

MARCH 2019

Oral Health Matters

Center for Oral and Systemic Health

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In the news

Center for Oral and Systemic Health

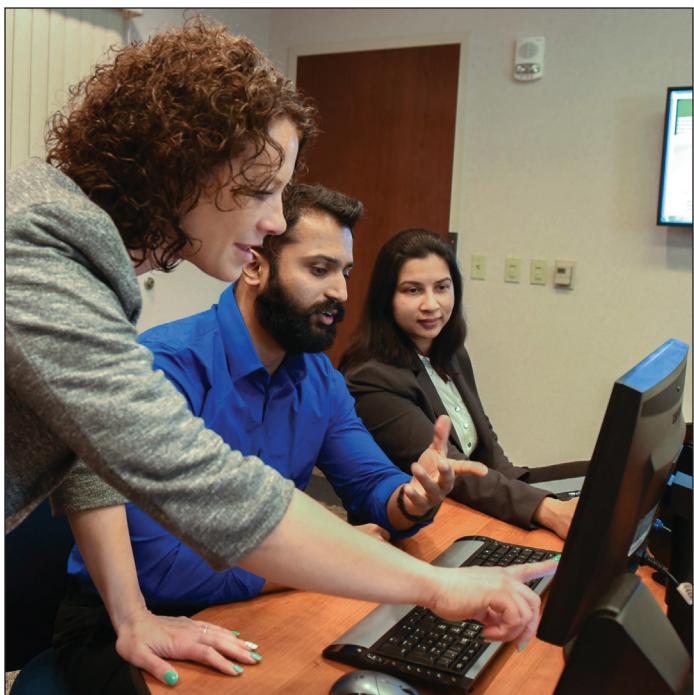
Welcome to *Oral Health Matters*. Throughout the latter part of 2018 and early 2019, the Center for Oral and Systemic Health (COSH), the staff has been very productive.

Here are a few highlights:

- Dr. Amit Acharya and the COSH team have recently received funding from the National Institute for Dental and Craniofacial Research for an exploratory study on the impact of oral health on pneumonia.
- Dr. Neel Shimpi received a joint appointment in the Cancer Care and Research Center (CCRC) as a research scientist and also remains an associate research scientist for COSH.
- Dr. Ingrid Glurich attended the European Oral Medicine conference and World Workshop on Oral Medicine VII (WWOM) precision medicine workgroup meeting as section leader in Gothenburg, Sweden.
- COSH hosted an Oral Health booth at the Wisconsin Science Festival in October, teaching our community about the necessity of good oral health habits and how it affects our overall health.

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Project Spotlight: Low oral health literacy can lead to ED visits for dental emergencies



Jeff VanWormer, Ph.D.

Clinic Research Institute, and was recently published in the Journal of Rural Health.

"Adults whose oral health literacy level was low, were less apt to go to the dentist regularly for checkups and teeth cleanings, and were more apt to be seen in the emergency department for acute dental issues such as severe pain or infection," said Dr. VanWormer.

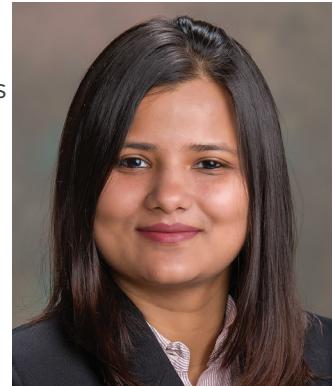
The researchers had patients from Marshfield Medical Center in Marshfield and Marshfield Clinic Colby Center answer survey questions to determine their oral health literacy, visits to the dentist and other study measures. Researchers then looked at these patients' electronic health records to determine how often they went to the emergency department in the past for dental care.

Researchers have wanted to better understand why some patients don't go to the dentist regularly and why some go to the emergency department for dental needs, especially given the high costs of emergency care and referral back to a dentist anyway. "Having medical and dental insurance helps greatly, but a patient's ability to process and use the oral health information they get from the dentist's office or other sources also seems to impact their oral health care decisions,"

Dr. VanWormer said.

New research has found that patients with a poor understanding of oral health go to the dentist less, and the emergency department more, for dental needs. The research was led by Drs. Jeffrey VanWormer and Amit Acharya from the Center for Oral and Systemic Health at Marshfield

Dr. VanWormer said that despite the clear positive impact of improving access to low-cost dental clinics available through the Family Health Centers in north-central Wisconsin, some patients still do not go to a dentist regularly, which is concerning from a public health perspective.



Sailee Tambe

Why oral health literacy is low for some patients also remains unclear. "Low oral health literacy is related to lower education level, but it's not a perfect correlation. Things like costs, fear of pain or limited recognition of its importance are known reasons why some patients avoid the dentist. Until severe tooth pain or complications put them in the emergency department, knowledge of oral self-care and the prevention of periodontal disease may be a low priority for some, regardless of their education." said Dr. VanWormer.

