.[31]

Perhaps the most widely studied adverse effect of childhood screen time is an increased risk of overweight and obesity (adiposity). High adiposity is associated with elevated risks of many chronic diseases, like type 2 diabetes and heart disease, as well as overall mortality.[32] Adiposity rates are rising steadily among children and adults. Between 1999 and 2016, the prevalence of obesity among children in the US rose from approximately 14% to 18.5%.[6] While these upward trends affect all racial and ethnic groups, Hispanic and Black children and adults consistently face the highest rates of obesity and related diseases.[12] Additionally, the prevalence of obesity increases as socioeconomic status decreases.[12] Obesity tends to develop early in life and obesity-related diseases are life-threatening and nearly impossible to treat.[5] Therefore, prevention is preferred to treatment.[13]

As a modifiable risk factor, screen time has become a target for childhood obesity prevention. Screen time in early life can become habitual and is often predictive of screen time in adulthood.[33–35] In a systematic review of the tracking of sedentary behaviors from childhood or adolescence, Biddle et al found that overall, early sedentary behaviors, including screen time, were consistent with later sedentary behaviors.[15]

As screens become more accessible, experts recommend limiting total screen time at home and in the ECE environment. Most children spend several hours per week in an ECE program: 60% of children aged 3 to 5 years are enrolled in some form of preschool,[36]and young children (0 to 3 years old) who attend ECE programs are there for an average of 32 hours per week.[37] ECE professionals are uniquely positioned to influence the long-term screen time behaviors and habits of a large proportion of children.

Screen Time and Negative Nutrition-Related Child Health Outcomes

Screen Time-Adiposity Association

In the 1980's and '90's, hours of television viewing and childhood obesity rates rose in tandem, prompting a hypothesized link between screen time and adiposity.[38] One of the earliest studies to test this potential association was an analysis of datasets from the National

Health Examination Survey (now, National Health and Nutrition Examination Survey).[39] Screen time and adiposity data (i.e., hours per day viewing television and triceps skinfold equal to or greater than the 85th percentile, respectively) were taken from two survey cycles: cycle II (1963 to 1965), with subjects aged 6 to 11 years; and cycle III (1966 to 1970), consisting of subjects aged 12 to 17 years. Some of the children in cycle III had previously participated in cycle II. Thus, the researchers used both cross-sectional and prospective study designs. Results of both samples revealed positive associations between screen time and obesity.[19] In the prospective sample, screen time was the strongest predictor of obesity at follow-up. Controlling for past obesity and socioeconomic characteristics attenuated the relationship between screen time and obesity; however, the relationship remained statistically significant.[39]

Subsequent studies repeatedly revealed similar associations. In 1986, baseline body mass index (BMI) was collected for 6- to 11-year-old children enrolled in the National Longitudinal Survey of Labor Market Experience Youth Cohort (NLSY).[40] In 1990, researchers collected BMI again, along with screen time (hours per day spent viewing television). A strong dose-response relationship was observed between childhood television viewing and the prevalence and incidence of overweight at follow-up.[40]

More recently, the same association was observed in preschool children. A cross-sectional study using data from the 2009 to 2012 National Health and Nutrition Examination Surveys (NHANES) revealed a significant positive association between daily television viewing and obesity risk in children aged 2 to 4 years.[41] Specifically—after adjusting for age, gender, poverty status, race/ethnicity, and BMI category—children whose daily television viewing exceeded 2 hours were 1.58 times more likely to be obese than children who watched television for 2 or fewer hours per day.[41]

Screen time may also be associated with negative impacts on metabolic health, independent of weight status. Some observational studies have revealed correlations between increased screen time and elevated risk of hypertension, high cholesterol, insulin resistance, inflammation, and metabolic syndrome.[42] In one study of 3- to 8-year-old children, television viewing and total screen time was significantly and directly associated with systolic and diastolic blood pressure, independent of body composition.[43] However, studies on this topic are lacking

in number and results are inconsistent. For example, a recent study of the cardiometabolic effects of screen time on 3- to 6-year-old children revealed no significant associations between total screen time and total cardiometabolic risk scores. Additionally, no associations were found between screen time and individual risk factors (i.e., glucose, systolic blood pressure, triglycerides, waist circumference, and waist-to-height ratio), with the exception of a positive association between screen time and non-HDL cholesterol. The inconsistencies in results may be due to the limited time frame of these studies. Perhaps the cardiometabolic effects of screen time develop over many years and are, therefore, not captured in these short-term studies. More research is needed to confirm a relationship between screen time and metabolic health.

Several rigorous experimental trials have bolstered the screen time-obesity association—often by demonstrating the effectiveness of screen time reduction on changes in adiposity, physical activity, and/or diet. An early study in California investigated the effects of a screen time reduction intervention on third and fourth grade children.[44] Two schools were randomly assigned to either an 18-lesson, 6-month screen time reduction intervention or no intervention (i.e., the control). The intervention was intended to reduce screen time (i.e., television viewing, playing sedentary video games, and computer use). The children in the intervention group reported significant reductions in screen time and experienced reductions in adiposity (i.e., BMI, triceps skinfold thickness, waist circumference, and waist-to-hip ratio) compared to the control group. A 2-year trial of 4- to 7-year-old children yielded similar results.[45] Families were assigned to either a screen time reduction intervention or a control parenting intervention. Children who received the screen time reduction intervention experienced significant decreases in screen time (i.e., television viewing and computer use), energy intake, and BMI.

Potential Mechanisms: Displacement of Physical Activity

Several potential mechanisms for the screen time-adiposity association have been proposed and investigated. Generally, weight gain results from an energy imbalance: when energy intake exceeds energy output. Screen time, therefore, may impact weight status by increasing energy intake, decreasing energy output, or both.

As digital media becomes more pervasive, daily screen time increases may contribute to reductions in energy output through displacing physical activity. In fact, an inverse relationship between screen time and total physical activity has been observed in the ECE setting. A recent study found that within ECE centers in the US, more limited/supervised screen-time was related to higher total physical activity and lower sedentary time.[46] Interestingly, physical activity was inversely associated with computer access and positively associated with the use of educational screen-time compared with non-educational screen-time.

Outside of ECE settings, studies of this association are inconsistent.[27,28] These discrepancies may be explained by differences in the types of screen time and context in which the screen time takes place in childcare versus outside of childcare. Outside of childcare, mobile screens, for example, may be used during already sedentary activities (e.g., while riding in the car or during meals); whereas, active video games may take the place of another equally physical activity or even *add* to the child's total physical activity. In the ECE setting, educational screen time may simply replace another sedentary educational activity; while non-educational screen time, like watching a video, may displace physical activity (i.e., watching a movie versus outdoor play time on a rainy day).

Unfortunately, when screen time does displace physical pursuits, the harm of low physical activity may be compounded by independent impacts of screen time.[47,48] The relationship between screen time and obesity persists, even after controlling for physical activity. That is, screen time appears to have negative consequences independent from the impacts of low physical activity.

Potential Mechanisms: Diet Quality

Sedentary screen time, like watching television, has been linked to increased consumption of energy-dense foods and decreased consumption of nutrient-rich foods. In one European study of preschoolers, watching television for more than one hour per school day was associated with increased consumption of sweetened beverages, sugary desserts, salty snacks, meat, and potatoes; and decreased consumption of fruits, vegetables, and fish.[49] Conversely, the researchers found a positive association between spending more than one hour per day engaged in quiet play and consumption of fruits and vegetables. This study suggests that

compared to other sedentary activities, television viewing may be uniquely associated with negative health impacts.[49,50]

The associations between screen time and diet quality may be due, at least in part, to advertising. Many food brands advertise directly to children. A recent exploratory study of directed towards children aged 12 months to 5 years found that 129 of 135 apps reviewed (95%) contained at least one type of advertisement.[51] Additionally, youth-oriented advertisements disproportionately target communities of color.[9,52] In fact, a recent examination of the targeted TV advertising practices of restaurant, food, and beverage companies revealed that Black and Hispanic children viewed significantly more food-related TV advertisements than their White peers.[9] These differences are greatest for high-energy foods and likely contribute to the disparate rates of obesity and chronic disease across racial groups.

Randomized controlled trials suggest that advertising immediately and directly impacts preschool children's food preferences. In one study, 2- to 6- year-old children from a Head Start program in California viewed a popular children's cartoon either with or without commercials.[53] After viewing the videotape, children were asked to identify their preferences from pairs of similar products, one of which was advertised in the video. Children who viewed the commercial-embedded video were significantly more likely to choose the advertised items than those who viewed the commercial-free video. Acute exposure to advertising immediately impacted the children's food preferences. The impact of advertising on children's food preferences seems to be strongest among those who watch the most television. In a study of 6- to 13-year-old children, "high television viewers" were more responsive to food promotion messages than children with less television exposure.[54] The more exposure to advertising a child has, the more susceptible they become to the messaging.

