SHOW
survey of the health of wisconsin

School of Medicine and Public Health
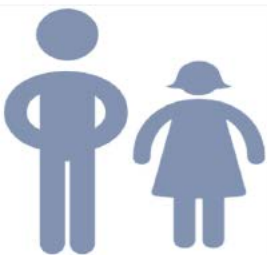UNIVERSITY OF WISCONSIN-MADISON

SHOW PERC PROGRESS REPORT 2018-2019

The Survey of the Health of Wisconsin (SHOW) remains a one of a kind, resource to the School of Medicine and Public Health (SMPH), the University of Wisconsin (UW)-Madison campus, and other organizations in the state. The research infrastructure, including a vast biorepository, is a dynamic framework. Between 2015 and 2019 the program was an important platform to accelerate both academic and community-driven research that continues to have lasting impact on future research. It remains an important tool for monitoring the social determinants of health and health outcomes of Wisconsin residents statewide and in select counties (4,6,8-30, Appendices F,G). Data have been used by academics across the UW including SMPH, School of Nursing, Kinesiology, Sociology, Nutritional Sciences, UW Carbone Cancer Center, the Molecular Environmental Toxicology Center, and School of Veterinary Medicine for peer reviewed research and new grant opportunities. The program has begun to attract both national and international attention for its growing biorepository of microbiome, epigenetic and genetic data. Numerous medical, Masters of Public Health, MS and PhD students have also completed training, and internships and used SHOW data to advance their education in SMPH.

Between 2015-2019 WPP investments in the SHOW infrastructure have allowed investigators from across UW- Madison to leverage this unique resource, bringing over $1.5M in ancillary funds to the program for SHOW's expertise in protocol development, in the field recruitment, community based sample collection, quality assurance and quality control to conduct applied public health, dissemination and implementation, and translational population health sciences research (see Letters of Support Appendix A). Since March 2015, 35 publications (11 in the past year) and 108 presentations (32 in the past year) have resulted from SHOW or ancillary to SHOW data.

Progress on Aims: Following is an abridged summary of **SHOW's achievements towards specific aims** for 03/1/2015-6/30/2019 including **new opportunities and enhancements to SHOW's scope and infrastructure that have contributed to our accomplishments** during the current extension period, (03/1/2018-6/30/2019). Progress includes accelerated use of the biorepository for translational research, increasing NIH, external federal and other ancillary awards building on the infrastructure including new microbiome and implementation science, expanded partnerships and dissemination. SHOW continues to serve as an important resource for training in epidemiology and population health sciences, with core SHOW data integrated into SMPH and UW-Milwaukee curriculum and over 40 undergraduate, graduate, medical students and preventive medicine residents advancing their careers using SHOW resources.

Aim 1: Maintain a novel population health research infrastructure for tracking trends in priority health indicators and allowing transdisciplinary research examining the multiple determinants of health and health disparities in Wisconsin.

Between 2015-2019 SHOW modified its sampling frame to improve efficiencies in sample recruitment and continued to maintain a high quality infrastructure comprised of administration, field staff, and scientists. A focus on service over the last three years has enabled the program to excel in the use of the program data for research, applied public health and eduction. SHOW continues to be a unique and valuable resource because of its population-based at-the-door recruitment, comprehensive social determinants of health data combined with extensive biomarkers and stored biosamples. Key highlights from 2015-2019:
- The core study population now includes over 6,200 Wisconsin residents (including children and adults) living across 62 counties (see Tables 1-2; Appendix F, SHOW Methods Paper).
- Average annual recruitment increased from 563/year in 2008-2013 to 653/year 2014-2016.
- 867 children less than 18 years of age were enrolled between 2014 and 2017.

- Over 35 peer review papers, 108 presentations (Appendix B).
- Expanded ancillary study funds over $1.5 million including new microbiome sample collection including the gut, skin, and oral microbiome, household dust, and soil collection.
- Increased use of infrastructure for implementation science (e.g. Dr. Heidi Brown and Dr. Lisa Cadmus-Bertram) and translational research (see Appendix C and D).
- Enhanced community based partnerships and under-represented recruitment (see below).
- Longitudinal follow-up of 725 adults in 2017 and additional follow-up and reconsent of 325 individuals in 2018 for repeat household, microbiome and biomarker collection.

Recruitment of under-represented racially and ethnically diverse populations began in 2018.
Efforts to build partnerships and increase capacity for health equity research include:
- Focused recruitment and retention began in 2016 with partnership building in Milwaukee. Presentations, listening sessions, and focus groups were held with the UW WAI community advisory board representing Milwaukee's African American (AA) Community; United Community Center (UCC) collaborations represent the Latino community (Table 3).
- Ongoing efforts include outreach and engagement at community events (27 in 2018; 28 planned in 2019 thus far) (Appendix E).
- Outreach specialists and field staff from the AA and Latino community were hired and trained to build community capacity and to support health equity research.
- Nearly 100 surveys have been completed or are scheduled and remaining (N=200-300) planned surveys are scheduled to be complete by the end of summer 2019.

Ongoing growth and enhancements to SHOWs extensive biorepository include:
- Continued growth from 128,000 biological samples collected between 2008-2014 to >225,000 from over 5,000 participants in 2015-2018 (Table 4).
- Increased utilization of samples by SMPH and other UW faculty for a range of 'omics' analyses, increasing the number of internal UW pilot awards and NIH applications (Table 5).
- Addition of innovative biomarker samples including stool, skin, nasal and oral swabs, hair and saliva. Paxgene tubes for RNA extraction and peripheral blood mononuclear cells (PBMCs) for single cell extraction.
- Repeat biospecimen collection on 550 past 2008-2013 participants.
- New protocols and collection of fasting blood and PBMCs in a non-clinical setting (n=140 follow-up microbiome participants).

Infrastructure improvements for tracking and adding new biologic samples were also made:
- In 2018, a new biobank management software, Freezerworks was purchased allowing for enhanced security, HIPPA compliance capabilities, and improved sample tracking.
- This process included a reinventory of all current samples and entry into the new software, the transition to the new system is scheduled for completion by the end of 2019.

SHOW developed capacity for investigator-driven, population based microbiome research, an emerging priority area at the UW. Major milestones were:
- Development of rigorous protocols for in-home and personal sample collection.
- *Winning the War on Antibiotic Resistance in Wisconsin* - 2016 ancillary study award. *The WARRIOR Study* (The Wisconsin Microbiome Study) included collection of stool samples for gut microbiome analysis among 725 SHOW participants.
- The Population-based Microbiome Research Core (PMRC), a follow-up study for repeat biomonitoring of the microbiome and home sampling, was established as a resource for the entire UW community. The goals were to enroll a subset of 325 past WARRIOR participants to collect repeat biomarkers and household samples (dust, soil, high touch swabs) for microbiome and antimicrobial resistance research. PMRC is the first of its kind and among

the largest longitudinal population-based microbiome studies with repeat measures (Table 6). Investigators from across SMPH, the UK London and University of Purdue have already submitted grants to the Burroughs Welcome Trust and NIH to use these samples.