This research project was funded internally by MCRI, and study analyses were completed by Sailee Tambe, a Masters of Public Health Student at the University of Minnesota who took part in MCRI's Summer Research Internship Program.

Featured COSH Team Member

Ingrid Glurich, Ph.D., COSH Core Lead: Dental Precision Medicine.



Dr. Ingrid Glurich is Project Scientist in COSH and brings a broad background in research to the COSH research team. Dr. Glurich received a Ph.D. in Microbiology from the State University of New York at Buffalo's School of Medicine with an emphasis on infectious immunopathology, microbial contribution to autoimmune disease etiology and microbial pathophysiology.

She later pursued a post-doctoral fellowship at SUNY of Buffalo's School of Dentistry in the Department of Periodontology working with Department Chair, Dr. Robert Genco, on research defining a potential role for oral pathogens in exacerbation of atherosclerosis. This research sparked her long-standing interest in exploring potential relationships between oral and systemic disease.

Ingrid Glurich, Ph.D.

On relocating to Marshfield, WI, Dr. Glurich was appointed as Director of the Office of Scientific Writing and Publication at Marshfield Clinic Research Foundation where she worked collaboratively with research teams on a broad spectrum of topics that expanded her research experience. Important exposures included studies that leveraged the Personalized Medicine Research Project, a population-based database and genetic repository. Key examples included collaboration with workgroups developing pharmacogenomics research focused on defining molecular mutations in drug metabolizing enzymes that contribute to adverse drug events and leveraging informatics approaches including application of machine learning to conduct surveillance of clinical data captured within electronic health records for the purpose of identifying emergent adverse drug events for newly marketed drugs.

With the establishment of COSH, Dr. Glurich identified an opportunity to re-engage research on oral-systemic health connections and joined Dr. Amit Acharya and his research team in COSH. Her current research efforts center on projects that promote establishment of oral/dental precision medicine in the context of integrated medical-dental care delivery, supported by dental informatics.

Several research efforts in which Dr. Glurich is engaged are highlighted in this issue including her participation with the World Workgroup on Oral Medicine (WWOM) consortium where she serves as section leader of the Dental Precision Medicine Workgroup and collaboration on the NIDCR-supported study engaging secondary use of big data to investigate whether poor oral health represents a risk factor for emergence of various types of pneumonia.

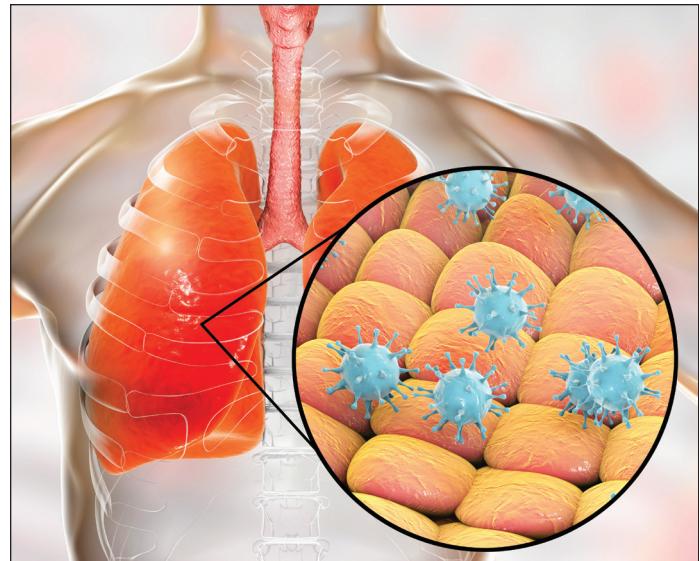
Exploring poor oral health as a potential risk factor for pneumonia

Dr. Acharya and the COSH team recently received funding from the National Institute for Dental and Craniofacial Research (NIDCR) for a study exploring the potential impact of oral health on pneumonia onset. The study investigators will explore whether evidence of poor oral health leading up to onset of specific pneumonia subtypes supports that oral conditions permissive to colonization by potential pulmonary pathogens present in their local environment increases risk for onset of pneumonia.

Current diagnostic coding practices provide limited insights into the setting where pneumonia was acquired or the specific subtype. Since exposures and types of pneumonia pathogens differ across various environmental settings (e.g., hospital acquired vs. community acquired pneumonia), classification of pneumonia by setting at time of pneumonia onset is informative to physicians in considering appropriate care delivery.

To accomplish their objectives, the investigators propose to first create algorithms for pneumonia subtype classification using various informatics approaches (e.g., machine learning and natural language processing). They will mine medical records data to identify characteristics that differentiate between pneumonia in different environmental settings.