The influence of advertising on preferences extends to actual consumption. Advertising for energy-dense products has been shown to increase children's consumption of energy-dense food and prompt the replacement of healthier, non-advertised products, especially among low-income families.[55]

Even in the absence of advertising, screen time may impact diet quality. Generally, overall caloric intake tends to increase with increased screen time (i.e., television watching). In

a systematic review of the non-advertising effects of screen-based sedentary activities on eating behaviors in children, adolescents, and young adults, Marsh et al concluded that screen time, even in the absence of advertising, was associated with increased intake relative to non-screen activities. [56] The mechanism for this effect is not yet understood, but may involve disruptions of physiologic signals of satiety, habituation to food cues, distraction, or impaired memory formation.[55,56] The studies on this have been somewhat inconsistent and findings seem to vary by age, gender, and weight status.[56]

For example, two similar studies explored the relationship between screen time and caloric intake in children aged 9 to 14. In one study, all subjects were boys and in the other, all were girls. In both studies, the children were randomized to drink either a glucose beverage or a Splenda-sweetened control beverage before being offered a meal in a room with or without a television.[57] Among the boys, both the glucose treatment and television viewing impacted energy intake: the glucose treatment reduced intake while television viewing increased intake. Additionally, the impact of the glucose beverage on energy intake was more significant in the TV-free condition (112%) compared to the TV environment (66%). Among the girls, there was no overall association between television viewing and food intake.[58] However, the glucose beverage was less effective at suppressing food intake in the television versus TV-free environment. Significantly different findings were observed between peri- and post-pubertal girls. This may be due to hormonal differences, as estrogen has regulatory effects on energy intake.[58] The results of these two studies suggest that television may increase caloric intake and that this effect may be greater among boys.

Television viewing may also influence energy intake in preschool children.[56,59] In one study, television viewing during lunch increased intake among children who normally eat during TV viewing, but decreased intake among those who normally did not eat during TV viewing.[59] The children who normally do not view television while eating may have been distracted by the TV, while children who regularly view television during eating may gradually become less sensitive to satiety cues. More research is needed to understand these contradictory effects. Regardless, a childhood habit of viewing television while eating is likely to carry into adulthood; and viewing television while eating in adolescence and adulthood has been associated with

higher energy intake.[56] Therefore, television viewing during meals in childhood may lead to higher energy intake in adulthood.

Potential Mechanisms: Sleep Quantity and Quality

In addition to the link between sleep and cognitive development, screen-related sleep disruptions may contribute to the screen time-adiposity association. Cross-sectional research consistently links screen time to adverse sleep outcomes in children and adolescents.[60] Poor sleep has, in turn, been associated with adiposity in young children.[61,62] The relationship between poor sleep and adiposity may be rooted in hormonal shifts and irregular eating patterns.

Inadequate sleep has been shown to alter the levels of two important appetite-regulating hormones: ghrelin and leptin.[63] Ghrelin and leptin work in opposition, promoting and suppressing food intake, respectively. In adults, poor sleep has been associated with increased levels of ghrelin and decreased leptin which may lead to increased caloric intake and, ultimately, weight gain. Interestingly, these hormonal impacts have been less consistent in children. An epidemiological study of school aged children indicated that chronically short sleep time was associated with reduced leptin levels.[64] However, in an experimental study of school-aged children, reduced sleep duration was associated with higher food intake, higher body weight, and *higher* fasting leptin levels (i.e., increased appetite suppression).[65] The observed increase in leptin may have been prompted by the weight changes. Leptin tends to fall with weight loss and rise with weight gain.[65] Additionally, the acute instances of poor sleep may have different impacts than chronic sleep deprivation.

Short sleep has also been linked to increased caloric intake and decreased diet quality. Aside from the potential hormonal shifts mentioned above, these links may be due to the increased energy expenditure associated with greater awake times, and/or increased opportunities for snacking outside of normal mealtimes.[63,66]

Finally, recent research suggests that sleep might modify the effects of obesity-linked genes.[67,68] That is, among those who are genetically predisposed to high adiposity, sufficient sleep may protect against obesity. Additional research, particularly in young children, is needed to clarify the role of sleep in the screen time-adiposity association.

Research Limitations

Early observational studies revealed associations between childhood screen time and adiposity. Subsequent randomized controlled trials have solidified this link, through demonstrating causality. However, this body of research has several limitations.

First, adiposity alone is not a reliable indicator of health status.[69] In fact, in adults, weight-neutral approaches to disease management and prevention are promising. [70] In a recent systematic review and meta-analysis, weight-neutral approaches to health were as effective as weight-centric approaches.[71] However, at the population level, obesity is linked to chronic disease and childhood obesity is associated with more severe disease risk in adulthood.[72] Early obesity prevention may, therefore, be an effective tool for preempting several chronic diseases.

Second, the etiology of obesity is multifactorial and complicated. The few studies that have yielded null results reflect this complexity. The negative impacts of screen time may be mitigated by other environmental, behavioral, and/or genetic factors.

Third, methodologies are inconsistent. For example, the definition of screen time is sometimes limited to television viewing and other times encompasses the use of all digital devices. When researchers adopt broad screen time definitions, they sometimes fail to distinguish between different types of screens in their analyses. This is problematic because studies that do distinguish between screen type suggest that not all screen time is equal.[29] For example, while television has consistently been linked to adiposity, similar associations are weak and inconsistent for computer and videogame screen time.[73] Relatedly, technology is constantly evolving, and technological advancements far outpace the research. As screen media changes, so do its applications and health impacts. Perpetually one step behind, even the most recent research fails to fully reflect contemporary technology and screen media use.

Finally, for both observational and experimental study designs, most screen time data have been obtained through self-report methods, which makes this research vulnerable to bias. Despite these limitations, the culmination of observational and experimental data provides strong evidence for a significant, positive association between childhood screen time and adiposity.

Screen Time Best Practices in ECE Settings

In response to the associations between screen time and poor health outcomes, the American Academy of Pediatrics (AAP) and the World Health Organization (WHO) established numerical screen time guidelines. The WHO recommends no sedentary screen time for infants less than 1 year old and no more than 1 hour for 2-to 4-year-old children.[74] Similarly, the AAP suggests no digital media (aside from video chatting) for infants under 18 months, avoidance of screens for children 18-24 months, and just one hour of "high quality" programming with caregiver engagement for children aged 2 to 5 years.[75]

These categorical guidelines, while appealingly straightforward, may be too simplistic for the increasingly complex digital landscape. As new devices and applications continue to develop, the quality of screen time becomes an important consideration. Screen time quality can be measured by the content (i.e., the type of programming) and the context (i.e., caregiver engagement).[76] Passive screen time, such as watching a movie or television, appears to be most strongly associated with negative health outcomes; whereas interactive forms of screen time, with caregiver engagement, may be developmentally or educationally beneficial.[77]

In light of the potential for negative impacts and the known benefits of non-screen based activities, ECE providers are encouraged to limit screen time altogether.[78] The Centers for Disease Control and Prevention (CDC) encourage screen time limitations in ECE centers as a method of obesity prevention.[79] The CDC refers ECE providers to the Caring for Our Children (CFOC) standards which limit screen time to 1 hour per day of educational or physical activity-related content (total exposure, for home and ECE) for children between 2 and 5 years old, and no screen time at all for children under 2 years old.

At the local level, Washington has codified similar screen time regulations specific to early learning providers. Screen time in childcare must be of high quality (i.e., developmentally appropriate, educational, and culturally sensitive), interactive, optional, and must occur outside of meal and snack times. In terms of quantity, screen time must be limited to no more than one hour per week, except when children are completing homework assignments. (WAC 110-305-6650 and WAC 110-305-6675).

The Current State of Screen Use in Early Childhood and in ECE Settings

Following these recommendations is difficult when digital screens are seemingly inescapable. Between the home and ECE environments, young children are often exposed to excessive doses of daily screen time.

Parents tend to rely on digital media as distraction tools. Screen time is reportedly used to occupy children while parents complete housework or rest.[80] In the home alone, young children are estimated to exceed the recommended screen time limits. A 2017 survey revealed that 2- to 4-year-old children spent, on average, 2 hours and 39 minutes with digital screens per day; more than two times the recommended upper limit for that age group (AAP).[10] Baseline data collected for the Pause and Play project, a study examining the influence of center policies and practices on children's physical activity and screen time, revealed similarly high numbers: an average of 5.1+/- 3.6 hours of screen time per day.[81] Importantly, screen time varies significantly across socioeconomic status and related factors. Specifically, screen time tends to be higher among children of lower socioeconomic backgrounds.[8,82,83]

As stay-in-place orders and day care and school closures are implemented to contain the spread of Covid-19, screen time is surging. One estimate places children's current daily screen time as 50-60% greater than pre-pandemic screen time.[84] Some of this excess screen time is likely beneficial during this unprecedented time. For example, Zoom-based classrooms and virtual visits with family members provide education and social stimulation. In fact, remote learning and FaceTime are often excluded from screen time definitions. However, the AAP still encourages parents to enforce media limits and follow best practices to protect child health and well-being.[85]

In the ECE setting, some early learning providers report using screens as educational tools and note that screen time is necessary for promoting digital literacy.[80] In many cases, children must be competent with technology to progress through the school system. Standardized testing, including elementary school placement tests are increasingly administered on a computer.[60] In Washington, for example, the paper-based Washington Assessment of Student Learning (WASL) assessment was replaced with the Washington Comprehensive Assessment Program (WCAP) which features a series of computer-based

tests.[86] Appropriate, high-quality screen use with adult support has been associated with some benefits in older children.[78] However, these benefits have not been consistently observed, particularly in children under 2.[78,87]