Use of SHOWs stored biological samples by SMPH investigators also grew (see Table 5) in large part due to focused program investments in promoting the infrastructure. Between 2015-2019 28 new federal and other grants were proposed with 8 grants (4 NIH) being funded. Table 7 provides a summary of proposals submitted, and pending funding. Tables 8 and 9 summarize the federal and non-federal grants submitted and pending review as of March 2019. Appendix D provides a full review. Key program activities implemented to support this growth include:

- Establishment of a competitive two-tier biospecimen pricing policy (UW investigators and non-UW investigators) that is available on the SHOW website.
- Creation of a pilot project fund to support analysis of SHOW biospecimens for future NIH awards. To-date, two research groups (Denu-WID/UWCCC, Lamming-VA Hospital / Nutritional Sciences) have been supported, and 2 more proposals are currently under review.

Partnerships in support of research transecting population and public health were fostered by providing data to leaders at the state, county, community, and neighborhood levels as well as academic researchers across the state.

- Between 2014-2016 adding county to the sampling strategy enabled county-specific estimates for 10 selected counties. Counties added questions to gather data of public health importance to their county, including questions prevalence of invdividuals with family members or friends with alcohol and drug abuse issues affecting health and well-being.
- Specialized reporting has been possible with MPH and Preventive Medicine fellow's reports to Dane and Brown counties; the reports provide more in-depth data, supplementing Brown county's recent health needs assessment (see Appendix G).

State agencies used SHOW to conduct cost-effective public health surveillance, program planning and evaluation.

- In collaboration with the Wisconsin Department of Health Services (DHS) SHOW began collection of data on Carbon Monoxide detector awareness, proper use and maintenance.
- SHOW led a DHS funded ancillary study to collect biosamples and survey data for over 400 anglers and 180 high risk Burmese immigrants to determine health risks of fish consumption in local Wisconsin waterways of concern based on historical pollution.
- In April 2019 SHOW collaborated with DHS and the WI State Laboratory of Hygiene for a future statewide environmental biomonitoring program.
- Support of the UW/WPP Obesity Prevention Intiative included collection of data on child BMI and physical activity and three manuscripts, including an evaluation of the prevalence and determinants of childhood obesity (pending review Wisconsin Medical Journal) and social determinants of physical activity completed by MS students in Population Health Sciences.

Expanded campus collaborations led to the UW Carbone Cancer Center (UWCCC) population health division using SHOW for cancer prevention and grant support:

- SHOW data were used to describe preventive health behaviors, cancer risk (obesity), screening and prevention supporting successful renewal of the center application.
- SHOW is currently supporting a cancer survivorship follow-up survey in summer 2019.
- UWCCC pilot awards were awarded using SHOW including: 1) identification of cancer biomarkers; and 2) development of residential histories to examine how changes in social determinants across the lifecourse influence cancer prevention and behaviors (ongoing).

Program impact is also reflected in the number of investigators on and off campus that continue to leverage the existing SHOW infrastructure, data and biorepository for grants to federal agencies. Faculty from SMPH, Veterinary Medicine, Nursing, Sociology and the Wisconsin Institute for Discovery have begun to see SHOW as viable for advancing their research. Diverse topics of NIH awards include Microbiome and Drug Development, Epigenetics of Social Disadvantage, Epigenetics and Genetics of Metabolic Health, Pesticides and Child Birth Defects, Impacts of Stroke on Neurocognitive Outcomes, Urinary Continence and Quality of Life interventions. Tables 7-9 summarize federal and non-federal grants submitted or pending, for a full listing of grants submitted see Appendix D. Additional highlights of SHOWs support of grant applications include:

- Among the 35 federal submissions or resubmissions between 2015-2019, 9 were funded, 21 not funded, and 5 (one R01 and one R21) are pending. Of these 12 were submitted in 2018.
- Among the 36 nonfederal submissions or resubmissions, 16 were funded, 16 not funded and 4 are pending. Ten were submitted in 2018 indicating sustained and growing interest.

Aim 2: Support data dissemination and educational initiatives for applied public health practitioners, faculty, and students interested in studies examining multi-layered determinants and outcomes of priority health conditions in the state.

Priorities were to generate new data and maintain complex data systems. Annually, the data team reviews thousands of individual-level variables for logical, processing, and data input errors that are stored by unique study ID number in SHOW databases and datasets on secure servers. The SHOW website (www.show.wisc.edu) continues to serve as a hub for information sharing with researchers, public health practitioners, students and potential study participants. Our Data Service Center tab includes information for new data users including data use and publications policies as well as full-detailed codebooks, organized by topic, with response frequencies for data elements (https://show.wisc.edu/data/). Guidance for analyses and methodological best practices are provided. Highlights include:

- 472 unique users; 64% Madison and 13% Milwaukee area visited the SHOW portal.
- 2018 showed an 8% increase in the times visitors have accessed the SHOW codebooks.
- SHOW received over 66 data requests in the past year and over 400 data requests to-date from partners within and beyond the University.
- Since March 2015, 35 publications (11 in the past year) and 108 presentations (32 in the past year) have resulted from SHOW or ancillary to SHOW data (see Appendix B).

Important resources for training students and fellows were also provided (Table 10).
- SHOW annually employs up to ten UW graduate and undergraduate students.
- SHOW supports UW SMPH Medical Shapiro program (4), Preventive Medicine Residents (2); MPH students; PHS doctoral students and clinical-scientists.
- SHOW also supported expanded education by providing datasets for epidemiology and biostatics at UW-Madison and UW-Milwaukee Zilber.
- 18 UW graduate student projects using SHOW data were on-going in the past year from Sociology, Population Health, Nursing, Kinesiology, Urban Planning and Human Ecology.
- Three Population Health Sciences (PHS) program PhD and one Nursing PhD dissertation, two MS thesis and one MPH capstone projects with SHOW data completed in 2018-2019.

Aim 3: Provide a flexible, high quality, and cost-effective infrastructure that is responsive to changing health and research priorities in the state and supports a host of ancillary studies.

SHOW has continued to serve as a resource flexible enough to integrate hypothesis-driven research through its ancillary study mechanism. Since 2015, ancillary projects have brought in over $1.5M to the SHOW infrastructure and SHOW contributed to projects resulting in over

$13M dollars to SMPH and the UW (See Figures 1&2). See Appendix C for a summary of 35 ancillary projects completed using SHOW's infrastructure since 2015.

- Translational research projects (11 ongoing in the last year) included the use of existing SHOW or SHOW/WARRIOR microbiome data and biorepository specimens for biomarkers development, drug development, risk assessment, and mechanisms discovery.
- University grant development projects (10 ongoing in the last year) included pilot or other projects generating preliminary data for investigators for future grants including federal submissions. Projects in this category also built on the SHOW framework and added depth to the SHOW core data and biorepository for future grants development (for example, microbiome data and genetic data).

Community-specific projects have also been possible owing to SHOW's existing systems and staff who are uniquely trained to facilitate and problem solve across the various domains of community-based research projects - tailored study design and recruitment, database design and production, protocol development and implementation for data and biospecimens alike. Separate modules and follow-up surveys have informed community-based research programs and health care system intervention development. County-specific assessments have been possible through added modules for health priorities and by supporting county reporting.

