



Health & Hydration Committee (10)

Monday, June 17th, 2019

2:30 pm – 4:15 pm GMT

Face to face – Dublin, Ireland

Minutes - Approved

Attendance:

Scott Shi, Co-Chair, CBIA
Geoff Parker, ABWI, ICBWA Vice-Chairman
Patricia Fosselard, EFBW
Stewart Allen, ICBWA Chairman
Annick Moreau, EFBW
Chris Dunn, ICBWA Treasurer
Jack West, IBWA
Doug Hidding, Supplier
Bob Hidell, Supplier
Nathalie Beriot-Nicolas, Advisor
Kyle Hidding, Guest
Madam Zhoa, CBIA
Valbona Malo, Advisor

Jyoti Bhasin, Guest
Ulrich Kreuter, Advisor
Jacki Allen, ICBWA

Regrets:

Petra Sanchez, ABINAM
Joe Doss, Co-Chair, IBWA
Phyllis Rokus, Advisor
Tim Carey, ABWI

Phone:

Edgar Castillo, LABWA
Elizabeth Griswold, CBWA

Start Time: 2:38 PM GMT

Minutes – Review and Approval

No previous minutes to approve (all approved at the last Board Meeting held on March 5th, 2019)

1. Water Intake: Adequate Hydration - Global Water Consumption Guidelines

Jacki will help out in gathering new logos - and post current doc on website with a disclaimer for low res logos

2. Recent updates on hydration and health events/research

EFBW - small team, priorities for them at the moment are all sustainability focused. no action plans on health and hydration

IBWA - 18 months ago, ground-breaking study that showed for the first time a relationship between stress producers and hydration (increased water intake, decrease in health issues. (university of Stockholm - on DWRF website). The release said 69 percent of the growth in bottled water consumption came from people shifting away from carbonated soft drinks and fruit drinks. This shift has saved approximately 470 billion calories and 73 million pounds of recyclable PET plastic last year alone.

IBWA has continued its efforts to publicize the good news that bottled water has maintained its position as the #1 packaged beverage product in the US after overtaking CSDs in 2016. They continue to provide IBWA members with media “tool kits” comprised of posters, social media calendar and suggested posts to help them promote healthy hydration. The messaging makes it clear that the shift from CSDs to bottled water reflects a continued demand by consumers for a

healthy, safe, convenient packaged drink. IBWA continued its efforts to ensure that the 2020 Dietary Guidelines for Americans continue to recognize the importance of water as healthy hydration source and a key part of a healthy diet. IBWA is also requesting that the DGAs recommend that water be added to the MyPlate nutrition graphic. The DGAs are important because they serve as the foundation for many nutrition policies and programs in the US.

- **CBIA** - On March 21, 2018, phase 3 of “Water Education” Project was launched at Pu Wai elementary School in Beijing. Supported by the National Water Conservation Office of the Ministry of Water Resources and other Government bodies. Some companies are involved. Reported by more than 10 media outlets including Sohu. On March 20, 2019, phase 3 was launched at the Star School of Tongzhou District, Beijing. 12 bottled water companies participated in the event. Business representatives enter the classroom. 12 companies were divided into 3 groups: 1) Know Water; 2) Love Water, and 3) Save Water. Sohu and other medias published activity reports.

3. DWRF - funded research - Machine Learning in Modeling the Elusive Daily Water Requirement (see pages 22-27 for Project Details)

DWRF - there is a gap in the clinical knowledge about copeptin threshold on stress reducers. DWRF is funding a clinical study on collection of serum, looking for copeptin levels, surveys on drinking attitudes, etc. Project details:

DWRF PROJECT

DATE SUBMITTED:

April 1, 2019

DATE APPROVED BY TRUSTEES:

April 26, 2019

FORMAL PROJECT NAME:

Machine Learning in Modeling the Elusive Daily Water Requirement



Health & Hydration Committee (10)

Monday, June 17th, 2019

2:30 pm – 4:15 pm GMT

Face to face – Dublin, Ireland

INVESTIGATORS NAME AND CONTACT INFORMATION:

Michael F. Bergeron, Ph.D., FACSM

Senior Vice President

SIVOTEC Analytic

Boca Raton Innovation Campus

4800T- Rex Avenue, Suite 315

Boca Raton, FL 33431

Phone: 706-284-7142

mbergeron@sivotecanalytics.com

Colleen X. Muñoz

Department of Health Sciences and Nursing

200 Bloomfield Avenue

West Hartford, CT 06117

Phone: 860-768-4368

cmunoz@hartford.edu

DESCRIPTION/OBJECTIVE:

Problem: Water intake guidelines are highly individual and variable because of the inherent dynamic integrated complexity of the brain's water regulation network.

Solution: Collect original data of healthy young adults and use advanced data mining, artificial intelligence, and machine learning combined with modern computing power to assess determinant patterns and develop and validate predictive models to address and more optimally manage/offset low water intake and its relevant challenges to human health.

This proposal seeks to:

- 1) Contribute to our understanding of human neuroendocrine defense of total body water as a sensitive and specific responsive biomarker of hydration status (i.e., using the unique plasma AVP-copeptin threshold);
- 2) Measure, determine, and incorporate high-value indicators and determinants of low water intake (e.g., anthropomorphic characteristics, habitual drinking habits, attitudes toward drinking, 24-h dietary intake) and water conservation biomarkers (e.g., copeptin; urine specific gravity, U_{SG} ; urine osmolality, U_{OSM}) to predict hydration status classification; and,
- 3) Develop practical evidence-informed daily water intake guidelines based on these data.

This proposal brings together two organizations for their initial collaborative effort: SIVOTEC



Health & Hydration Committee (10)

Monday, June 17th, 2019

2:30 pm – 4:15 pm GMT

Face to face – Dublin, Ireland

Analytics, Boca Raton, FL and the University of Hartford, CT. Each organization brings essential and distinctive expertise to this novel and innovative research. The Institutional Review Board (IRB) study protocol submission and approval, subject recruitment and participation, all direct measurements from each participant, and laboratory plasma copeptin and other biomarker analyses will take place at the University of Hartford; whereas all advanced data mining, artificial intelligence-guided machine learning iterative analyses, and predictive modeling will be done by SIVOTEC. New evidence-informed daily water intake guidelines based on these data will be collaboratively developed by both organizations.

This project involves two primary research modules:

Module 1: Original data collection involving approximately 80 healthy young adults living and conducting daily business in the community surrounding Hartford, CT. Subjects will provide medical history, record their dietary intake and physical activity, and will collect 24h urine on five consecutive days; subjects will meet with the research team daily to provide completed records, urinary collections, and a blood sample. Plasma copeptin will be used as the primary outcome variable to identify LOW- and HIGH-volume drinkers (L/day). Additional variables will include consumed macro- and micronutrients, caffeine, total water (from beverages and foods), and water specifically from bottles; urine specific gravity, osmolality, and color; plasma osmolality; body composition; thirst perceptions, exercise behaviors, and attitudes towards daily water consumption. Comparisons will be made to determine what factors, indicators, and individual characteristics distinguish these differentiated levels of habitual daily water intake.

Module 2: Rather than analyzing single-variable relationships and differences, SIVOTEC Analytics will clean and map the data and subsequently perform all descriptive and other initial analytics. Hundreds of interim models will be built using 10-fold cross validation, by randomly dividing the data into 10 equal segments, using nine of the segments to train each model and the remaining segment for testing. This procedure will be repeated 10 times, using a different segment as the test set in each iteration, and then the results are combined. For each learner (algorithm), this entire process will be repeated 10 times to reduce bias, ensure replicability, and determine overall model performance. These results would be used to determine the highest-precision validated predictive model(s) for clinical application that can be practically integrated into establishing evidence-informed guidelines for daily water intake.