Results from the Washington State Survey of Nutrition and Physical Activity in Child Care reveal that screen time in the ECE setting is often not educational. This survey was conducted by the University of Washington Center for Public Health Nutrition in 2013 and 2018. Respondents included licensed child care centers and family home child care providers in Washington. Questions covered nutrition and physical activity practices and policies in child care programs. The questions in the 2013 survey focused on children aged 2-5 years, and the questions in the 2018 survey included children from infancy through age 5. Forty-three percent of Washington ECE providers surveyed in 2018 reported showing television for entertainment, and 23% report using screen time to encourage or reward good behavior.[21] Similarly, screens are sometimes used to occupy children during transition times. For example, a survey of ECE providers in Delaware revealed that television is commonly used to occupy children while staff tend to other tasks and during transition times like pick-up and drop-off.[88]

The quantity of screen time varies across different types of ECE programs. In a recent systematic review of the association between childcare arrangements and childhood overweight and obesity, Black et al identified higher screen time estimates for home-based relative to center-based programs.[89] Additionally, estimates of television viewing are higher among centers serving children of low socioeconomic status relative to centers serving children from high socioeconomic status.[90] These inconsistencies suggest that screen time can vary drastically from child to child. For example, a child from a low socioeconomic background attending a home-based ECE program may experience significantly more screen time than a child from a high socioeconomic background attending center-based childcare. Considering the screen time-adiposity association, these disparities may contribute to the disproportionate rates of adiposity and related illnesses across socioeconomic and racial groups.

Barriers and Facilitators to Screen Time Best Practices in ECE Settings

Despite clear national and international guidelines, survey data indicate that ECE providers face multiple significant barriers to implementing and adhering to screen time best practices.

Barriers: Knowledge and Understanding of Screen Time Recommendations

Both health experts and education professionals generally agree that screen time in childhood should be restricted to a limited amount of developmentally appropriate, supervised, interactive content. However, recommendations are not always consistent. Health experts tend to highlight the consequences of screen time while educators emphasize the potential benefits and importance of digital competence. In 2012, the National Association for the Education of Young Children (NAEYC) and the Fred Rogers Center released a position statement supporting the use of developmentally appropriate technology in early childhood.[78] The authors argue that screen time is not inherently harmful, and that the type of screen should be considered when developing guidelines. This position is not entirely aligned with the AAP screen time limits. While the AAP does note the importance of screen time *quality*, it primarily imposes categorical time limits.

Somewhat conflicting messages like these may cause confusion and burden ECE providers with determining which guidelines to follow.[25] In fact, the NAEYC suggests that the ECE provider is ultimately responsible for identifying developmentally appropriate screen activities.[78] Educators may lack the education, training, or resources to adequately weigh the harms and benefits of screen time and develop appropriate policies. Additionally, education and resource levels may vary across early learning professionals.[91] These differences are likely to contribute to inconsistent policies and disparities in screen time quality across ECE programs.

Many providers are altogether unaware of the details of local and national guidelines and recommendations. A recent survey by NAEYC found that only 53% of NAEYC members were familiar with the NAEYC/Fred Rogers Technology Statement.[92] Another recent study revealed that ECE providers were generally unaware of local and national screen time guidelines.[80] In fact, some providers felt it unnecessary to keep abreast of these guidelines because they

assume that their programs meet or exceed recommended practices. This lack of knowledge is reflected by the absence of formal screen time policies at ECE programs. Only 58.5% reported that their program has specific technology use policies; the remaining respondents either reported no policies, or that they did not know whether their program had a policy.[92] In Washington, about half of early learning programs surveyed reported having a written policy or written guidelines (54% of center-based programs and 47% of family home programs).[21] The other nearly 50% of programs reported either an informal policy, or none at all.[21]

Barriers: ECE Provider Experience and Training

ECE professionals' own technology experiences shape their individual attitudes and approaches to screen time.[93] Personal beliefs are, in turn, likely to influence how providers incorporate screens into the ECE setting. A variety of factors including provider age, educational background, and type of ECE program may influence screen time attitudes.[93] For example, younger ECE providers report more positive attitudes about the educational value of childhood technology use. Home-based providers, compared with center-based providers, are more likely to believe that children under the age of three should be exposed to technology.[93] Providers in Washington report a range of attitudes toward screen time in early care and learning settings. Of those surveyed in 2018, about half of the early learning providers believed that educational screen time is important to learning, while the other half either disagreed or could not decide.[21] Just under half of the providers surveyed reported that concerns about screen time were exaggerated. These reported differences in beliefs may result in differing screen time practices. For example, providers with overly positive attitudes toward technology may be less likely to set appropriate screen time limits.

Availability of training may also contribute to provider attitude. In recent years, ECE providers' report that access to technology has increased, but the amount of technology training they receive has not.[92] The Fred Rogers Institute and the Northwestern University Center of Human and Media Development conducted surveys of NAEYC members (including ECE administrators and educators) in 2014 and 2018. In 2014, 49% of ECE providers surveyed reported ever receiving professional development in educational technology, and in 2018, just 51% reported receiving such training.[92] ECE providers felt particularly under-supported in

finding and navigating media resources and appropriate content. In 2013, family home providers in Washington were more likely to be trained in screen time practices compared to center providers.[20] However, in both cases, screen time training was limited. Providers were especially under-trained in how to communicate with families about limiting screen time and developing program policies on screen time best practices.[20] In 2018, of those surveyed, only 15% of Washington early learning providers from Centers reported that they were required to complete trainings on how much screen time should be allowed and why limiting screen time is important.[21]

Staff that serve higher poverty children are less likely to receive adequate technology training.[94] Without sufficient training and support, ECE providers may choose devices and content based on their familiarity and/or accessibility rather than educational value. In fact, screen time quantity and quality differ across childcare type.[95] For example, the most common screen type used in home-based programs were television and DVDs, and the reported use of more educational screens like E-readers, smartboards and computers was relatively low.[92] In contrast, school-based programs (i.e., pre-Kindergarten programs within a formal K-12 school system) reported significantly greater use of computers and the internet compared to center-based, home-based, and Head Start programs.[92] Differences in screen time use across childcare types may reflect differences in staff attitudes and, relatedly, OBJ program resources for training and support. training and support.

Barriers: Resources for Non-Screen-Based Activities

In the ECE setting, non-educational screen time and total physical activity are inversely related. When screen time is high, physical activity time tends to be relatively low.[46] Therefore, barriers to physical activity may indirectly function as barriers to limiting screen time. For example, inclement weather, safety concerns, low staff-to-child ratios, and lack of materials may pose barriers to physical activity and, thereby, promote screen-based alternatives.[88] In Washington, lack of space and inadequate staffing may limit physical activity. In 2013, lack of (covered) outdoor and indoor play spaces was the most common challenge to providing physical activity reported by Washington ECE providers.[20] In 2018, 51% of centers in Washington had at least one unfilled position, which highlights staffing challenges.[96]

Facilitators: Licensing Regulations

In recent years, several states have updated ECE licensure requirements to address screen time. For example, in 2015, Louisiana implemented new licensing regulations to enforce screen time limits and require a written physical activity policy.[97] These requirements involved posting the state policy, providing more active play opportunities, and limiting screen-time. One-year post-implementation, surprisingly, overall physical activity decreased and sedentary behavior increased.[97] However, in centers where physical activity practices did improve (e.g., decreased screen-time), total physical activity increased. The greatest changes were observed among centers that engaged in the most informational events (i.e., a roundtable discussion and webinar). These results suggest that policy paired with opportunities for ECE provider engagement can promote change.

In South Carolina, a more robust policy change was implemented with the different, but related, intention of increasing child physical activity.[98] In addition to requiring a written policy, the new standards outlined, in detail, the amount of physical activity time, procurement of physical activity materials, and teacher training requirements. One year after the new policy was implemented, South Carolina ECE centers were compared to North Carolina ECE centers. Relative to North Carolina centers, the South Carolina centers significantly improved their Environmental Policy Assessment and Observation tool (EPAO) scores for practices aimed at increasing physical activity (although, actual physical activity time was not measured). Improvements were significant, but modest. The limited improvements may be due, in part, to insufficient provider training. Aside from introductions to the policy changes, no technical assistance or training was provided. While this case study did not involve screen time policy, the inverse relationship between screen time and physical activity within the ECE setting suggest that physical activity policy is one avenue for reducing screen time.[46]

These case studies illustrate how policy change can prompt changes in ECE center practices and ECE center practices can impact child wellness.

Facilitators: Training and Technical Assistance

The impact of even the most thorough policy is limited without ongoing training and technical assistance. Policy awareness among ECE providers is futile if they lack adequate support. Identifying specific alternatives to screen time and clarifying appropriate screen time content and context is a daunting task. Regular training can keep ECE providers informed of recommendations while technical assistance can encourage successful fulfillment of those regulations.

