

369 Characterization of the Relationship Between Prenatal Farm Exposures and Allergen Sensitization in the First Year of Life



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RATIONALE: Early childhood exposure to animal farming environments has been associated with decreased incidence of atopic disease. We hypothesize that prenatal farm environment exposure is associated with lower rates of allergen-specific and total IgE in early life.

METHODS: The Wisconsin Infant Study Cohort (WISC) birth cohort enrolled farm and non-farm pregnant woman from central Wisconsin. Farm and other environmental exposures are surveyed prenatally. Plasma total IgE, mixed aeroallergen IgE (Phadiatop), and specific food IgE are measured at 12 months of age. Farm subjects were also grouped by the number of animal species (0-2 animals, n=15; 3-4, n=38; 5-6, n=14) exposed to prenatally. Analysis was performed using the Chi-square test, ANOVA, or 2-tailed t-test.

RESULTS: Of 240 subjects enrolled in WISC, 169 had 12 month IgE data available for analysis. Farm (n=70) and nonfarm (n=99) participants had similar total IgE (geomean farm 4.1 kU/L, nonfarm 4.3 kU/L, p=0.81), aeroallergen IgE (farm=10%, nonfarm=13.4%, p=0.50), and food IgE (farm=12.9%, nonfarm=13.5%, p=0.90) at 12 months of age. Within the farm group, the number of prenatal animal exposures (0-2, 3-4, 5-6) tended to be inversely related to total IgE (geomean 4.4 kU/L, 4.3 kU/L, 2.5 kU/L; p<0.10), while the prevalences of sensitization to aeroallergens (20%, 7.89%, 7.14%; p=0.39) and foods (13.3%, 15.8%, 0%; p=0.29) were similar.

CONCLUSIONS: Our preliminary analysis suggests that total IgE and allergic sensitization at 12 months of age are similar among farm and non-farm children but may be reduced by prenatal exposure to farm animals. Additional samples are being analyzed to further test this hypothesis.

370 Remote Data Collection Through the ASTHMAXcel Mobile Application, and Lessons Learned During the COVID-19 Pandemic



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RATIONALE: The ASTHMAXcel mobile application has been associated with improvements in clinical outcomes and healthcare utilization through on-site use at designated study visits. Remote testing and data collection may streamline and transform clinical trials for mobile health (mHealth) interventions.

METHODS: ASTHMAXcel is a novel, guideline-based smartphone application freely available on the iOS/Android app marketplaces. Within the app, users answered surveys on initial (prior to navigating content) use and after first-time use. Pre-intervention questions included user demographics and baseline knowledge. Post-intervention questions addressed attitude changes after completion of all content.

RESULTS: Between April 15 and August 13, 2020, 96 users (F: 60%, mean age: 38.8 ± 14.9, range: 19-77) completed the pre-intervention survey. 56% of users completed college or a higher program. 83% of users primarily spoke English, 6% primarily Spanish, and 11% another language. Common comorbidities included seasonal allergies (37%), anxiety/depression (37%), eczema (16%), food allergies (12%), and diabetes mellitus (9%). At baseline, the following proportion of users reported: 41% had an asthma action plan; 60% knew the difference between a rescue vs controller medication; 32% had a peak flow meter; and 38% had a spacer. 23 users completed the post-intervention survey. 72% reported knowing the importance of an asthma action plan; 81% reported knowing the difference between a rescue vs controller medication; 87% reported

knowing the importance of a spacer; and 81% reported knowing the importance of a peak flow meter.

CONCLUSIONS: Remote data collection through mHealth interventions may serve as a viable method for conducting clinical trials, especially during the COVID-19 pandemic.

371 Human dietitians vs. Artificial intelligence: Which diet design do you prefer for your children?



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RATIONALE: Caregivers of children with food allergy should always be concerned about the diet design to ensure adequate intake of nutrients and elimination of implicated foods. We believe that artificial intelligence (AI) solutions can help the diet design for them. In this study, we developed the two types of AI and compared their utility over human dietitians.

METHODS: The first one mimics existing records of human-made diets using the generative adversarial network (GAN) model. The second one mimics the human's diet design process using the reinforcement learning (RL) framework. Using the database of 1,724 foods and 220 daily diet plans for the 3-5-years old children, we have trained these AI solutions to produce the daily diet plans. To evaluate the utility of AI solutions, we conducted the two surveys to an expert group consisting of dietitians, pediatricians, and teachers of day care center, from April 2020 to May 2020. In the first survey! , we asked 41 experts to evaluate the compositional, nutritional, and overall quality of the 45 diet design outcomes made by the GAN-based AI, RL-based AI, and human dietitians; here, we gave them only the menu name information. In addition, we asked them to guess which diet outcome is designed by an AI. In the second survey, we asked 27 experts the same questions the other way around; here, we did not give them the menu name but the nutrient information.

RESULTS: In the first survey, the human-made diet outcomes received 82.44% of positive response in overall evaluation, whereas the diets made by RL-based AI and GAN-based AI received 43.74% and 35.12%, respectively. In addition, the respondents easily distinguished human-made diets and AI-made diets. Interestingly, the result of second survey without the menu name information was different to the above. The diets made by RL-based AI received 86.67% positive response, whereas the human-made diets received 43.70%.

CONCLUSIONS: The survey results may indicate that the experts (1) have their own preference to the menu composition of diets, (2) are not capable to precisely evaluate the nutritional quality of diets, and (3) become negatively biased if the composition does not fit their preference, regardless of the nutrient quality. This study shows the possibility and direction of developing a dietary AI for children with food allergies.