

A. COVER PAGE

Project Title: Work and Health among Early Childhood Education Workers in Washington State	
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Human Subjects: Yes. Washington State Institutional Review Board Project # 2020-042; University of Washington IRB # STUDY00010786	Vertebrate Animals: No
hESC:	Inventions/Patents: None

B. ACCOMPLISHMENTS

B.1. What are the major goals of the project?

Early childhood education (ECE) workers are potentially exposed to myriad health risks on the job including infectious disease, musculoskeletal strain, and high levels of stress. However, little research has focused on the health status of the ECE workforce, the prevalence and characteristics of poor working conditions they may confront, and associations between the two. Using a statewide survey and detailed worksite observational methods, we developed a comprehensive assessment of work and health in the industry.

The major goals of the project were to:

- 1. Characterize the work exposures, health, and associated factors among a representative sample of registered ECE workers in WA State, including exploring the relationships between working conditions and health, and the quality of learning environments, and**
- 2. Conduct a detailed assessment of work factors that may affect the health of ECE workers through on-site work observations.**

Because the study began during the first year of the COVID-19 pandemic, and would inherently reflect pandemic-impacted working conditions and health, we included a focused characterization of these impacts of the pandemic on the ECE workforce, taking advantage of the timely distribution of the survey during 2021.

B.2. What did you accomplish under these goals?

Goal 1:

Through a data sharing agreement with the Washington State Department of Children, Youth and Families (DCYF), we identified a cohort of 28,306 ECE workers registered to work in center-based childcare programs in the state of Washington. We developed and tested a questionnaire assessing work history, socio-demographic-economic characteristics, working arrangements, working conditions, and health status, including scales for stress and depression for the ECE workforce. Given that the survey was conducted approximately one year into the COVID-19 pandemic (spring, 2021), the questionnaire included questions addressing working conditions and health-related work experiences pertaining to the pandemic. We surveyed the identified ECE workforce, with multiple communications and an incentive lottery, offering the survey in English or Spanish, and using an online survey form with an option for a hard copy survey instrument. A total of 3,299 (9%) of the workforce consented to participate.

In a first set of analyses, we examined survey data pertaining to workers' perceived stress and work-related exposures in the context of the COVID pandemic. We described the prevalence of reported impacts, including workplace closures; job changes; COVID-19 transmission; risk factors for severe COVID-19; the use of social distancing practices; satisfaction with workplace responses; perceptions of worker roles, respect, and influence; and food and financial insecurity. Themes from open-ended responses illustrated how workers' jobs changed and the stressors that workers experienced as a result. Fifty-seven percent of ECE workers reported moderate or high levels of stress. In a regression model assessing unique contributions to stress, work changes that negatively impacted home life contributed most to stress. Feeling respected for one's work and feeling positive about one's role as an "essential worker" contributed to lower levels of stress. Experiencing financial insecurity, caring for school-aged children or children of multiple ages, being younger, and being born in the United States also contributed to higher stress.

In other analyses of survey data, we examined the relationship of socio-economic factors, work organization characteristics, psychosocial exposures, and ergonomic and other physical work exposures on five elements of health: general health, work injury, physical functioning, mental health (depression) and economic health. We documented high levels of adverse health outcomes, including general health, injury, physical functioning, mental health, and economic health, despite the relatively young age of the population, and the fact that they were all working at the time of the survey. In addition, we documented exposures potentially contributing to poor health in several domains: personal characteristics, work organizational factors, psychosocial stressors, and physical occupational exposures.

Each of these domains appear to contribute significantly to poor health outcomes, though in somewhat different ways and in different combinations.

We were unable to assess linkages between the health and working conditions of ECE workers to ECE quality. As a result of the COVID-19 pandemic, the Washington State ceased collecting the data pertaining to quality that the research team had planned to use. The significance of changes in the ECE sector to staffing and operation during the pandemic also meant that it would be inappropriate to try to connect survey data collected during the pandemic to historical quality data. Although the team explored the possibility of using alternative, less detailed quality data (center ratings in the state's Quality Rating and Improvement System), after conducting preliminary descriptive analyses of the center ratings, we determined there was insufficient variability in these data to achieve the research objectives initially intended.

Goal #2:

We conducted detailed observational exposure assessments at eight ECE centers using a system that characterized the frequency and duration of physical (observable) exposures. We developed a 29-item observation tool to systemically characterize the duration and frequency of four types of conditions or exposures: situations, behaviors, point hazards and modifiers. Sixty-four observations of nominally 30 minute duration were conducted at eight selected ECE centers across Washington state in summer 2021.

We conducted descriptive analyses of observed exposures. Bivariate analysis and multiple linear regressions were used to analyze the relationship between center- and classroom-level variables and four selected ergonomic exposures. Our results indicate that the age of the children cared for by workers appears to be a key contributor to the ergonomic exposures ECE workers experience due to children reaching different developmental stages and levels of mobility. Providers were observed to spend on average an estimated half of their time walking and standing and one-third of their time in sedentary postures. The three most prevalent instantaneous movements (point hazards) are rapid torso bending/twisting, lifting a child, and lifting an object. Workers caring for toddlers were estimated to lift, on average, about a total of 2,000 lbs in a workday; lifting is considered a 'hazardous' risk to ECE providers at the observed lifting frequency and weight. Results underscored the gap in applicable ergonomic guidelines to the ECE workforce.