- SHOW has supported 11 public health or community health ancillary projects since 2015.
- Appendix G is a summary of our Brown County Health report (see also Letters of Support).

Unanticipated Challenges (16 month extension) and Progress Towards Future Goals

The program achieved the majority of its goals for the 16 month extension including increasing community based partnerships for focused population health research. We were successful in purchasing new biosample software, launching a pilot program for analysis and use of biosamples for new grant submissions. We also were successful in community-engaged research efforts leading to the full translation of SHOW into Spanish and launching a Hispanic pilot and we have forged growing relationships with the UW CCE, to further promote partnerships.

The majority of challenges were related to IT infrastructure and data sharing. We proposed in the extension to use the Health Innovation Program for creating dedicated, secure server space for investigators wishing to link electronic medical records (EMR) to existing SHOW participants' survey data. We will continue to seek partners who are interested in EMR linkage with SHOW but have postponed making the expensive HIP server investment having found no interested and funded investigators ready to use such a resource to-date. We did expand use of the Social Science Computing Center for secure data sharing and epigenetic and genomic data on over 650 SHOW participants.The program also lost its database administrator in 2017 due to an out of state move. Recruitment and retention of a high quality replacement are ongoing and we are currently in the process of reconfiguring IT and data security needs. Future plans include employing SMPH Shared Services for desktop support, and continued parterships with UW DoIT for database support as well as hiring a part-time individual to serve database management needs.

Finally, the program prioritized field data collection for ancillary studies in 2018, coupled with important partnership building, and challenges in field collection, we had unanticipated delay in SHOWs core field data collection of under-represented groups in Milwaukee. However, plans are in place to complete recruitment of 150-200 individuals June 2019. We will build on this progress and partnerships to recruit an additional 300-400 self-identified black residents and Latino residents from Milwaukee 2019. SHOW has also experienced much greater delays in protocol approval from the IRB over the last few years, making our flexiblility to launch new studies, and alter protocols in a timely fashion much more challenging. Despite challenges, we have achieved all aims and laid important groundwork to continue to excel as an innovative resource for population health sciences research well into the future (Appendix F).

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Table 1. SHOW Cohort Demographics for Adults by Cohort Year, 2008-2017.

Demographic characteristics	2008-2013 Cohorts			2014-2016 Cohort			2017 Follow-up Cohort		
	N*	Mean**	95% CI**	N*	Mean**	95% CI**	N*	Mean*	95% CI***
Age$^{\Delta}$ (years)	3380	45.6	(44.8, 46.4)	1957	48.7	(46.8, 50.6)	725	54.1	(52.8, 55.3)
	N*	Percent**	95% CI**	N*	Percent**	95% CI**	N*	Percent*	95% CI***
18 to 29	512	16.6	(14.3, 18.9)	278	15.8	(12.5, 19.1)	29	4.0	(2.2, 5.8)
30 to 39	592	20.7	(18.4, 23.1)	346	20.7	(17.4, 24.1)	114	15.7	(12.7, 18.7)
40 to 49	690	21.3	(19.3, 23.3)	255	14.2	(11.4, 16.9)	128	17.7	(14.5, 20.8)
50 to 59	813	23.1	(21.2, 25.1)	353	19.2	(17.4, 21.0)	157	21.7	(18.3, 25.0)
60 to 74	773	18.2	(16.5, 20.0)	525	22.5	(18.8, 26.2)	238	32.8	(28.9, 36.7)
75 or older	NA	NA	NA	200	7.6	(6.0, 9.1)	59	8.1	(5.9, 10.4)
Gender									
Male	1479	50.1	(48.5, 51.8)	864	49.1	(47.2, 50.9)	288	39.7	(37.0, 42.5)
Female	1901	49.9	(48.2, 51.5)	1093	50.9	(49.1, 52.8)	437	60.3	(57.5, 63.0)
Race / ethnicity									
Non-Hispanic white	2867	85.1	(83.0, 87.3)	1623	85.0	(81.7, 88.2)	575	79.5	(76.1, 82.9)
Non-Hispanic black	243	6.1	(4.7, 7.6)	151	6.3	(3.6, 9.1)	96	13.3	(10,3, 16.2)
Hispanic	108	4.1	(2.8, 5.3)	77	3.9	(2.8, 5.0)	22	3.0	(1.6, 4.5)
Other	154	4.7	(3.3, 6.0)	104	4.8	(3.9, 5.7)	30	4.2	(2.6, 5.7)
Education									
Less than HS	258	7.5	(6.3, 8.7)	132	6.5	(4.9, 8.1)	47	6.5	(4.7, 8.3)
HS degree or some college	1416	40.7	(38.1, 43.3)	775	40.1	(37.7, 42.4)	272	37.5	(33.7, 41.3)
Associate's degree or higher	1701	51.8	(49.1, 54.4)	1048	53.5	(50.2, 56.7)	406	56.0	(52.0, 60.0)
Poverty									
≤ 200% FPL	985	29.0	(26.4, 31.5)	556	30.5	(26.7, 34.2)	167	23.7	(20.1, 27.2)
> 200% FPL	2249	71.0	(68.5, 73.6)	1303	69.5	(65.8, 73.3)	539	76.4	(72.8, 79.9)
Employed (among the economic labor force)									
Yes	2283	91.1	(89.7, 92.5)	1115	92.6	(90.7, 94.5)	450	95.3	(93.4, 97.2)
No	238	8.9	(7.5, 10.3)	92	7.4	(5.5, 9.3)	22	4.7	(2.7, 6.6)

Health insurance coverage over the last 12 months									
0	316	9.1	(7.7, 10.4)	75	4.1	(2.3, 5.9)	12	1.7	(0.7, 2.6)
1 to 11	216	6.3	(5.3, 7.3)	146	8.3	(7.0, 9.5)	30	4.1	(2.6, 5.7)
12	2833	84.6	(82.9, 86.4)	1742	87.6	(84.7, 90.5)	681	94.2	(92.3, 96.0)
Census 2010 urban / rural classification									
Urban	2139	67.1	(61.4, 72.7)	1339	69.9	(48.8, 90.9)	575	79.3	(75.6, 83.1)
Rural	1241	32.9	(27.3, 38.6)	618	30.1	(9.1, 51.2)	150	20.7	(16.9, 24.4)

* Unweighted

** Weighted and adjusted for the stratification and clustering in the complex survey sampling design.

*** Unweighted but adjusted for clustering at the household level

Δ Age range of adult participants in SHOW 2017 was 25 to 82. Age range of adult participants in SHOW 2014-2016 was 18 to 98.

Table 2. SHOW Cohort Demographics for Children by Cohort Year, 2014-2017.

