

Tooth Fairy Study

The South Texas Oral
Health Network Collaboration

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ABSTRACT:

PURPOSE: This study's purpose was to examine the processes and the potential for dental practitioners to address environmental health exposure risks to their patients through dental practice-based research participation. To explore this, the South Texas Oral Health Network (STOHN) initiated a collaboration with The Tooth Fairy National Study investigating toxicants stored in deciduous teeth as a potential neurodevelopmental risk factor.

BACKGROUND: Neurodevelopmental disorders (ND), like Autism Spectrum Disorder (ASD), affect 1 in 68 live births. Evidence suggests that environmental chemicals may play a role in ASD risk and/or etiology by acting independently or through interactions with genetic vulnerabilities. Provider awareness of environmental exposure risk during pregnancy and early childhood in South Texas is low. Therefore, it is important to increase provider knowledge and awareness to enable greater communication with patients. STOHN serves as a conduit reaching large numbers of patients. This study also engaged practitioners in an ongoing national study with minimal impact on their practice.

METHODS: The goal was to enroll 20 parents with children via 10 dental practitioners. STOHN pediatric and general practitioners were recruited for the study. Practitioners were contacted by phone and in person. Upon completion of Human Subject Protection training, each practitioner participated in a study training taught by a public health educator in the department of Family and Community Medicine at University of Texas Health Science Center in San Antonio (UTHSCSA). Training topics included NDs, environmental health exposures, patient engagement, survey administration, and how to collect donated teeth. This collaboration allowed STOHN to gather control teeth as well as demographic and health information for the Tooth Fairy Study repository for future analyses. Participants received a thank you card from the Tooth Fairy and participating providers were highlighted in the monthly STOHN newsletter.

EVALUATION RESULTS: Evaluation was threefold: practitioner enrollment and retention; practitioner confidence in educating their patients about potential environmental risk exposures; and completed surveys with donated teeth.

CONCLUSION: The interdisciplinary collaboration between dental practitioners and medical researchers through STOHN provided an opportunity to increase practitioner knowledge and awareness of a novel health concern, while also raising their confidence and willingness to educate their patients about potential environmental exposure risks. UTHSCSA IRB Protocol #HSC20170132E

KEY WORDS:

Practice-based research, collaboration, deciduous teeth, environmental exposure, neurodevelopmental disorder



Introduction

Practice-based research networks (PBRNs) are groups of practices devoted to patient care with a mission to investigate community-based practice questions to improve the quality of care. This mission represents the ongoing commitment to network activities and an organizational structure that transcends a single research study. PBRNs link clinicians with investigators experienced in health research, thereby enhancing the research skills of network members.¹ The high number and diversity of PBRNs is due to the advantages offered to research and quality improvement, as well as their ability to bring practice-relevant topics into the research agenda while quickly moving scientific advances into routine practice.²⁻⁹

STOHN is a PBRN supported by the University of Texas Health Science Center at San Antonio's (UTHSCSA), Institute for Integration of Medicine & Science. STOHN includes 37 dentists and dental hygienists with over 10,000 patients, working together with researchers to answer questions to improve clinical decision-making and patient outcomes. STOHN provides a centralized university-based infrastructure for developing and implementing research. Practitioner benefits include peer researcher interactions; links to investigators and statisticians, and hands-on research experiences with presentation and publishing opportunities.

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Faculty gain access to large diverse patient populations with a collaborative team of investigators. Most recently, STOHN collaborated with the University of Texas Health San Antonio, School of Public Health, the Bexar County Translational Advisory Board, and the Madonna Neighborhood Center to extend its community outreach.¹⁰

In 2016, STOHN expressed interest in a multidisciplinary research study. After assessing possible collaborative opportunities, STOHN and the UTHSCSA Department of Family & Community Medicine (FCM) formulated a multidisciplinary study experience utilizing 3 existing projects investigating environmental toxic chemical exposure and its relationship to autism spectrum disorder (ASD). The overarching study goals were to investigate environmental chemicals that may play a role in ASD risk and/or etiology.¹¹ These studies are collectively known as the "Tooth Fairy Study" as deciduous teeth of children are collected for chemical analyses. Deciduous teeth begin forming in utero. Environmental chemicals circulating in the bloodstream during that time are sequestered in the forming dental tissue and remain thereafter. The content and concentration of chemicals in the teeth of children with and without ASD are then determined through mass spectrometry.¹² The multidisciplinary collaboration allowed for an expansion of the Tooth Fairy Study into dental practices while increasing practitioner knowledge and awareness about possible environmental exposure risks.

The FCM Department provided environmental exposure educational training linked to ASD (and patient communication resources) to participating practitioners.¹³ Together FCM and STOHN collaborated to create greater awareness of toxic exposures in the workplace and homes to increase practitioner confidence in educating their patients about potential chemical exposure risks. This collaboration of medicine and dentistry provided emerging science to dental practitioners; an important process in engaging families in discussions about environmental exposures. The purpose of this study was to develop and evaluate a process for dental PBRN practitioners to engage in an environmental health exposure risk study aimed to increase practitioner knowledge and awareness of possible ASD etiologies.