Project overall:

We experienced significant delays in beginning the project due to the disruptions occurring in the early phases of the COVID-19 pandemic. We took advantage of this event to expand the scope of the work to consider the impact of the pandemic and its workplace ramifications on ECE worker health. Despite the delay and the extra work, we were able to complete the project during the project period, as extended for an additional no-cost year. Final acceptance of the papers has not yet been achieved.

B.3. Competitive Revisions/Administrative Supplements

N/A

B.4. What opportunities for training and professional development did the project provide?

One masters of public health student was trained in occupational exposure assessment and assisted in the development, conduct, and analysis of the observational data. She obtained an MPH from the UW School of Public Health, Department of Environmental and Occupational Health Sciences at the conclusion of the project.

B.5. How did you disseminate the results to communities of interest?

We shared our findings with our partners at the Washington State Department of Children, Youth, and Families (DCYF) through review of the generated papers. (See section C1.) Agency staff then disseminating findings from the first published paper to relevant stakeholders within the agency. Agency staff also expressed interest in further disseminating findings to relevant stakeholders within the state, including during the state's legislative session to inform consideration of ECE-related policy discussion. We also invited key stakeholders to one presentation of results

from the observational assessments. Finally, some data from the survey pertaining to food security were included in a statewide assessment. (<https://nutr.uw.edu/resource/washington-state-food-system-assessment-report/>)

B.6 - What do you plan to do during the next reporting period to accomplish the goals?

N/A

C. PRODUCTS

C.1. Publications, conference papers, and presentations

We published a paper related to stress and work in ECE during the pandemic: Quinn EL, Stover B, Otten JJ, Seixas N. Early Care and Education Workers' Experience and Stress during the COVID-19 Pandemic. Int J Environ Res Public Health. 2022 Feb 25;19(5):2670. doi: 10.3390/ijerph19052670. PMID: 35270362; PMCID: PMC8910108. A copy of this paper is being submitted with this report.

An additional paper describing the exposures and health among ECE workers in Washington State more broadly has been submitted for publication: Quinn E, Stover B, Peckham T, Otten J, Seixas N. Work-related factors associated with health and wellbeing of early care and education workers.

Also, a report of the observational exposure assessment was completed as a part of a masters student thesis: Exposure Assessment for Early Childhood Education (ECE) Workers. Student: Joycelyn Chui, University of Washington Department of Environmental and Occupational Health Sciences; Faculty committee members: Noah Seixas, Jennifer Otten

C.2. Website(s) or other Internet site(s) – include URL(s)

N/A

C.3. Technologies or techniques

N/A

C.4. Inventions, patent applications, and/or licenses

N/A

C.5. Other products and resource sharing

The observational assessment used a novel observation tool based on software called BORIS (<https://www.boris.unito.it/>). The assessment tool developed under this platform is described in detail in the Chui article.

D. PARTICIPANTS

D.1. What individuals have worked on the project? Please include calendar, academic, and summer months.

Commons ID	S/K	Name	Degrees(s)	Role	Cal	Aca	Sum	Foreign	Country	SS
nseixas		Noah Seixas	PhD	PI	.7					
		Jennifer Otten	PhD	Co-I	.1					
		Emilee Quinn	MPH	Res Coord	3.0					
		Bert Stover	PhD	Statistician	3.7					
		Allison Crollard	MPH	Res Coord	1.8					
		Joycelyn Chui	BA	Res Ass't.	2.8					

D.2 Personnel updates

- a. Level of Effort:** During our no cost extension period, staff efforts were adjusted to allow for completion of the analysis and reporting of results.
- b. New Senior/Key Personnel:** None.
- c. Changes in Other Support:** None.
- d. New Other Significant Contributors:**

E. IMPACT

E.1 - What is the impact on the development of human resources, if applicable?

Our graduate student research assistant successfully graduated from her MPH program, and has begun a career in public and environmental consulting, using the knowledge and skills obtained through her work on this project.

E.2 - What is the impact the Public Health Relevance and Impact? The investigator should address how the findings of the project relate beyond the immediate study to improved practices, prevention or intervention techniques, legislation, policy, or use of technology in public health.

The results of this study have a variety of potential public health impacts.

- We found high levels of stress among the ECE workforce with additional stressors added during the pandemic and the organizational responses to these challenges. The study identifies several factors which could significantly reduce stress on the ECE workforce, through improved management practices, and demonstration of respect for work.
- We found a broad array of factors, including employment conditions, workplace exposures, psychosocial factors and economic challenges contributing to poor general health, physical functioning, injury, depression and economic outcomes among the ECE workforce. ECE workers were exposed to high levels of ergonomic stressors, potentially affecting the low back and knees. A multi-faceted approach to improving the lives and working conditions of this vital workforce is needed.
- Taken together, a multitude of interventions in ECE working conditions including organizational policies, government support and regulation, and individual health behavior training could improve these conditions. Follow-up studies are needed to consider the potential effectiveness of alternative strategies.

F. CHANGES

F.1 - Changes in approach and reasons for change, including changes that have a significant impact on expenditures

Nothing to Report

F.2 - Actual or anticipated challenges or delays and actions or plans to resolve them

None.

F.3 - Significant changes to human subjects, vertebrate animals, biohazards, and/or select agents

None.