Demographic characteristics	2014-2016 Cohort			2017 Cohort		
	N*	Mean**	95% CI**	N*	Mean*	95% CI***
Age (years)	645	7.7	(7.1, 8.3)	222	8.6	(7.9, 9.4)
	N*	Percent**	95% CI**	N*	Percent*	95% CI***
0-6	279	44.8	(39.4, 50.2)	71	32.0	(25.3, 38.7)
7-11	182	28.1	(25.5, 30.8)	88	39.6	(33.4, 45.9)
12-17	184	27.1	(22.2, 31.9)	63	28.4	(21.4, 35.4)
Gender						
Male	332	51.1	(46.5, 55.8)	123	55.4	(49.1, 61.8)
Female	313	48.9	(44.2, 53.5)	99	44.6	(38.2, 50.9)
Race / ethnicity						
Non-Hispanic white	472	71.4	(62.9, 79.8)	149	67.4	(57.7, 77.1)
Non-Hispanic black	103	16.8	(8.2, 25.5)	38	17.2	(9.2, 25.2)
Hispanic	15	2.5	(0.2, 4.7)	23	10.4	(4.7, 16.1)
Other	53	9.3	(5.5, 13.2)	11	5.0	(0.0, 10.1)

* Unweighted

** Weighted and adjusted for the stratification and clustering in the complex survey sampling design.

*** Unweighted but adjusted for clustering at the household level

Table 3. SHOW Community Based Partnerships and Activities, 2017-2019

African American- Milwaukee -In 2017 SHOW began working with Gina Green-Harris, Director of the UW Center for Community Engagement and Health Partnerships and her long-standing Community Advisory Board (CAB) that advises on research with the African American community in Milwaukee. SHOW Community Outreach Specialist and Field Interviewer, Tarakee Jackson's close collaboration with the center has fueled SHOW's growing community engagement strategies in Milwaukee,

Under-represented Communities- Madison, Erin Bailey with the UW Carbone Cancer Center (UW-CCC) Cancer Health Disparities Initiatives (CHDI) program has been working with SHOW to build partnerships with community organizations through presentations and listening sessions, with the goal of building capacity for projects leading to data-driven responses to health inequities in the UW-CCC catchment area. Ongoing work includes planned listening sessions in Dane County to support the development of such projects.

Latino – Milwaukee - Also in 2017, planning began for a community informed Latino Pilot with the United Community Center (UCC). MPH student, Allison Rodriguez joined Ms. Jackson in coordinating activities to partner with the UW Collaborative Center for Health Equity (CCHE) Research Ambassador Al Castro. Focus groups were held and recruitment strategies were modified according to stakeholder input. Spanish translations of the survey materials were recently completed and event based recruitment of approximately 100 Latinos will begin in summer 2019. Bilingual interviewers and new approaches to recruitment are crucial modifications for this pilot project.

Asian American (Burmese) – Milwaukee- In collaboration with the Wisconsin Department of Health Services (DHS) an ancillary study examining environmental exposures among high-risk Burmese population. PHS doctoral student Amy Schultz led these efforts. Recruitment and retention relied on respondent driven sampling which increased SHOWs capacity to conduct non-random sampling approaches. Similar methods are being considered to improve recruitment in high-risk AA communities in Milwaukee for 2019.

Table 4. SHOW Core Biorepository Inventory

| | SHOW Cohort Year | | | | | | | | | | |
	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL
Participating Subjects	198	296	853	802	389	379	411	559	591	550	5,028
Serum	1,884	2,743	8,643	8,698	4,659	4,698	3,970	5,982	5,884	3,213	50.374
Plasma	2,853	3,720	10,728	11,132	5,888	6,025	4,997	7,002	7,184	4,098	63.627
Urine	2,515	4,017	12,442	12,686	5,534	5,474	5,265	7,108	8,275	7,196	70,512
WholeBlood PaxGene							354	504	524	486	1,826
DNA blood/saliva	103	272	819	781	377	378	388	532	568	515	4,733

Table 5. Usage of SHOW Biospecimens by UW Investigators

Biospecimen use by year	Plasma/ serum	Urine	DNA	Stool	PAXgene
2016	840	80			40
2017	460	965	61	525	50
2018	300	229	870		150
2019	208	180			

Table 6. SHOW Ancillary Population-based Microbiome Research Core (PMRC) Biorepository Inventory

	Baseline		Follow-up	
	# of participants (P) or households (H)	# samples	# of participants (P) or households (H)	# samples
Stool	749 (P)	749	306 (P)	4223
Saliva	788 (P)	788		
Plasma			142 (P)	1124
Household dust			301 (P)	1212
High touch swabs			235 (H)	699
Soil			203 (H)	1334

Table 7. NIH and Federal Grants Submitted and Pending Review as of March 2019

Study	Funding source	PI(s)/institution or department (SHOW partner)	Description	Status/ Timing
Researching Epigenetics, Weathering, Aging & Residential Disadvantage (REWARD)	NIH R01	Malecki/ Engelman Sociology and Pop Health Sciences	SHOW data and biosamples will be used for investigating DNA methylation as an epigenetic marker of biological aging to determine associations with individual and neighborhood level stressors in order to examine mechanisms behind social disadvantage **(uses SHOW biorepository)**.	Submitted 2/2018; Not funded. Resubmitted 11/2018; **Pending.**
Obesity, Toll-Like Receptors, and Human Sensitivity to the Environment	NIH R21	Malecki/PHS	SHOW data and biosamples will be used for investigating obesity, toll-like receptors and sensitivity to the environment **(uses SHOW biorepository)**.	Submitted 2/2018; Not funded. Resubmitted 11/2018; **Pending.**
PFAS Fate, Reduction and Development Origins of Toxicity	NIH/NIEHS	Lee, Wells/ Purdue Univ; Environmental Chemistry and Environmental and Occ.Health	SHOW data and biosamples will be used for investigating the relationship between PFAS measures in samples and cognitive function and neurologic and cardiovascular health outcomes **(uses SHOW biorepository)**	Submitted 12/2018; **Pending.**
StrokeNet Central Repository	NIH/NINDS	Dempsey/Neurological Surgery and Neurology	U19 Central Repository application for UW to NIH/NINDS; SHOW participating in central biorepository to store samples from StrokeNet cites across the country **(uses SHOW biorepository)**.	Submitted 4/2019; **Pending.**
EPHT Biomonitoring	CDC	Meimen, Werner/DHS; Malecki/PHS	This study will use the SHOW research infrastructure and biospecimens for monitoring environmental exposures among Wisconsin residents across the state, including cohort follow-up **(uses SHOW biorepository)**	Submitted 4/2019; **Pending.**

Table 8. Non-Federal (internal UW, or other) Grants Submitted, Pending as of March 2019

Study	Funding source	PI(s)/institution or department (SHOW partner)	Description	Status/ Timing
Building a Microbiome Informatics Resource	UW2020	McMahon/Bacteriology; College of Engineering	Contributing existing SHOW and SHOW/Population-based Microbiome Research Core (PMRC) microbiome data for building a microbiome hub.	Submitted 12/2018; **Pending.**
Social Determinants of the Microbiome	Burroughs Welcome Fund	Jennifer Dowd/Global Health and Social Medicine, Kings College London UK	Partnership with SHOW and PMRC proposed for investigating relationships between the microbiome and 1) early life social environments, 2) psychosocial stress and 3) place/built environment.	Submitted 12/2018; **Pending.**
Functional characterization of cholesterol regulatory SNPs and TMEM3 gene	UW Center for Human Genomics and Precision Medicine	Wei Xu/Oncology; Malecki/PHS	Using the SHOW research infrastructure (laboratory), existing SHOW data and CIDR data to characterize the function of cholesterol regulatory SNPs and the TMEM3 gene.	Submitted 3/2019; **Pending.**
Leveraging data from SHOW to explore stress, sleep, hunger & preferences	Center for Demography of Health and Aging (CDHA) Pilot	Ashton/SoHE	Using existing SHOW data to examine relationships between stress, sleep deprivation and hunger biomarkers and economic preferences.	Submitted 4/2019; **Pending.**