In 2010, Massachusetts revised their early education and care licensing standards to include physical activity requirements.[79] Specifically, all children in half-day programs must receive 30 minutes of daily physical activity, and children in full-day programs must receive 60 minutes of daily physical activity. A subsequent state survey revealed that despite knowledge of the licensing changes, providers lacked the time or resources to implement the new standards. The Massachusetts Department of Public Health (DPH) responded by collaborating with members of the Departments of Early Education and Care and Elementary and Secondary Education to create a free training program: Massachusetts Children at Play (MCAP). MCAP mentors helped early care and education providers implement the new licensing regulations. Additionally, MCAP mentors identified specific barriers and concerns that might otherwise be overlooked. The MCAP program has resulted in significant improvements in ECE settings including reduced screen time and increased physical activity time.

Lack of support is a common barrier to policy implementation. A study of ECE center directors in southwest Georgia investigated the barriers and facilitators to implementing a nutrition and physical activity pilot program.[99] A recurring theme across director interviews was the need for support in modifying nutrition and physical activity practices. Training, including information dissemination and introduction of new indoor physical activities, successfully promoted increases in physical activity. Additionally, procurement of material resources was invaluable: “We’ve got more stuff now, so whether it’s too hot or too cold or too rainy outside, we take it out and they can do it in the classroom.”[99]

The needs of ECE providers likely differs depending on their location, type of facility, and the community they serve. Targeted pilot programs are one way to understand and address the

unique needs of specific ECE facilities. The one-year nutrition and physical activity pilot program in Georgia targeted child care providers in the Southwest region of the state, where communities experience high rates of poverty and obesity.[99] All centers enrolled in the pilot participated in the United States Department of Agriculture Child and Adult Care Food Program (CACFP), a federal program that subsidizes meals and snacks provided by child care programs to low-income families.[99] Interviews following the pilot provided insight into the needs of ECE providers in that specific region. This information can aid the development of tailored resources. Additionally, policy and practices informed by the needs of communities that face the highest risk will arguably have the greatest impacts.

Toolkits have become a common resource for policy and best practice implementation. Various organizations have developed toolkits in the form of online trainings and printable packets to help guide screen time at home and in ECE programs. Screen time toolkits generally function to inform ECE providers of screen time regulations, offer tips for implementation (including alternative activities), provide self-assessment opportunities, and suggest additional references and resources. The National Resource Center for Health and Safety in Child Care and Early Education developed toolkit action sheets for various partners from licensing agencies to child care providers.[100] This approach ensures that all stakeholders receive consistent information as they work toward a common goal.

State-specific toolkits have been created in response to state-level surveys and evaluations. The Louisiana Screen Time Regulations Toolkit for Early Childhood Education Centers was developed following an evaluation of screen time regulation implementation.[97] This resource was specifically designed to address concerns voiced by Louisiana ECE professionals. The toolkit, therefore, responds directly to the specific needs of key stakeholders, like ECE providers and parents.

Effective training and technical assistance require communication with ECE providers and opportunities for ECE provider engagement. Gaps in provider knowledge require improved systems of information dissemination; training and technical assistance must be customized to meet specific ECE provider needs; and collaboration is necessary for developing appropriate toolkits.

Facilitators: Quality Rating and Improvement Systems

Quality rating and improvement systems (QRIS) are a common resource for ECE programs. QRIS are state-level rating systems intended to improve the quality of ECE programs. QRIS encourage ECE program quality and function as free information sources for participating ECE programs. Licensing and QRIS standards are typically closely aligned, however, licensing standards are firm requirements whereas QRIS participation may be voluntary. That said, QRIS exist in most states, and ECE participation is generally high.

With widespread participation and well-established infrastructures, QRIS present a viable opportunity for encouraging health-promotion measures, like screen time reduction, in ECE programs.[101] In fact, several states have embedded screen time standards in their QRIS.[102] As of 2016, Indiana, Maryland, Nebraska, New Mexico, New York, Oklahoma, Oregon, South Carolina, and Texas had implemented screen time QRIS standards.[102] For example, Oregon's QRIS includes a standard for "appropriate screen time use."[103] To achieve five stars for this standard, the ECE center must have a program policy on screen time and written description of how the program uses screen time with intentionality to achieve instructional goals.[103] Appropriate screen time is defined as screen time that is related to instructional goals, free of advertisement and brand placement, and limited to no more than one hour per day.[103] Similarly, Maryland's QRIS, EXCELS, instructs providers to develop a screen time policy limiting digital media to content that is directly related to facilitated learning experiences, and banning all digital media for children younger than 2 years old.[101]

In Washington, ECE provider subsidies are contingent upon participation in the state QRIS.[19] Screen time, however, is not currently included as an Early Achievers quality standard.

Including screen time reduction standards in QRIS can help streamline relevant information and may reduce the confusion around screen time best practices. Additionally, meaningful ECE technical assistance, including coaching and mentoring, is often offered through QRISs.[101,102] Thus, including screen time reduction in the QRIS may open the door for training and technical assistance opportunities. Additionally, incentives, including stipends, trainings, and awards, are essential to many state QRIS and can provide additional motivation for limiting screen time.[102]

Conclusion

Researchers and public health professionals struggle to keep pace with the constantly expanding world of digital media. At this point, the consequences of early and excessive screen time are not fully understood. However, associations between early screen time and several negative outcomes including harms to cognitive, behavioral, and physical health have emerged. Many of these impacts disproportionately affect children of color, are permanent, and far outweigh the limited evidence of any theoretical benefits. The potential harms of excessive screen time are broad ranging; thus, limiting screen content, context, and duration in the ECE setting is key to promoting academic success and long-term health.

Chapter V: Analysis of Statewide ECE Provider Survey Data

Data Analysis Methods

The Media Aware Child Care online training was developed by the University of Washington's Center for Public Health Nutrition. This training is offered at no cost to all Washington ECE providers, and provides STARS continuing education credit to licensed providers. The training includes information about screen time guidelines and best practices as well as links to relevant resources. Forty multiple choice and long-response survey questions are embedded in the training module. These questions are intended to assess providers' learning, explore their current practices, and identify concerns. The raw data analyzed in this project include responses to 14 of these survey questions submitted between June 2018 and December 2019.

The Screen Time and Media Use topical report from the 2018 Washington Statewide Survey on Nutrition and Physical Activity in Early Learning was also reviewed. 671 early learning programs (representing 297 Centers and 374 Family Homes) responded to this survey. DOH conducted this survey and authored topical reports with insights and recommendations. These data are also referenced in Chapter IV of this report.

Qualitative Analysis

Answers to 8 long-response questions from a random sample of 400 ECE providers make up the qualitative portion of this data analysis. The distribution of Center providers and Family providers in this sample was similar to that of the entire survey population (302 Center providers, 34 Family Home providers, 47 After School providers, and 17 "Other"). The long-response questions covered attitudes and beliefs about screen time, current screen time practices, concerns about best practices, and hypothetical scenarios (Table 1).

Responses to these questions were analyzed using an inductive approach.[104] First respondents were randomized. Each respondent was assigned a random number in Excel and then respondents were reordered from smallest to largest according to their assigned random number. Next, individual responses were perused and common themes were identified. Theme saturation was achieved upon reviewing . A few responses were provided in Spanish; these

were translated by the author of this project and verified with Google Translate, as needed. Next, themes were broken down into discrete codes. To test the rigor and replicability of the codebook, two coders independently coded three random responses per question. One code was adjusted based on the results of this code test (i.e., two codes were collapsed into one). The final code book includes eight codes related to providers' knowledge and beliefs, six codes related to providers' concerns or perceived barriers, four codes related to current ECE practices and three codes related to hypothetical next steps.

After developing and testing the code book, responses from a random sample of 400 ECE providers were coded using the quantitative and qualitative data analysis application, Dedoose. Multiple codes could be applied to each individual response. A few long responses were given in incomplete sentences or otherwise worded in a way that made them difficult to interpret. If the meaning was unclear, the respondents' responses to other questions were used for context. If the coder could not identify the respondents' meaning, the response was left uncoded and excluded from the sample. The final sample included 400 respondents.