Prior studies by Dr. Frank Scannapieco, study co-investigator at the State University of New York at Buffalo, previously defined a link between oral health and ventilator-associated pneumonia, by demonstrating molecular identity between oral bacteria and the causal pneumonia pathogen. To see whether poor oral health is an independent risk factor for onset of other pneumonia subtypes, the research team plans to explore patterns of oral health history captured in Marshfield Clinic's integrated medical-dental electronic health record (iEHR) preceding emergence of other pneumonia subtypes.



*Amit Acharya,
B.D.S., M.S., Ph.D.
Pneumonia Study
Principal Investigator*



Kelly Schroeder, R.D.H., COSH Dental Hygienist-Research, interacting with Wisconsin Science Festival attendee

COSH hosts Oral Health booths for Science Festival

More than 200 children attended the Wisconsin Science Festival interactive event hosted by Marshfield Clinic Health System October 13, 2018, in the Erdman Lobby at Marshfield Clinic Research Institute (MCRI).

The event introduced children to scientific investigations taking place in their community. MCRI scientists and staff demonstrated scientific principles with fun, hands-on activities such as making ice cream in a ziploc bag, elephant toothpaste, iron for breakfast, an archaeological dig and farm safety jeopardy.

Several interactive and educational activities were available at the three different oral health tables presented by COSH at the Wisconsin Science Festival. Attendees learned about dental decay, the amount of sugar the average person consumes per day and how sugar affects tooth decay at one table. Another table focused on oral health literacy with a chance to spin the wheel and win a prize. Additionally the relationship between oral disease and diabetes was presented. Children and parents alike were surprised to see

just how much sugar is in their favorite snacks and beverages as well as how easily soda can dissolve tooth enamel (represented by eggshells).

"Not only did we succeed in promoting interest in science among youth and their families in our community, but the level of enthusiasm and engagement our staff brought to the event was incredible," said Molly Dowden, one of the organizers of the event and IRB administrator for the MCRI. "As this was the first year for this event, we weren't quite sure what to expect, but this will surely become an annual occurrence."

Besides this event, Marshfield Clinic Health System entities including All of Us Wisconsin and New Visions Gallery also hosted Wisconsin Science Festival events in Marshfield. The local events were hosted in coordination with events happening across Wisconsin for people of all ages. These events included hands-on science exhibitions, demonstrations, performances and much more.

For more information on this statewide Celebration of Science, go to www.wisconsinsciencefest.org/.

COSH Project Scientist attends World Workshop on Oral Medicine (WWOM) VII Initiative in Sweden



Standing (left to right): Drs. Siri Beier Jensen, Douglas Peterson, Arjan Vissink, Camile Farah, Antonio Celentano; **Seated (left to right)** Drs. Ingrid Glurich, Konstantina Delli, David Ojeda Diaz, Alessandro Villa

In June of 2017, Dr. Glurich accepted an invitation from the WWOM leadership to serve as section leader to the Oral Precision Medicine Workgroup. This international collaborative seeks to train young and mid-career level oral medicine practitioners and dentists on how to conduct systematic literature review that will evaluate the literature base in the Oral Medicine domain.

In this role, Dr. Glurich has been collaborating with an international team consisting of WWOM steering committee members, expert consultants and reviewers-in-training on systematic reviews surrounding biomarker research in the context of Sjogren's syndrome and oral leukoplakia. Outcomes of this collaborative effort resulted in:

- 1) acceptance of a systematic review of the status of biomarker research for detection of membrane-associated lymphoma emergence as a complication in Sjogren's syndrome by Oral Diseases for publication in a special edition to be published in Spring of 2019.

Delli K, Villa A, Farah CS, Celentano A, Ojeda D, Peterson D, Jensen SB, Glurich I, Vissink A. World Workshop on Oral Medicine VII: Biomarkers predicting lymphoma in the salivary glands of patients with Sjögren's syndrome. A systematic review. *Oral Dis.* Jan 21. doi: 10.1111/odi.13041. [Epub ahead of print]

- 2) production of a second systematic review defining biomarkers surrounding leukoplakia that has also been submitted and was recently accepted for publication.
- 3) development of two additional manuscripts that remain in progress.

The workgroups assembled for a two-day workshop in September 2018, and subsequently provided updates on their efforts by delivering oral presentations to attendees at the three-day European Oral Medicine Conference held in Gothenburg, Sweden.