Table 9. Examples of Recently Awarded or Pending NIH or other Federal (CDC) Awards Using SHOW Data

Awarded NIH Grants
Microbiome - Dr. David Andes' awarded Centers of Excellence for Translational Research (CETR) U19, included Dr. Nasia Safdar's Project 3 of *Novel antimicrobials targeting MDR pathogens from animal microbial symbionts* relies on the SHOW-WARRIOR project (leveraging ~$0.5M of existing SHOW data and samples).
Omics Research - An X01 (X01HG010110) from NIH/NIEHS was awarded to support Multi-Ethnic genotyping array and Illumina Methylation EPIC array analysis of DNA from 650 SHOW participants for whom we also have data on gut microbiome. (>$350,000).
Environmental Health/Veterinary Medicine - Dr. Robert Lipinski, Veterinary Medicine received NIH funding to examine pert-butyl oxide, a pesticide agonist. Dr. Lipinski has preliminary data in animal models showing associations between BpO exposure and severe cranio-facial defects in mice. SHOW serum samples will be used to provide the first population based sample of BpO levels among women of reproductive age (leveraging ~$145,000 of existing SHOW data and samples)
Dissemination and Implementation Science - Dr. Heidi Brown has built several studies with SHOW to inform dissemination and implementation planning for community-based continence promotion programming (leveraging ~$120,000 of existing SHOW data and subjects). Wisconsin Department of Health Services submitted several applications to the CDC to support surveillance in partnership with SHOW.

Pending NIH Applications and Scores
Metabolic Health and Environmental Susceptibility - Nikodemova and Malecki received a score of 2 on a pending application titled *Obesity, Toll-Like Receptors, and Human Sensitivity to the Environment* to investigate mechanisms for susceptibility to environmental exposures and obesity, building on existing SHOW data and biosamples.
Epigenetics and the Health Disparities of Aging - Malecki and Engelman (Michal), are pending decisions on an R01 which scored in the 19th%tile just at the cut-point for new investigators, they will receive word in June 2018.
Stroke Center Grant - April 2019, U19 StrokeNet Central Repository application to NIH/NINDS submitted by Dr. Robert Dempsey in April 2019 relies heavily on SHOW's biospecimen handling and storage expertise.
Environmental Exposures and Neurologic Health - Malecki, LeCaire and Nikodemova are collaborators on a P42 application to NIEHS with investigators at Purdue University submitted in December 2018, *PFAS Fate, Reduction and Developmental Origins of Toxicity.* The project relies on existing SHOW data and specimens, including genetic data resulting from the X01 CIDR award as well as new data collection and new genetic testing. The subaward would bring ~$590,000 to the UW over 5 years.

Table 10. Completed Preventive Medicine, Shapiro, MPH, MS and PhD Student Projects

Student/Trainee Program	Title	Year
Preventive Medicine Residency		
Margaret Nolan, MD	Cancer Screening Participation by Smoking Status, Wisconsin, 2014-2016	2019
Elizabeth Stein, MD	Chronic disease risk factors among male veterans with a history of combat exposure—Survey of the Health of Wisconsin, 2010-2013. SHOW data for 2014 from Dane County for Healthy Dane.	2016
Shapiro Medical Student		
Omar Grantley Jarrett	Household Pet Ownership and the Microbial Diversity of the Human Gut Microbiota.	2018
Augustine Saiz Jr. and Allison Aul (joint project)	Food insecurity and cardiovascular health: Findings from a statewide population health survey in Wisconsin.	2015
MPH Students		
Jewon Lee	Survey of the Health of Wisconsin Community Health Report for Brown County.	2019
Madison Carey	Using Data for Public Health Action: The Role Stakeholder Engagement Played in Optimally Disseminating SHOW data	2016
Elizabeth Hovel	Economic Hardship and Cardiovascular Health in Wisconsin	2015
MS Students		
Rissa Lane	Comparison of Estimates of Physical Activity in Children and Adolescents living in Wisconsin measured with Subjective and Objective Tools	2019
Christian Schmidt	Bicycling rates and the prevalence of bicycle helmet usage in the state of Wisconsin using data from the Survey of the Health of Wisconsin.	2018
Linn Jennings	LGBT Health and Healthcare Access and Utilization in Wisconsin	2018
Kate Rifken	Veteran Access to Care and Health Outcomes	2016
Dhwani Bosamiya	Impact of Affordable Care Act dependent coverage expansion on insurance coverage and health-related outcomes of young adults in Wisconsin	2017
Jess Gorzelitz	Concordance of physical activity reporting: Interviewer-administered GPAQ verses waist accelerometry from 2014 SHOW Adult cohort	2016
Amy Schultz	Allergic disease associations with regional and localized estimates of air pollution	2015

Katilyn Booske	Predictors of mental health service utilization by adults with depression or anxiety symptoms in the survey of the health of Wisconsin.	2015
PhD Students		
Amy Schultz	Living near concentrated animal feeding operations (CAFOs) and respiratory and allergic disease: Results from the Survey of the Health of Wisconsin 2008-2017	2019
Kathryn Hatchell	Vitamin D deficiency: Analysis shows season and dietary vitamin D intake influence the effect of a polygenic risk score on vitamin D levels	2018
Katie Mead	Neighborhood Influences on Physical Activity and Physical Function among Older Adults	2018
Shoshannah Eggers	Lead (Pb), The Gut Microbiota, and Colonization by Antibiotic Resistant Bacteria (ARB)	2018
Unnur Gudnadottir	Understanding the Role of Residential Self-Selection in the Relationship between the Built Environment and Physical Activity in Urban Residential Areas	2018
Patricia Jewett	Disparities in mammography utilization patterns according to geographic access and car ownership, and long term mammography utilization among ductal carcinoma in situ survivors	2018
Rachel Bergmans	The multidimensional approach to the link between food insecurity and depression: The role of dietary inflammatory potential and participation in food assistance	2017
Jun-Im Shin	Food insecurity, fat intake, and dyslipidemia: the Survey of the Health of Wisconsin (SHOW), 2008-2010	2016
Anna Roubal	The Food Environment and Health: Roles Fast Food and Fast Casual Restaurants and Farmers' Markets can play	2015