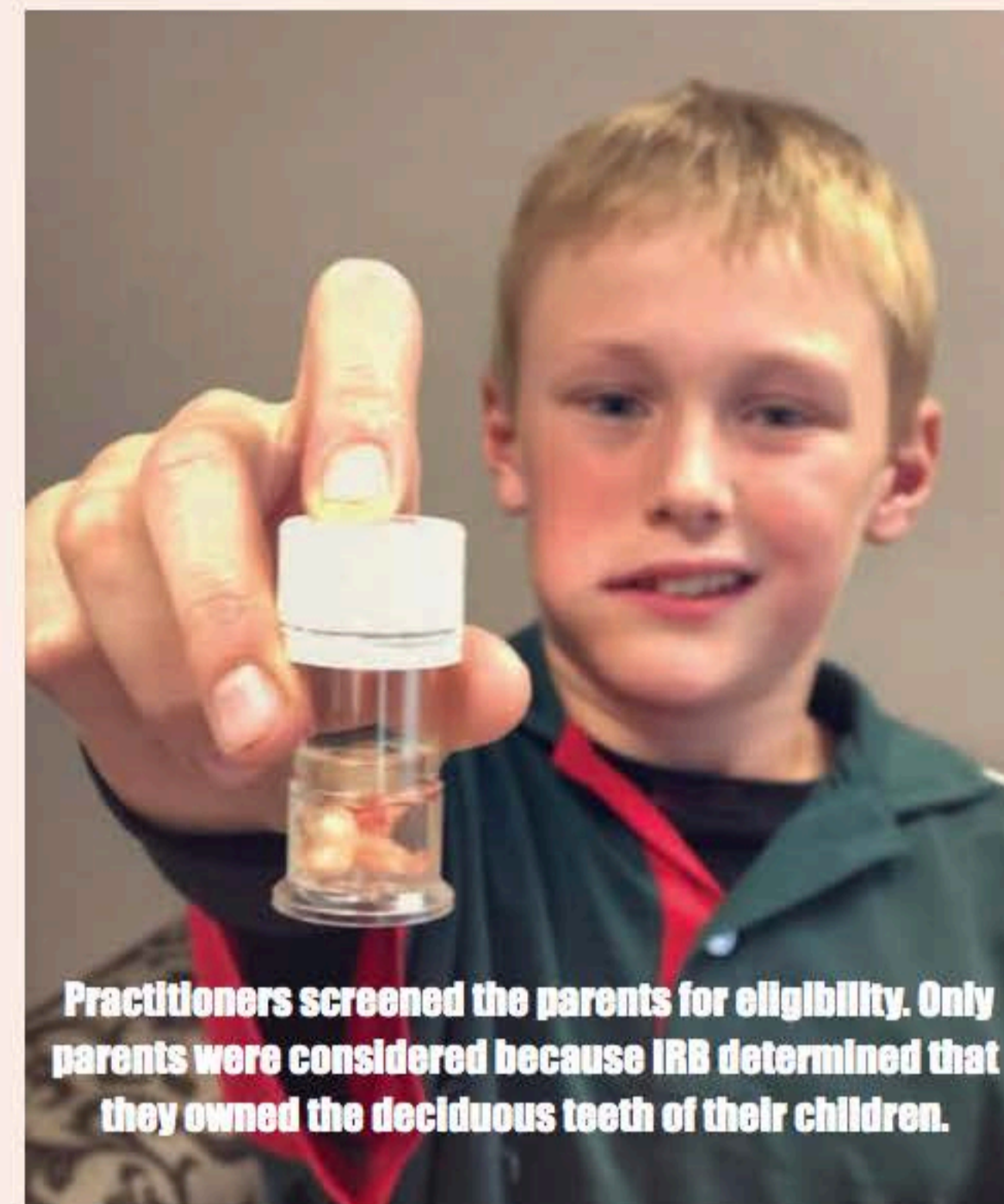
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Methods

The STOHN infrastructure team sought participating STOHN members to assist with subject recruitment and data collection. Outreach methods for enrolling practitioners included phone calls, email, and face-to-face office visits. STOHN practitioners, who agreed to participate in the study, individually completed an online-abbreviated human subject protection (HSP) training which was forwarded as an amendment to add them to existing IRB protocol.

In addition to HSP training, all participating STOHN practitioners (and applicable staff) were required to attend a 1-hour working lunch training. The training was based on a modified FCM curriculum focused on environmental exposure risks and the retention of toxic chemicals in the deciduous teeth. Additional

presentation topics included the possible effects of toxic chemicals in neurological development; environmentally induced illnesses among children; historical changes in chemical production; chemical intolerance; and resources for reducing exposures. Thereafter, practitioners received information on subject recruitment and data collection via quick reference guides, including the research study protocol, participant screening and enrollment, survey, and the collection and submission of deciduous teeth. At the end of the training, practitioners completed an evaluation to assess their knowledge of environmental exposures, as well as their confidence (self-efficacy) in discussing the topic with their patients and assisting with the research study. Participating practitioners distributed flyers about the study at their respective clinics. In addition, STOHN staff were present onsite as needed to recruit parents. Those who were interested in the study were provided a study information sheet. They were advised to inform their practitioners of their interest during their exam. Practitioners screened the parents for eligibility. Only parents were considered because IRB determined that they owned the deciduous teeth of their children. The eligibility criteria for parents were as follows:



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Parents who are:

- 18 years or older
- with children ages 5 and older with no diagnosed neurological disorders (such as ASD or ADHD) with healthy deciduous teeth containing no crowns, fillings or large cavities

If eligible, the parents were provided a link to give their consent to participate and then complete the online survey with their personal smartphone or a laptop. Survey questions included parent/child demographics, the mother's pregnancy and medical history, and the child's diagnosis and communication skills. Parents were given the option of donating teeth extracted during their child's clinical appointment. If so, the dental clinic was responsible for packing the donated teeth. If no teeth were extracted during the visit, the dental staff provided packing materials to the parents so that they could mail the saved teeth of their children later. Thank you letters from the "Tooth Fairy" were mailed to families who participated for their time and donation. No study incentives were given to the participants.

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