Updates from COSH Scientist/Chair of AMIA Dental Informatics Working Group



*Neel Shimpi,
B.D.S., M.M., Ph.D.*

The past few years have witnessed a rapid growth in the field of informatics, creating new surge of activities in healthcare. Dental Informatics as a potential core discipline is yet in its infancy. Dr. Neel Shimpi, COSH Associate Scientist and the Chair of Dental Informatics Working Group (DI-WG) has been actively involved in expanding this domain. These activities included establishing a quarterly newsletter ‘Dentformatics’ and creating subcommittees for planning and implementation of activities for the 2019 American Medical Informatics Association (AMIA) Annual Symposium. These subcommittees include pre-symposium workshops, panel presentations, a dental informatics (DI)-quarterly newsletter and collaborative manuscript/abstract submission.

Dr. Neel Shimpi, also presented at the “Dental Informatics: Year-In-Review” Webinar held on Monday, December 10, 2018. Presentations were also given by: Karen Williams, DrPH, MBA, Vice-Chair of AMIA DI-WG. Dr. Williams is a Post-doctoral Fellow at Center for Biomedical Informatics, Indiana University, Regenstrief Institute, IN.

DI-WG hosted this webinar for AMIA and non-AMIA members. DI-WG includes interdisciplinary membership with 52 members from organizations including, 34 academia, 12 hospitals and industry and 7 research institutions.

The webinar contained an overview of the future activities that will be conducted within the DI-WG and results of the survey that was conducted to understand the opinions of DI-WG members. The webinar discussed challenges and opportunities identified by the survey participants in the field of dental informatics. Some current challenges in dental informatics include: linkage of dental records to rich physical health data, lack of appreciation of the benefits of informatics, removing silos and working together to support a meaningful collaboration among dental informatics professionals. Some opportunities include integrated data, medical-dental integration, generation of new knowledge using private practice, utilizing electronic dental records for personalized decision making, and identifying dental informatics as core research.

Book Chapters: January 2019

Dr. Amit Acharya, COSH Research Scientist and MCRI Executive Director has served in an editorial capacity along with three other scientists to publish the second edition of *Integration of Medical and Dental Care Data*. This new publication is currently available online with hard copies becoming available in Spring 2019:

Integration of Medical and Dental Care and Patient Data (Second Edition). Editors: Acharya, A., Powell, V., Torres-Urquidy, M.H., Posteraro, R.H., Thyvalikakath, T.P. (Eds.) Springer Nature Switzerland AG, Cham Switzerland, 2019 (ISSN 2197-3741 (electronic) ISBN 978-3-319-98289-4 eBook) <https://doi.org/10.1007/978-3-319-98298-4>

Book chapters contributed by COSH staff include:

- **Panny A, Krueger K, Acharya A.** Achieving the 'True' Triple Aim in Healthcare. doi:10.1007/978-3-319-98298-4_2; pgs:11-32.
- **Acharya A, Geist S-MRY, Powell V, Torres-Urquidy MH.** An Environmental Scan of the Various Oral-Systemic Contact Points. doi:10.1007/978-3-319-98298-4_3; pgs:33-46. **Shimpi N, Ashton JL, Sorenson CA, Louay DO, O'Brien J, Melms W, Acharya A.** Interdisciplinary Care Model: Diabetes and Oral Health. doi:10.1007/978-3-319-98298-4_4; pgs:47-61.

- **Shimpi N, Dart R, Umukoro P, Acharya A.** Interdisciplinary Care Model: Cardiovascular Diseases and Oral Health. doi:10.1007/978-3-319-98298-4_6; pgs:71-85.
- **Glurich I, Shimpi N, Acharya A.** Interdisciplinary Care Model: Chronic Kidney Disease and Oral Health. doi:10.1007/978-3-319-98298-4_7; pgs:87-107.
- **Glurich I, Shimpi N, Scannapieco F, Vedre J, Acharya A.** Interdisciplinary Care Model: Pneumonia and Oral Health. doi:10.1007/978-3-319-98298-4_9; pgs:123-139.
- **Shimpi N, Pathak R, Acharya A.** Interdisciplinary Care Model: Metabolic Syndrome and Oral Health doi:10.1007/978-3-319-98298-4_10; pgs:141-154.
- **Shimpi N, Glurich I, Acharya A.** Integrated Care Case Study: Marshfield Clinic Health System. doi:10.1007/978-3-319-98298-4_17; pgs:315-326.

Publications: July 2018 – December 2018

- **Shimpi N, Glurich I, Schroeder D, Katrak C, Chyou PH, Acharya A.** Patient Awareness of Association of Diabetes and Periodontal Disease. *Health Promot Pract.* 2018; doi: 10.1177/1524839918801909. [Epub ahead of print]
- **VanWormer JJ, Tambe SR, Acharya A.** Oral Health Literacy and Outcomes in Rural Wisconsin Adults. *J Rural Health.* 2019; 35(1):12-21. doi: 10.1111/jrh.12337. [Epub ahead of print 2018 Nov 23.]

Go to <http://www.marshfieldresearch.org/iosh/publications-and-presentations-2018> for more publications and presentations.



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