Table 1 Media Aware Child Care training long-response questions

Category	Question
Provider Knowledge/Attitude	**Question A011:** What do you think? What are some ways appropriate technology and screen media could help foster children's learning and build skills for later in life? Write down some of your thoughts below:
Current Screen Practices	**Question A043:** How do children in my child care center interact with media? Is their screen time passive or more interactive? When do they use screen media in my childcare setting? How often and for how long? Do children use screens alone or with an adult?
Concerns about Best Practices	**Question A017:** What concerns do you have about meeting these best practices? Which practices are you most likely to do, and why? <u>Screen Time Best Practices for Child Care</u> • Screen time is limited to one hour per week or never offered. • If screen time is provided, it is rarely or never used to encourage desired behavior. • If TV or videos are shown, they are always free from commercials and advertising. • TV is rarely or never on where children can see it or hear it, even if they are not watching it.
Concerns about Best Practices	**Question A064:** What concerns do you have about having a screen and media use policy?
Concerns about Best Practices	**Question A066:** What concerns do you have about the strategies listed [below]? Which of these strategies are you most likely to use, and why? <u>In Child Care Settings</u> • Become a "screen free" program • Plan fun activities to replace screen time • plan ahead for challenging times • plan and select high-quality screen time in advance • teach children why it is important to limit screen time <u>Working with Parents</u> • Share information and resources about the effects of screen time and ideas of other activities • Host a "Screen Free" week challenge • Develop a policy or written set of guidelines for your program *(so parents stay informed? or are the guidelines to be followed at home?)*
Scenario	**Question 026:** Scenario 3 - Your parent organization comes to you asking that you start providing more opportunities for their preschool children to learn how to use computers and tablets. They feel these skills are important for their children to learn during this age and will help them once they get to school. One parent has even agreed to donate some tablets for your classroom. You want to meet the

	desires of your parents, but also do not want to negatively impact the children with too much screen time. What are steps you could take to provide quality experiences for your children with the new tablets? Where could you go for resources and guidance on how to use this technology in your program?
Scenario	**Question A067:** Scenario 1 - Lots of screen time with families You notice that many of the children in your care are using mobile devices and tablets when they get dropped off and picked up. Several talk about the show they are going to watch in the car on the ride home. What are things you could say or do to help inform parents about the effects of too much screen time?
Scenario	**Question A068:** Scenario 2 - Screens and babies One of your new parents comes to you asking for suggestions of quality shows and apps for her 8-month-old. What could you say to her?

Quantitative Analysis

Responses to 6 multiple choice questions and demographic data from all 2,517 respondents make up the quantitative portion of this data analysis. Of the six multiple choice questions, two tested knowledge of screen time recommendations, and four questions explored current screen time practices (Table A2). The quantitative data were analyzed using simple descriptive statistics. The rural-urban commuting areas system was used to categorize survey respondents as urban or rural based on their zip codes.[105,106] Additionally, a mixed methods approach was used to further assess the qualitative data based on quantitative characteristics, such as respondent demographics.

Results

Respondent Demographics

A total of 2,517 respondents completed the Media Aware Child Care training survey. Four hundred of these respondents were included in the qualitative analysis portion of this project, and quantitative data were assessed for all 2,517 respondents. The demographics of the qualitative sample was representative of the entire survey sample.

Most respondents (76%) reported that they currently work at Centers as opposed to Family Homes, or School-Age/After School programs (Table 2). Importantly, this breakdown is not reflective of ECE facilities in Washington—statewide, most licensed ECE facilities are Family Homes.[15] However, Centers serve roughly 66% of children enrolled in ECE programs.[15]

As shown in Table 2, most respondents identified themselves as teachers (assistant or lead). Roughly 13% of respondents were owners or directors; and 11% listed some other position (e.g., "floater"). The respondents represented a large selection of experience levels, ranging from less than one year to more than ten years, however most reported at least 3 years of experience (Table 2).

In terms of geographical distribution, the survey sample was relatively representative of statewide ECE facilities. Two thousand five hundred and seventeen survey respondents were located in 321 unique zip codes, 86.5% of which were urban. Additionally, though survey respondents were located in 34 of Washington's 39 counties, nearly one third of respondents reported zip codes in King County. This distribution is similar to the distribution of ECE facilities in the state. In 2019, about 2,036, or 37% of the state's total ECE facilities were in King County. Table A3 includes a breakdown of counties represented in the survey compared to facility distribution statewide.

Table 2 Media Aware Child Care training demographic breakdown

Respondent Demographics (N = 2517)	
Current Role	
Lead Teacher	44%
Assistant Teacher	31%
Director	7%
Owner	6%
Other	12%
Years of Experience	
0 to 2	23%
3 to 9	42%
10+	35%
Program Type	
Center	76%
Family Home	11%
School-Age/After School Program	9%
Other	4%

Qualitative Analysis of Media Aware Child Care Training Survey Data

Generally, respondents reported that limited screen time in early childhood can be beneficial to learning and development. Respondents indicated a basic understanding of guidelines but were less knowledgeable about specific best practices and resources. Regardless of current ECE practices, providers were generally not concerned with implementing best practices. Those who did report concerns were primarily worried about resistance from parents, staff or supervisors, and children. In the following sections, results are categorized by theme, including providers' attitudes and knowledge, current practices, barriers to best practices, and learning from the training module.

Provider Attitudes and Knowledge. Most respondents reported that screen time in childhood can be beneficial but should be limited. Respondents were most concerned with limiting the duration of screen time and least concerned with controlling the setting in which screen time takes place. Eighty-four percent of respondents suggested that screen time should be limited in duration; 71% indicated that the quality of screen time (e.g., content) should be limited; and 33% reported that the context of screen time should be controlled (e.g., adult supervision/engagement). Eighty six percent of respondents indicated that screen time can promote learning and development. Providers listed school readiness; cognitive, social-emotional, and motor skill development; and familiarity with technology as potential benefits of childhood screen time.

Respondents highlighted the value of screens as teaching tools. Screens, some noted, allow providers to show children people, places, or things that cannot be brought into the classroom. The internet and documentary videos were identified as tools for deeper exploration of specific topics.

Fifty respondents (13%) indicated that they believed screen time is important for digital literacy. Generally, these respondents expressed that digital literacy is an asset in the modern world. A few respondents wrote about digital literacy in relation to school readiness, suggesting that screen exposure in early childhood prepares children for elementary school. Provider attitudes about digital literacy seemed to vary based on location. Specifically, digital literacy

was more of a concern for providers with urban zip codes: approximately 13% of respondents from an urban area discussed digital literacy compared to just 8% of rural respondents.

> *"In an age where most jobs/careers will involve some kind of technology use I think that it is important for children to develop skills that will aid in that."* – *After School Program Lead Teacher, King County*

> *"In older preschoolers, they aren't being prepared for kindergarten, who uses screens all the time in education."*
> – *Unspecified Program Type Lead Teacher, Clark County*

> *"We are already here, in the age of technology. Screens are now essential to everyday life. Students are now taking standardized tests on iPads and telling time only on digital clock. I think the use of screen media will definitely help prepare children for what they will be faced with as adults and will make them tech savvy."*
> – *Center Director, King County*

Current ECE Practices. Providers reported using screens and digital media in limited amounts. As explained in the sections below, reported uses for screens and digital media ranged from administrative tasks to entertainment.

Screen duration is limited. Many respondents reported that under their care, children never interact with screens or other digital media. Nearly half of the respondents indicated that their program was currently screen-free. Respondents in urban zip codes were slightly more likely to be screen-free compared to respondents with rural zip codes (50% and 40%, respectively). Respondents from Centers and those from Family Homes equally discussed being screen-free (47% for both).

Nearly all of those that did report use of screens indicated that digital media was used sparingly and tended to be interactive, educational, and supervised. Different providers had different parameters for limiting media time. For example, one provider referred to their media use of 20-30 minutes per week as "extremely limited." Another respondent reported not using screen time "much" and only allowing pre-kindergarten children to view about 10 minutes of screen time per day.

Screens are used for administrative purposes. Some providers who reported being screen free also reported using digital media for administrative purposes (i.e., recording attendance, naps, etc.). Additionally, some reported that this screen use often occurred in front of the children. One provider also indicated that their tech-based system of information logging can pull their attention away from the children for unnecessarily extended periods of time.

Screens are used for educational and entertainment purposes. Examples of digital media use included taking photographs, singing, dancing, or movie-viewing. Depending on the specific content and context, these media-based activities may be either educational or purely entertaining. Providers reported using digital media, especially videos, during transition times "to keep [children] occupied," or on special occasions. For example, one provider shared that they use screens: "right before lunch if they have to wait for meal prep." Another provider explained that screens are used "if there is a transition period where we might be listening to music/watching a video."

Of 400 respondents, 59 (14%) reported that their program used screens for entertainment. This was more frequently true for respondents from rural versus urban zip codes; 23% of rural respondents used screens for entertainment, compared to just 14% of urban respondents. A similar difference was observed for respondents from Family Homes versus Centers; 22% and 15%, respectively.

These findings did not align with results from the 2018 Statewide Survey where a significantly greater proportion of respondents, 43%, reported showing television for entertainment.[21] This discrepancy may be due to limitations the quantitative data gleaned from the 2018 Statewide Survey. The Media Aware Child Care training survey long-response questions allowed for nuanced reporting of screen use. Alternatively, entertainment-based screen time may be underreported in the Media Aware Child Care training survey, as the long-response format did not require the respondent to explicitly state whether they use screens for entertainment.

Provider Concerns Regarding ECE Screen Time Best Practices. Several respondents indicated at least one concern about implementing screen time best practices. The sections below expand on the most common concerns and barriers as well as differences based on respondent characteristics (e.g., directors versus teachers).

Staff, parent, and child resistance. Nearly one quarter of the respondents reported at least one concern about implementing screen time best practices. The most common concerns were about resistance from various stakeholders. Respondents were primarily worried about parent resistance, followed by staff/supervisor, and child resistance. Practical concerns, like identifying or planning alternative activities, and procuring appropriate digital content, were not common concerns among this sample.

Among teachers (lead and assistant), parent resistance and staff/supervisor resistance were the most common concerns. Among directors and owners, the two primary concerns were parent resistance and child resistance. Teachers, directors, and owners worried that parents' screen time practices at home would not align with recommendations and would undermine ECE screen time best practices. Additionally, some respondents expressed hesitation about educating parents on the topic of screen time.