ANTICIPATED LENGTH OF PROJECT AND TARGET COMPLETION DATES:

April - May, 2019

Submit University of Hartford IRB proposal

June - July, 2019

Address IRB proposal modification requests

Purchase supplies and consumables

July - August, 2019

Begin subject recruitment

Begin testing

Collect human subjects data and enter in spreadsheets

Begin analyzing diet records

April 1, 2020

Submit interim report to DWRF (goal: $n \geq 30$ subjects)

April - June, 2020

Complete human subjects testing (goal: $n = 80$ subjects)

Prepare preliminary abstracts (partial data sets) for Scientific Conferences

Begin manuscript preparations utilizing 1-2 research questions (without copeptin data)

Conduct copeptin laboratory analyses

June, 2020 and beyond

Begin data analyses, include copeptin data

Submit abstracts to scientific conferences

Construct and submit manuscripts to peer-reviewed journals

August 1, 2020

Submit final report to DWRF



Role of SIVOTEC Analytics in the proposed research

- 1) SIVOTEC will collaborate with Dr. Muñoz on the planned protocol and data collection as determined by the Research Questions.
 - a. This will include the mechanisms for all data collection/interim storage and transfer, as well as related assays of all analytes.
 - b. Discuss in detail and refine (as needed) research timelines and deliverables. This will greatly enhance our initial perspective of current needs and facilitate a viable step-wise strategy for our analytics and modeling strategy.
Secure transfer and local storage (mirrored from University of Hartford) of de-identified data to SIVOTEC. Fully assess the data for content/context, clarity, consistency, and readiness to fulfill the desired data analysis, integration, and modeling development.
- 2) Clean and map the data; and then perform all descriptive and other analytics.
 - a. Work with Dr. Muñoz in ongoing dialog to clarify and prioritize the data and analytic outcomes for scientific, clinical, and DWRF practical relevance and application. This is integral for optimizing the data management process and initial related analytics, as well as achieving the desired development and application insights.
 - b. Build the validated predictive models for clinical and scientific application that can be practically integrated into practice and hydration status tracking.
- 3) Work closely with Dr. Muñoz to develop and deliver to DWRF a detailed summary report inclusive of data analytics insights and the clinical, scientific, and practical significance of the results found and recommended implementation and viable ways forward.

SPECIFIC RELATIONSHIP TO DWRF'S OBJECTIVES:

This research will provide new insights and definitive practical information specific to determinants and indicators of hydration status in this population of healthy adults. From this novel and important perspectives, practical guidelines daily water intake guidelines will be developed that will reinforce effective drinking water behavior to optimize associated acute and long-term health benefits.

ANTICIPATED PRACTICAL USE OF RESULTS:

The results of this research will be submitted for publication consideration in recognized peer-reviewed clinical/scientific journals. Overall results, implications, and guidelines will be posted to the DWRF, IBWA, and other websites appropriate for the public and member use. Also, the information from this research will be used to support and promote daily water intake requirements with the



Health & Hydration Committee (10)

Monday, June 17th, 2019

2:30 pm – 4:15 pm GMT

Face to face – Dublin, Ireland

scientific community, government agencies, as well as media and other publications.

FUNDING REQUIREMENTS:

University of Hartford: \$ 31,555.78

SIVOTEC Analytics: \$ 10,000.00

Total Project Cost: \$ 41,555.78

STAFFING REQUIREMENTS/RESPONSIBILITIES:

Monitor and report progress of the research to the DWRF Trustees. One interim report and one final report will be submitted to DWRF.

PROJECT MEASURABLES/RESULTS:

- 1) Contribute to our understanding of human neuroendocrine defense of total body water as a sensitive and specific responsive biomarker of hydration status (i.e., using the unique plasma AVP-copeptin threshold);
- 2) Measure, determine, and incorporate high-value indicators and determinants of low water intake (e.g., anthropomorphic characteristics, habitual drinking habits, attitudes toward drinking, 24-h dietary intake) and water conservation biomarkers (e.g., copeptin, U_{SG} , U_{OSM}) to predict hydration status classification; and,
- 3) Develop practical evidence-informed daily water intake guidelines based on these data.
- 4) Construct at least two scientific manuscripts. See Research Questions (enclosed with this document)

5. Adjournment

The Meeting was adjourned at 3:47 PM GMT