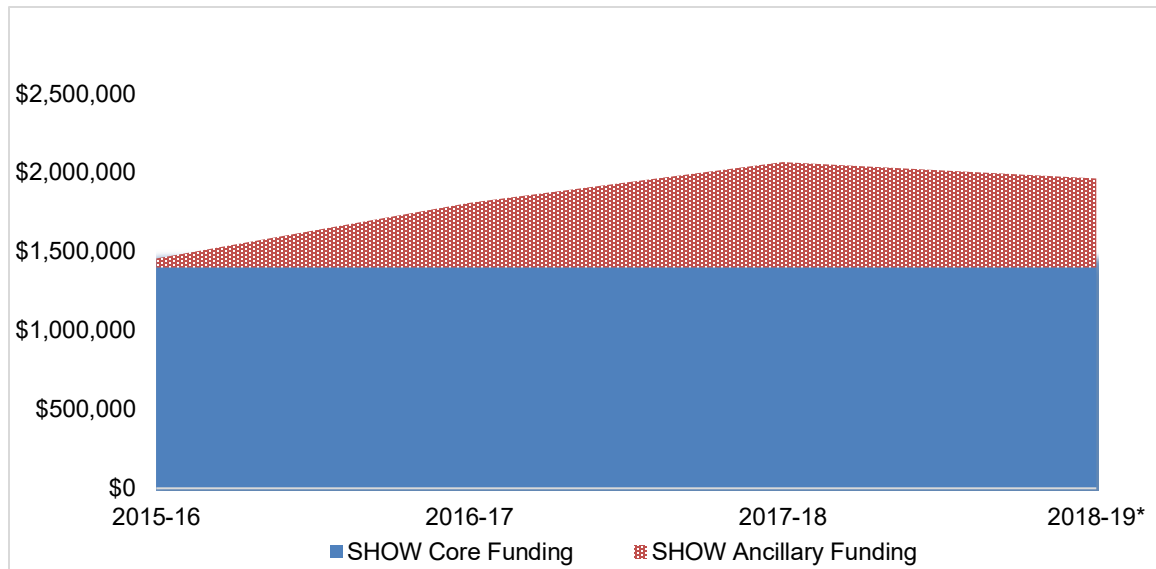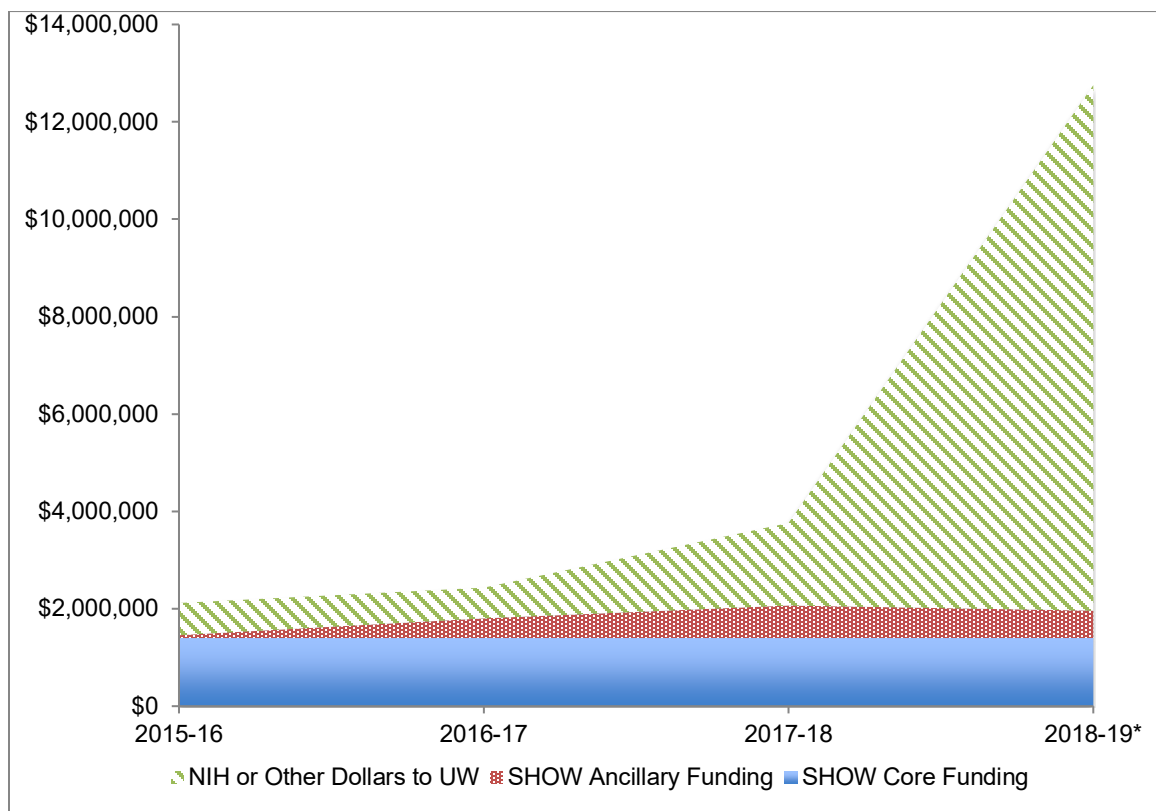**Figure 1. SHOW Operating Budget - Core and Ancillary Funding 2015-2019**

Figure 2. SHOW Core, Ancillary, and Annual NIH Dollars Leveraging SHOW Resources to UW

List of Appendices

Appendix A - Letters of Support

Appendix B - SHOW Publications, Presentations and Press Hits, 2015-2019

Appendix C - SHOW Ancillary Studies, 2015-2019

Appendix D - SHOW Grants Submitted, 2015-2019

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Appendix F - SHOW Updated Methods Paper (Pending Review- BMC Open)

Appendix G - SHOW Community Health Report, Brown County, WI, 2016

Appendix A – Letters of Support

Christopher Bradfield, PhD, Professor, Department of Oncology, Director, UW Biotechnology Center

Heidi Brown, MD MAS FACOG, Assistant Professor, Tenure Track, Female Pelvic Medicine & Reconstructive Surgery, Department of Obstetrics & Gynecology

Andrea Schultz Kressin, MPH, Community Engagement Manager, Brown County Health & Human Services, Division of Public Health

Robert Lipinski, PhD, Assistant Professor, Comparative Biosciences, Associate Director, Molecular and Environmental Toxicology Program, Faculty, Neuroscience Training Program School of Veterinary Medicine

Jonathan Meiman, MD, MS, Chief Medical Officer, Environmental Epidemiology and Surveillance, Bureau of Environmental and Occupational Health, Wisconsin Department of Health Services, Division of Public Health

Sheri Peterson, PhD, Associate Professor, Department of Population Health Sciences; Director, Population Health Institute

Nasia Safdar, MD, PhD, Associate Chief of Staff for Research, Madison VAH, Professor, Infectious Diseases, Healthcare Epidemiologist, UW Health; Vice-chair for Research, Department of Medicine

Susan Zahner, DrPH, RN, FAAN, Associate Dean for Faculty Affairs, Vilas Distinguished Achievement Professor, Co-director, Wisconsin Public Health Research Network, University of Wisconsin-Madison School of Nursing

May 13, 2019

Kristen Malecki, PhD, MPH
Associate Professor
Department of Population Health Sciences
Principal Investigator and Director,
Survey of the Health of Wisconsin
University of Wisconsin School of Medicine and Public Health

Dear Dr. Malecki (Kristen):

I'm pleased to write this letter of support for your application to the Wisconsin Partnership Program for the 2019-2022 renewal of the Survey of the Health of Wisconsin (SHOW) program. Over the last several years we have collaborated and identified unique opportunities to use the large biorepository for important translational research. Moving forward we see this as an important area for program impact for the University of Wisconsin and on a national or international level.