> *"I worry about the population I serve and how families would receive this information."* – *Center Lead Teacher, King County*

> *"What concerns me is the parents don't back us up and do the same."* – *Center Assistant Teacher, Franklin County*

Lack of knowledge, training, or information. Lack of relevant knowledge, training, or information was another barrier to ECE screen time best practices. Many respondents either directly or indirectly revealed a knowledge gap that would presumably interfere with adherence to best practices. For example, several respondents stated incorrect screen time guidelines in response to the scenario question that asked respondents how they would advise a parent about screen time for an 8-month-old (see question A068 in Table 1). Many responses also indicated a lack of resources for additional information. For example, when asked where the respondent could go for resources and guidance on how to use tablets in their program (see question A067 in Table 1), several respondents replied "Google" or "the internet." Others listed the Media Aware Child Care training as their only resource. Only 24 out of 400 respondents (6%) listed a specific outside resource. Roughly 40% of the respondents reviewed indicated a lack of knowledge, training, or information.

Concerns and barriers by facility type. Overall, providers from Family Homes were more likely to report concerns or perceived barriers to implementing ECE screen time best practices compared to providers from Centers (30% and 22%, respectively). Compared to Centers, providers from Family Homes were slightly more likely to report all concerns except for staff/supervisor resistance (see Table 3). For all providers, parent resistance was the most common concern. A small number of providers from Centers and Family Homes reported difficulty identifying or accessing child-appropriate, commercial-free media and lack of resources needed for screen-free activities; whereas no providers from School-Age/After School programs reported these concerns.

Table 3 Concerns and perceived barriers to screen time best practices

Concern About Implementing Best Practices	Center-Based Providers Who Reported a Barrier (N=302)	Family Home-Based Providers Who Reported a Barrier (N= 34)	School-Age/After School Program Providers Who Reported a Barrier (N=47)	Other Providers Who Reported a Barrier (N=17)
Parent Resistance	10%	12%	21%	18%
Staff/Supervisor Resistance	5%	3%	2%	0%
Child Resistance	2%	6%	9%	6%
Lack of Resources for Screen-Free Activities	3%	6%	0%	6%
Difficulty Procuring Commercial Free or Appropriate Content	2%	3%	0%	0%

Providers' Learning from the Media Aware Child Care Training. The scenario questions included in this analysis were intended to assess provider learning. Generally, responses to these questions reflected the material presented in the training. For example, in response to a scenario question in which a parent asks the provider for screen suggestions for her infant, many respondents referenced the AAP guideline for infants under two years old. Similarly, responses to a scenario question asking how the provider could encourage parents to limit screen time at home often included strategies from the training (see question A026 in Table 1).

Responses to these scenario questions also provided insight about respondents' attitudes and current ECE practices. For example, in response to the scenario question wherein a parent offers to donate tablets, many providers stated that they would reject the tablet donation because they are a screen free program (see Table 1). In response to scenario questions that prompted advising parents, several providers expressed discomfort with educating parents, and worried about parent resistance to best practices (see questions A067 and A068 in Table 2).

Quantitative Analysis of Media Aware Child Care Training Survey Data

Among those surveyed, knowledge of screen time recommendations was high—75% of respondents correctly indicated that children younger than 18 to 24 months should avoid digital media use. Knowledge of recommendations for 2 to 5-year-old children was slightly higher—84% of respondents selected the correct recommendation of no more than 1 hour per day, or a recommendation of less than 1 hour per day. Knowledge of screen time recommendations for children younger than 18 to 24 months was higher among Center providers as compared to Family Home providers; and knowledge of recommendations for children aged 2 to 5 years was higher among Family Home providers as compared to Center providers.

Current ECE practices generally aligned with provider knowledge. A large majority of providers reported meeting screen time best practices; 83% reported limiting screen time to 1 hour or less per week and 82% report only showing commercial-/advertisement-free content. However, for many, these practices were not formalized. Just 60% of respondents reported that their program had a formal screen use policy.

Providers from Centers reported higher compliance with screen time recommendations compared to providers from Family Homes. Eighty two percent of providers from Centers reported that screen time was limited to one hour per week, or never offered, while this was true for just 59% of providers from Family Homes. Similarly, 79% of providers from Centers compared to 62% of providers from Family Homes reported that screen time was always commercial-free.

Overall, knowledge of recommendations was relatively high among all providers, however, ability to abide by these recommendations seemed to vary by facility type. Family Home providers reported lower adherence to recommendations compared to Center providers.

*Table 4 Media Aware Child Care Training multiple choice questions (correct answers to knowledge questions indicated with a *)*

	Question	# (% total respondents)
Knowledge	A047 What are the recommended screen time limits for children younger than 18 to 24 months?	n = 2517
	Avoid digital media use*	1884 (75%)
	Limit screen use to 30 minutes a day	415 (16%)
	Limit screen use to 1 hour a day	78 (3%)
	Limit screen use to 2 hours a day	140 (6%)
Knowledge	A048 What are the recommended screen time limits for children 2 to 5 years of age?	n = 2517
	Avoid digital media use	250 (10%)
	Limit screen use to 30 minutes a day	1363 (54%)
	Limit screen use to 1 hour a day*	499 (20%)
	Limit screen use to 2 hours a day	405 (16%)
Practices	A016 How likely are you to meet the Screen Time Best Practices for child care listed above?	n = 2517
	Very likely, I already do most or all of these best practices	2018 (80%)
	Very likely, I am committed to making this happen	348 (14%)
	Somewhat likely, I have some concerns	74 (3%)
	Not likely, I have too many concerns	17 (0.7%)
	Not likely, I do not agree with these best practices	14 (0.5%)
	Other	46 (1.8%)
Practices	A049 Best Practice: Screen time is limited to one hour per week or never offered.	n = 2517
	Yes, fully meeting this best practice	2092 (83%)
	Making progress on meeting this best practice	332 (13%)
	Ready to get started on meeting this best practice right now	66 (3%)
	Unable to work on meeting this best practice right now	27 (1%)
Practices	A055 Best Practice: If TV or videos are shown, they are always free from commercials or advertising.	n = 2517
	Yes, fully meeting this best practice	2059 (82%)
	Making progress on meeting this best practice	347 (14%)
	Ready to get started on meeting this best practice	83 (3%)
	Unable to work on meeting this best practice	28 (1%)
Practices	A063 Do you have a written policy on screen use in your child care program?	n = 2517
	We do not, but I think it would be beneficial	559 (22%)
	I am not sure how having a policy would reduce screen use	150 (6%)
	I am not sure what to include in an official screen and media policy	134 (5%)
	We already have a policy that includes SOME of the standards/goals presented in this training	543 (22%)
	We already have a policy that includes ALL of the standards/goals presented in this training	947 (38%)
	Other	184 (7%)

Discussion

The data from the Media Aware Child Care training survey questions suggest a general consensus among ECE providers, that screen time content, context, and duration should be limited, to some degree. However, definitions of "limited" vary from provider to provider, particularly regarding screen time duration. The survey questions revealed a small knowledge gap about AAP screen time guidelines. However, most respondents indicated that their current practices align with recommendations. Only 60% of respondents reported having a formal written screen and media use policy, and only 60% of those have a comprehensive policy in line with all the best practices presented in the training. This lack of formal policies may be related to the primary concerns about meeting best practices: parent, staff, or child resistance. Without the support of a written policy, best practices may be difficult to enforce in the face of resistance.

The data analyzed in this project revealed differences in screen time practices in Family Homes versus Centers. Family homes, for example, were more likely to use screens for entertainment. Providers in urban settings, where Centers predominate, were more likely to be screen free. These differences may exacerbate racial and socioeconomic health disparities. Compared to Centers, Family Homes are more likely to serve communities that already face an increased risk of obesity and related health outcomes.

Limitations

A few key limitations of these data should be noted. First, neither the Media Aware Child Care training survey sample nor the 2018 Statewide Survey sample is representative of ECE providers in Washington. Statewide, Family Homes outnumber Centers; yet three quarters of the training survey respondents and just under half of the 2018 Statewide Survey work at Centers. The relatively low response rate from Family Home providers limits the generalizability of the results, and highlights the question of accessibility – are Family Home providers less aware of trainings? Further exploration is needed to understand why Family Homes provider participation was relatively low.

Second, respondents did not indicate their ECE program and, therefore, the actual number of programs represented is not known. Multiple individuals from the same ECE program likely responded to the survey (for some counties, the number of respondents is greater than the number of ECE centers, see Table A3).

Third, several participant responses did not align with their corresponding question. This appeared to be due to language barriers and the phrasing of certain questions. For example, some responses were provided in Spanish or otherwise appeared to indicate a language barrier. Additionally, the phrasing of one question which asked respondents to list some ways that "appropriate technology and screen media could help foster children's learning" led some respondents to mistakenly interpret the question as pertaining to foster children (see question A011 in Table 1).

Finally, some responses to long-response questions were difficult to interpret and code (specifically, questions A017 and A066 in Table 1). These questions asked the trainee to list concerns about practices and identify practices they are likely to do. Some respondents simply listed a practice, without prefacing it as either concerning or likely for them to do. For example, one respondent answered with the following, "limiting screen time fully." Another respondent answered question with "Well the one that says we should have more activities to do for the kids." These responses could not be coded.

Chapter VI: Recommendations

1. Collaborate with the Washington State Department of Youth, Children and Families

The Washington State Department of Youth, Children and Families provides key resources to ECE providers. Providers primarily interact with this agency through the licensure process and through participation in Early Achievers. Providers' familiarity with DCYF was evident in the Media Child Care Aware training survey responses; several providers listed the DCYF and Early Achievers webpages as resources. The partnership between DCYF and DOH is critical to several of the following recommendations.

2. Incorporate screen time practices in Early Achievers standards

Collaborating with the Washington State Department of Children, Youth and Families to incorporate screen time practices into Early Achievers may help standardize screen use across ECE programs. Early Achievers is a pre-existing system with the potential to influence ECE providers across the state. Early Achievers is accessible to providers from various learning settings, including Centers and Family Homes, and participation is high. In 2018, just over 70% of licensed ECE programs were enrolled in Early Achievers.[15] Incorporating clear screen time best practices into Early Achievers could potentially minimize differences in screen use between ECE programs and, ultimately, mitigate obesity disparities. Incorporating screen time practices into Early Achievers would ensure that the same information reach all (enrolled) providers.

The survey results also revealed that even when a policy exists, it is not always enforced. Incorporating screen time practices to Early Achievers standards may increase policy adherence by adding a level of accountability.

3. Make screen time information and tools widely accessible

Create clear online sources for all screen time recommendations, easily accessible for both Center and Home providers. The Early Achievers website is a compelling option for a streamlined approach to information and resource access. A majority of ECE providers are already enrolled in Early Achievers and familiar with Early Achievers resources. In fact, when asked what resources they would turn to for screen time guidelines, some respondents listed

"Early Achievers." This recommendation would require partnering with the agency behind Early Achievers, the Washington State Department of Children, Youth and Families.

The DOH website is another logical place for resources. Ideally, the same information would exist on the Early Achievers website and one other location to ensure that those not enrolled in Early Achievers have equal access to information. Creating a couple "one-stop-shop" resource sites may increase accessibility of information and simplify updates as screen time research and related recommendations continue to evolve.

The Media Aware Child Care training survey revealed a lack of informational resources among providers. When asked what resources respondents would reference for additional screen time guideline information, many replied with non-specific answers (i.e., "Google" or "the internet"), or referred to the Media Aware Child Care training and/or resources embedded in the training. Rare was the respondent who identified a specific resource. These findings present the opportunity to create one space to house all screen time related information and tools.

4. Offer trainings in multiple languages

Develop Media Aware trainings in multiple languages and increase outreach to and training awareness among Family Home providers. While the majority of ECE providers in Washington speak English, non-English responses to the Media Aware Child Care training survey suggest a demand for translated materials.[15] Spanish, Somali, and American Sign Language are the most common languages among non-English speaking providers in Washington.[15] However, there are also small populations of providers who speak Russian and Ukrainian.[15] To ensure equal access to information, trainings and related materials should be provided in multiple languages--or should be made available upon request. Several Early Achievers materials are available in Spanish and Somali. Perhaps Collaborating with Early Achievers may be one strategy for developing translated materials.

Outreach efforts to Family Homes should be increased. Providing translated materials may help with this. Almost all of the estimated 7% of child care providers who do not speak English are Family Home providers located in Central and Eastern Washington.[15] Another

strategy to improve Family Home provider participation in the Media Aware training is to offer trainings specific to the Family Home provider.

5. Develop age-range-specific trainings

A large majority of the Media Aware Child Care training survey respondents reported a strong interest in additional online training modules. The Media Aware Child Care training provides a comprehensive overview of screen time in childhood. However, the nuanced recommendations may lend themselves to a series of more focused trainings. Age-based trainings could dive deeper into recommendations specific to different developmental stages. Appropriate methods for promoting digital literacy, for example, might be introduced in a training that covers screen time practices for older children; whereas alternatives to screen time could be explored more thoroughly in a training geared towards providers who serve toddlers.

6. Provide technical assistance for policy development and implementation

The paucity of formal screen and media policies reported in the Media Aware Child Care training survey presents an opportunity for technical assistance. ECE providers may benefit from guidance for writing a screen time policy. This technical assistance could take the form of a virtual training (i.e., a virtual policy-writing workshop), or a simple fillable template document (ideally available in multiple languages).

Assisting providers with screen time policy development may also address their primary concerns about parent, supervisor, and child resistance to best practices. A written policy shared among staff and families would keep all parties informed and may reduce resistance. Additionally, providers can refer to their program's policy in response to screen time related questions and concerns.

7. Gain a more comprehensive understanding of ECE provider needs

To be most effective, educational resources should reflect the unique needs of ECE providers. The data included in this project provide some insight into provider need, however, additional information is needed to inform effective trainings and resources.

The data from both the Media Aware Child Care training survey and the 2018 Statewide Survey revealed differences in needs depending on facility type and location. The different practices reported by Family Home versus Center providers may suggest differences in provider attitudes, knowledge, or resources based on ECE type. For example, the fact that providers from Family Homes were more likely to report use of screens for entertainment may reflect a lack of resources, like low staffing.

Targeted surveys, focus groups, and pilot programs are potential strategies to help DOH gain a more comprehensive understanding of provider needs. Survey questions should be developed with the specific goal of identifying needs. Questions should be stated clearly in plain language. Questions intended to identify concerns should be separated from questions about current practices or likely practices. Multiple choice questions may be the best option for minimizing confusion among respondents and simplifying analysis. Subsequent focus groups could dive deeper into the nuances of provider needs. A small-scale pilot program could help DOH further understand the depth of ECE provider needs and the practicality of best practice implementation.

Chapter VII: Project Summary

This project is focused on the public health nutrition issue of obesity in relation to screen time among young children in Washington. Addressing screen time practices in ECE programs has the potential to decrease overall child screen time, improve screen time practices at home, and, ultimately, impact health outcomes for children across the state. A literature review was conducted to understand the screen time-obesity association, screen time best practices, and current screen time practices in ECE programs. Additionally, the 2018 Statewide Survey results were reviewed, and training questions were analyzed to understand the screen time experiences and perspectives among Washington ECE providers.

The project findings informed recommendations of how DOH can support ECE adoption and implementation of screen time best practices. These recommendations consider the diversity of ECE providers and the children they serve, and the interplay of social determinants of health.

Recommendations:

1. Collaborate with the Washington State Department of Youth, Children and Families
2. Incorporate screen time practices in Early Achievers standards
3. Make screen time information and tools widely accessible
4. Offer trainings in multiple languages
5. Develop age-range-specific trainings
6. Provide technical assistance for policy development and implementation
7. Gain a more comprehensive understanding of ECE provider needs

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Appendix

Table A1 Media Aware Child Care Training Questions Code Book

Theme	Sub-Theme	Code	Description	Key Words & Example
Knowledge and Beliefs				
	Childhood screen time is beneficial	1. Screen time can promote child learning and development	Respondent indicates that childhood screen time can be helpful to the child's learning and development (i.e., cognitive, social-emotional, and motor skill development). Respondent indicates that screen time can supplement a lesson or allow the teacher to expose the child to otherwise inaccessible people, places, or things.	*"It will help in improve literacy, cognitive and social skills for the children." (A011)* *"Shows like 'Mr. Rogers' promote self-regulation skills and decrease fear of new situations." (A011)* *"Better hand-eye coordination." (A011)* *"Something that will help their understanding of what they may be learning about." (A011)*
		2. Screen time in childhood is important for digital literacy	Respondent indicates that children should be exposed to technology to learn to navigate the digital world. Mention of the ubiquity of screens in schools and jobs as well as the importance of teaching appropriate	*"Familiarizing them with tech that is widely used." (A011)*

			technology uses/skills align with this code.	
	Awareness of screen time best practices	3. Screen content should be limited	Respondent indicates that screen content should be regulated (e..g., interactive and educational versus passive and entertaining)	*"High quality technology that is not over-stimulating does have some benefits. It should never replace hands-on learning." (A011)*
		4. Screen time duration should be limited	Respondent indicates that the amount of time spent viewing screens should be limited. This code includes age-based limitations (i.e., no screen time under a certain age).	*"Short amount of time." (A011)* *"I do not believe children younger than 3 should have any screen time." (A011)*
		5. Screen time context should be controlled	Respondent indicates that screen time is appropriate only within certain contexts, e.g., not while eating and with adult supervision.	*"Supplement an interactive in person activity." (A011)*
	Childhood screen time is harmful	6. Screen time disrupts learning, development, or health	Respondent indicates that childhood screen time can be harmful to the child's learning,cognitive, social-emotional, or physical development; and/or health outcomes (e.g., poor sleep, diet, physical activity).	*"Limit screen time 30 minutes a day for children because it can cause children to not sleep correctly and can affect their bodies if they eat unhealthy foods." (A067)*