The SHOW infrastructure provides valuable human biomarker data for innovative inter-disciplinary research. The observational biomarker data in SHOW offers a good baseline for new discovery, and mechanistic research in many basic research laboratories. It will also provide important data for future environmental and molecular epidemiology research that will help inform future policies in how toxicology and human health data are used in risk assessment.

It uniquely provides researchers across the School of Medicine and Public Health and the UW-Madison campus access to a rich biorepository with linked gut microbiome, epigenetic and genomic data, as well as comprehensive survey data at the individual, household and community levels. This framework is unmatched in the nation and a key resource at UW-Madison for advancing translational research-based discoveries.

As Director of the Biotechnology Center, I plan to make it even easier for SHOW to integrate with a number of our core resources. In particular, our CAP-accredited, CLIA-certified genomics core for DNA RNA analysis of populations, our Mass Spectroscopy Core for proteomic and small molecular characterizations of human samples and our Bioinformatics Core which is particularly skilled in high content and genetic analyses. Our recent completion of whole genomes from your repository has paved the way for low cost genomics. Our recent collaboration demonstrating RNA expression differences in populations exposed to PAHs should also serve as an example of the value of your resources for our campus and nation.

I look forward to the future successes f SHOW and further collaborations.

Sincerely,

Christopher Bradfield, PhD
Professor, Oncology
UW-Madison School of Medicine and Public Health
Director, UW Biotechnology Center

May 13, 2019

Kristen Malecki, PhD, MPH
Associate Professor
Department of Population Health Sciences
Principal Investigator and Director,
Survey of the Health of Wisconsin
University of Wisconsin School of Medicine and Public Health

Dear Dr. Malecki:

It is with great pleasure that I write this letter in support of the Survey of the Health of Wisconsin's application for renewed function. I strongly support SHOW's mission to promote healthy aging, health equity and well-being. As a urogynecologist and dissemination and implementation researcher in the Department of Obstetrics and Gynecology at UW-Madison, my research focuses on improving access to solutions for pelvic floor disorders using dissemination and implementation science and community-engaged research.

My collaborations with SHOW over the last several years have provided incredible insight. Community-based self-management programs for chronic conditions offer low-cost scalable options for a variety of chronic conditions, but often have limited dissemination and uptake. SHOW's unique infrastructure enables us to tackle some historically difficult dissemination questions related to who we miss through traditional dissemination efforts. In *SHOW Me the Reach* our goal was to understand the potential reach of three continence promotion formats among older women with incontinence. We surveyed women across Wisconsin about their reported willingness to participate in continence promotion.

Using data from that initial collaboration, we secured external funding from the NIH-funded Prevention of Lower Urinary Tract Symptoms (PLUS) Consortium (https://plusconsortium.umn.edu/) for *SHOW and TELL,* where our goal was to compare and characterize adult women who do and do not actually engage with bladder health promotion materials. Most importantly, because of SHOW's infrastructure, we were able, for the first time, to characterize those participants who are missed through traditional dissemination efforts.

We have presented our results from these projects at various national and international meetings:

- Brown HW, Wise ME, LeCaire TJ, Braun EJ, Drewry AM, Buttigieg E, Macco M, Barnet J, Bersch A, Peppard PE, Malecki K, Nieto FJ, Mahoney JE. Show me the reach: Mixed-methods analysis of preferences for community-based continence promotion. Poster presentation "Prevention and Public Health" at the 11th Annual Conference on the Science of Dissemination and Implementation, December 3-5 2018 Washington, D.C.

- Brown HW, Wise ME, LeCaire TJ, Braun EJ, Buttigieg E, Macco M, Peppard PE, Malecki K, Mahoney JE. But Why? Reasons behind preferences regarding community-based continence promotion. Full oral presentation at the 2018 American Public Health Association Annual Meeting and Expo, November 13, 2018, San Diego, CA

- Buttigieg EM, Wise ME, Braun EJ, Macco M, LeCaire TJ, Brown HW. What do women want and why: Values behind preferred formats for continence promotion interventions. Short oral podium presentation at the 2018 American Urogynecologic Society Annual Scientific Meeting (PFD Week), Chicago, IL, October 11, 2018.

- Drewry AM, Braun EJ, LeCaire TJ, Barnet JH, Bersch A, Peppard PE, Malecki K, Nieto FJ, Mahoney, JE, Brown HW. Reported reach: How likely are women with incontinence to participate in continence promotion? Oral scientific salon presentation at the 2018 American Urogynecologic Society Annual Scientific Meeting (PFD Week), Chicago, IL, October 10, 2018

- Buttigieg EM, Wise ME, *Braun EJ, Macco M, LeCaire TJ, Brown HW. What do women want and why: Values behind preferred formats for continence promotion interventions. Short oral podium presentation at the 2018 Annual Meeting of the International Continence Society, Philadelphia, PA, August 31, 2018.

Collaborating with SHOW has been an exceptional experience and as an invested collaborator in dissemination research, I look forward to continuing this rewarding partnership with SHOW. I cannot more highly recommend renewal of their funding. Please feel free to contact me directly with any questions.

Sincerely,

Heidi W. Brown, MD, MAS

Assistant Professor, Tenure Track
Division of Female Pelvic Medicine and Reconstructive Surgery
Department of Obstetrics and Gynecology
University of Wisconsin School of Medicine and Public Health

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May 13, 2019

Kristen Malecki, PhD, MPH
Associate Professor
Department of Population Health Sciences
Principal Investigator and Director,
Survey of the Health of Wisconsin
University of Wisconsin School of Medicine and Public Health

Dear Dr. Malecki:

I am pleased to provide this letter of support for your 2019-2022 renewal application for the Survey of the Health of Wisconsin (SHOW) program. The SHOW program has been a valuable partner in our efforts to improve health in Brown County. SHOW worked with Brown County Public Health to provide county-specific data on priority health indicators resulting from SHOW's 2016 visits to households in Brown County. Following up on meetings with representatives from Brown County's Community Health Improvement Process (CHIP) steering committee, SHOW inserted new modules to support data collection on emerging health issues and/or content not otherwise available, including on the impact of alcohol and/or substance abuse on families as well as on food sources. SHOW also supported in-depth reporting of this and other priority health indicators captured in the core survey including on obesity, mental health and alcohol use. For example, SHOW's comprehensive data allowed reporting of obesity for our county based on objective physical measurements and in the context of residents' reported food insecurity, access to fruits and vegetables and physical inactivity. I was grateful to partner with you and SHOW Associate Director, Tamara LeCaire, on MPH student Jewon Lee's capstone report summarizing this data. This report's extensive summary is a very insightful and impactful complement to our community health needs assessment. We welcome and look forward to future opportunities to partner with the SHOW program and we enthusiastically support SHOW's renewal.

Sincerely,

Andrea Schultz Kressin, MPH
Community Engagement Manager
Brown County Health & Human Services
Public Health Division

Public Health
Prevent. Promote. Protect.