		7. Non-screen-based activities are more beneficial to children's learning and development	Respondent either directly states the benefits of non-screen-based activities, or, in a scenario-based question, recommends/encourages non-screen-based activities.	*"Emphasize to parents that children learn best through social interaction and real-life activities." (A067)*
		8. Lack of alternative activities/resources for alternatives	Respondent indicates concern about identifying, planning, or implementing alternative activities. This code includes lack of resources for implementing other activities (e.g., lack of staffing, funding, space, or physical materials).	*"The challenges I see have to do with how much money and time a child center has to implement changes." (A066)*
Practices				
	Current screen time practices	9. Program is screen-free	Respondent indicates that screens are never used in their child care program.	*"At our center we do not allow any screen time for the children. The only screens are the teachers computers for data entry or lesson planning." (A043)*
		10. Program limits screen time duration and/or content	Respondent indicates that screen use is limited in time and/or content (e.g., to a certain number of minutes per day or week, and/or a certain number of days per week or month; and	*"We use very little screen time. Occasionally for entertainment or as a learning tool." (A043)* *"The screen time is more interactive. We only allow children ten minutes screen time and child play games that will enhance their thinking skills." (A043)*

			educational/interactive versus entertainment/passive).	*"The screen time is more interactive. We only allow children ten minutes screen time and child play games that will enhance their thinking skills." (A043)*
		11. Program uses screens for entertainment	Respondent indicates that screen content is entertainment (versus educational) and/or passive (versus interactive). The use of screen time to calm or distract during transition periods aligns with this code.	*"We watch one 2-hour movie every 2-3 months and their screen time is more passive." (A043)* *"We use very little screen time. Occasionally for entertainment or as a learning tool." (A043)*
		12. Program limits context in which screen time takes place	Respondent indicates that screens are viewed only under certain circumstances, e.g., with adult supervision; in conjunction with a lesson or other educational activity; never during meal times.	*"The children always use screens with an adult present." (A043)*
	Next Steps	13. Parent education and support regarding screen time best practices are needed	Respondent indicates that parents should receive screen time/media related information. This could be in the form of conversations, handouts, newsletters, meetings, etc.	*"I believe family need more information about screen time" (A066)*

		14. Child education regarding screen time best practices is needed	Respondent indicates the importance of directly teaching children appropriate screen time and technology practices.	*"Teach children why limiting screen time at home is important. and introduce activities they can do with their families instead" (A066)*
		15. Screen time best practices seem feasible	Respondent states that they have no concerns with implementing best practices and/or expresses excitement about trying out a strategy (without expressions of concern).	*"I don't have any concerns at this time."*
Perceived Barriers *(expressed as hypothetical concerns or actual barriers)*				
		16. Child resistance	Respondent indicates concern over child reactions to reducing screen time.	*"When the rest of the center is allowed one movie day per quarter, my kiddos don't quite understand why they aren't allowed to peer over the gate and watch as well." (A017)*
		17. Parent resistance	Respondent indicates concern that parents will resist screen time reduction and/or	*"I have a feeling if I was to tell the parents that a child from the ages 2-5 years old should only get an hour a week of T.V. time that they would get mad." (A017)*

			discomfort with discussing this topic with parents.	*"What concerns me is the parents don't back us up and do the same." (A017)* *"...at home I know that when some of my kids leave, they go and watch TV most of the time." (A017)*
		18. Staff or Supervisor resistance	Respondent indicates concern that supervisors or staff members will resist screen time reductions or ignore established policies; or that the respondent lacks the power to implement such policies.	*"I wish other staff would stay off their phones!" (A064)* *"It's not my place to write policies." (A064 - Lead Teacher)* *"Although we have a screen and media policy, many times even when the director is t I see it abused here." (A064 - Assistant Teacher)* *"...if the director does not enforce the screen time policy, the teachers would not be onboard." (A066 - Assistant Teacher)*
		19. Lack of knowledge/ training/information	Respondent indicates a lack of training or simply a lack of knowledge. Respondents may indicate a lack of informational resources by suggesting that this training is their only resource/guide, or by failing to identify specific resources (e.g., generally listing "Google"	*"I was not fully aware as to why these strict policies were in place." (A017)*

			rather than a handbook or other reputable source). Responses that indicate difficulty developing a policy (e.g., unsure what to write or include) would also align with this code.	
		20. Difficulty procuring commercial-free content	Respondent indicates difficulty procuring commercial/advertisement-free content.	*"I don't have a TV in my classroom. My tablet is not connected to the internet. I do use my mobile phone to get youtube, but that is only for music. We listen to it when we clean up. There are commercials, but I cancel them ASAP, and put my phone in a place where the students cannot see it." (A017)*
		21. Difficulty identifying/procuring educational content	Respondent indicates a lack of adequate training in identifying appropriate content.	*"I wish my center allowed access to screen time approved sites for the children to use." (A017)*

Table A2 Media Aware Child Care training multiple choice and demographic questions

Question	Answer Options
What are the recommended screen time limits for children younger than 18 to 24 months?	• Avoid digital media use • Limit screen use to 30 minutes a day • Limit screen use to 1 hour a day • Limit screen use to 2 hours a day
What are the recommended screen time limits for children 2 to 5 years of age?	• Avoid digital media use • Limit screen use to 30 minutes a day • Limit screen use to 1 hour a day • Limit screen use to 2 hours a day
How likely are you to meet the Screen Time Best Practices for child care listed above?	• Very likely, I already do most or all of these best practices • Very likely, I am committed to making this happen • Somewhat likely, I have some concerns • Not likely, I have too many concerns • Not likely, I do not agree with these best practices • Other
Best Practice: Screen time is limited to one hour per week or never offered.	• Yes, fully meeting this best practice • Making progress on meeting this best practice • Ready to get started on meeting this best practice right now • Unable to work on meeting this best practice right now
Best Practice: If TV or videos are shown, they are always free from commercials or advertising.	• Yes, fully meeting this best practice • Making progress on meeting this best practice • Ready to get started on meeting this best practice right now • Unable to work on meeting this best practice right now
Do you have a written policy on screen use in your child care program?	• We do not, but I think it would be beneficial • I am not sure how having a policy would reduce screen use • I am not sure what to include in an official screen and media policy

	• We already have a policy that includes SOME of the standards/goals presented in this training • We already have a policy that includes ALL of the standards/goals presented in this training • Other
Type of Program:	• Family child care home • Center-based child care • School-age or afterschool program • Other • N/A
Current Role:	• Owner • Center Director • Lead Teacher • Assistant Teacher • Other: • N/A
Years of experience in child care/early childhood education:	• Less than one year • 1 to 2 years • 3 to 4 years • 5 to 9 years • 10 years or more. Number of years: • N/A
Program age group:	• Infants (age 0-1) • Toddlers (age 2) • Preschoolers (age 3-5) • I don't currently work with children • Other: • N/A
What is your zip code:	*Write-in*

Table A3 Media Aware Child Care training county representation

County	Respondents	% of Total Respondents	Statewide # of ECE Facilities	% of WA ECE Facilities
Adams	11	0.44%	31	0.56%
Asotin	15	0.60%	10	0.18%
Benton	77	3.07%	131	2.36%
Chelan	56	2.23%	107	1.93%
Clallam	17	0.68%	44	0.79%
Clark	146	5.81%	245	4.41%
Columbus	0	0.00%	4	0.07%
Cowlitz	55	2.19%	48	0.86%
Douglas	8	0.32%	68	1.22%
Ferry	1	0.04%	1	0.02%
Franklin	33	1.31%	141	2.54%
Garfield	0	0.00%	2	0.04%
Grant	45	1.79%	146	2.63%
Grays Harbor	28	1.11%	54	0.97%
Island	10	0.40%	44	0.79%
Jefferson	1	0.04%	6	0.11%
King	780	31.05%	2026	36.48%
Kitsap	64	2.55%	140	2.52%
Kittitas	10	0.40%	22	0.40%
Klickitat	0	0.00%	9	0.16%
Lewis	29	1.15%	41	0.74%

Lincoln	1	0.04%	5	0.09%
Mason	15	0.60%	32	0.58%
Okanogan	6	0.24%	38	0.68%
Pacific	48	1.91%	10	0.18%
Pend Or.	0	0.00%	2	0.04%
Pierce	220	8.76%	518	9.33%
San Juan	2	0.08%	6	0.11%
Skagit	49	1.95%	96	1.73%
Skamania	0	0.00%	5	0.09%
Snohomish	226	9.00%	497	8.95%
Spokane	221	8.80%	268	4.83%
Stevens	1	0.04%	15	0.27%
Thurston	111	4.42%	210	3.78%
Wahkiakum	2	0.08%	2	0.04%
Walla Walla	11	0.44%	47	0.85%
Whatcom	58	2.31%	118	2.12%
Whitman	33	1.31%	21	0.38%
Yakima	122	4.86%	343	6.18%
Total	2512	100.00%	5553	100.00%

Notes: *% of Total Respondents was calculated using 2,512 respondents because 5 respondents provided an invalid or no zip code. Statewide data was retrieved from the Child Care Aware of Washington 2018 Child Care Data Report. When the Respondents value is greater than the Statewide ECE Facilities value, one can assume that multiple respondents from a given facility completed the survey.*