May 13, 2019

Kristen Malecki, PhD, MPH
Associate Professor
Department of Population Health Sciences
Principal Investigator and Director,
Survey of the Health of Wisconsin
University of Wisconsin School of Medicine and Public Health

Dear Dr. Malecki:

I am pleased to write this letter of support for the continuation of the Survey of the Health of Wisconsin (SHOW) health research infrastructure. SHOW was pivotal for moving my research forward and for my receiving NIH R01 funding. My lab is seeking to understand how genetic and environmental factors interact to cause etiologically complex craniofacial birth defects, including the potential contribution of a pesticide synergist that also inhibits the hedgehog signaling pathway. This work will ultimately support developing effective prevention strategies which are lacking because our understanding of how these birth defects are caused is inadequate. Reviewers noted the strength and uniqueness of the SHOW program for providing plasma samples and linked environmental exposure data. Specifically, I am building on SHOW's infrastructure for plasma samples linked to measure pesticide exposures for urban and rural women of child-bearing age. This will enable translating findings from my lab's in vitro and in vivo animal model systems to humans.

SHOW is an invaluable resource to investigators on campus who would otherwise not have access to such samples and comprehensive, multi-level data. These resources are particularly valuable to researchers like myself who investigate factors and mechanisms focused on human health using in vitro and animal model systems. The resources and expertise available through SHOW is considerably expands our options and power as we think about critical knowledge gaps and how to approach them.

I look forward to SHOW's successful renewal and continued collaborations with you and this important campus resource.

Sincerely,

Robert Lipinski, PhD
Assistant Professor, Comparative Biosciences
Associate Director, Molecular and Environmental Toxicology Program
Neuroscience Training Program
School of Veterinary Medicine

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Tony Evers
Governor

Andrea Palm
Secretary

State of Wisconsin
Department of Health Services

May 13, 2019

Kristen Malecki, Ph.D., M.P.H.
Associate Professor, Department of Population Health Sciences
Principal Investigator and Director, Survey of the Health of Wisconsin
University of Wisconsin-Madison
School of Medicine and Public Health
610 Walnut St.
Madison, WI 53706

Dear Dr. Malecki:

It is my pleasure to provide this letter of support for renewal of the Survey of the Health of
Wisconsin (SHOW) program. SHOW and the Department of Health Services, Bureau of
Environmental and Occupational Health (BEOH), have collaborated on several projects over the
past decade utilizing SHOW's infrastructure and ongoing surveys. Most recently, the SHOW
infrastructure was used for recruitment, specimen collection, and survey of anglers who reside in
the Milwaukee Estuary Area of Concern (AOC). SHOW also supported respondent-driven
recruitment of Burmese anglers living in the AOC who are recent immigrants to Wisconsin. This
biomonitoring project will allow us to characterize the body burden of environmental
contaminants among highly exposed and vulnerable populations in the Milwaukee area. This
work followed a prior project focusing on anglers to assess a screening tool for fish consumption,
testing of hair, and screening for emerging toxicants.

SHOW has also been a key partner with BEOH in pursuing innovative public health surveillance
efforts. With funding support from CDC, BEOH is collaborating with SHOW to implement a
module in the core survey to assess the prevalence of functional carbon monoxide (CO) detectors
in homes and assess awareness of CO risk among Wisconsin residents. SHOW, BEOH, and the
Wisconsin State Laboratory of Hygiene are also seeking CDC funds to establish a statewide
biomonitoring program utilizing SHOW participants and banked biospecimens that will advance
environmental health surveillance nationwide.

The partnership between SHOW and BEOH has been instrumental for monitoring health across
the state. The SHOW infrastructure is unique and places Wisconsin at the forefront of national
efforts to better understand and protect against environmental health threats. Public health will
clearly benefit by the successful renewal of the SHOW program and will ensure that Wisconsin
remains a leader in environmental public health surveillance. We are eager to extend our

Kristen Malecki, Ph.D., M.P.H.
May 13, 2019
Page 2

longstanding collaborations for future efforts and provide our highest level of support for
renewal of SHOW.

Sincerely,

Jonathan Meiman, M.D.
Chief Medical Officer and State Epidemiologist
Bureau of Environmental and Occupational Health

May 13, 2019

Kristen Malecki, PhD, MPH
Associate Professor
Department of Population Health Sciences
Principal Investigator and Director,
Survey of the Health of Wisconsin
University of Wisconsin School of Medicine and Public Health

Dear Dr. Malecki (Kristen):

I am very happy to write this letter in support of the Survey of the Health of Wisconsin (SHOW)'s renewal application to the Wisconsin Partnership Program. As Director of the Population Health Institute (PHI), there is great potential for synergy between the SHOW program and PHI in advancing health, health equity and well-being in the state through both academic and community-based research and partnerships. The mission of the Institute is to 'Translate Research for Policy and Practice' by implementing and evaluating interventions to support evidence-based health policy and practice changes. Collaborations for evaluation have included community, tribal, university and governmental organizations and there's great potential for building on statewide SHOW data for providing context for such evaluations.

The Institute's Mobilizing Action Toward Community Health (MATCH) Program provides a great opportunity for collaboration with SHOW, to advance health equity through developing community-based research partnerships and lending support to leadership and capacity building within communities. In addition, we connect academic researchers to policymakers through the Evidence Based Health Policy Program, and welcome the opportunity to support build bridging between lawmakers, government agency leaders and advocates, and SHOW researchers.

We are very supportive of SHOW's renewal and look forward to strengthening the collaboration to support improving health and well-being for all in the state.

Sincerely,

Sheri Johnson, PhD
Associate Professor (CHS)
Dept. of Population Health Sciences
Director, UW Population Health Institute
School of Medicine and Public Health

Translating Research for Policy and Practice

University of Wisconsin
SCHOOL OF MEDICINE
AND PUBLIC HEALTH

Department of Medicine

May 13, 2019

Kristen Malecki, PhD, MPH
Associate Professor
Department of Population Health Sciences
Principal Investigator and Director,
Survey of the Health of Wisconsin
University of Wisconsin School of Medicine and Public Health

Dear Dr. Malecki:

I am writing to express my enthusiastic support for your renewal application to the Wisconsin Partnership Program for the Survey of the Health of Wisconsin (SHOW) program.

I am Principal Investigator or Co-Principal Investigator for several microbiome-based projects that have greatly benefitted from leveraging of the SHOW health research infrastructure, including projects funded by the Wisconsin Partnership Program, the Office of the Vice Chancellor for Research and Graduate Education, the Department of Medicine and NIH. Without SHOWs existing infrastructure, these and other projects in development for new NIH applications would not have been possible. I am also a collaborator for the SHOW Population-based Microbiome Research Core (PMRC) to support the use of gut, skin, oral, nasal, and household microbiome-based data and samples arising from these projects. Together with SHOW, the PMRC has built a unique and extensive data and sample repository for expanding UW-Madison's capacity for cutting-edge microbiome research.

We have collaborated with SHOW on the following major projects: 1) *Winning the War Against Antibiotic Resistance in Wisconsin, The WARRIOR Study*, 2) *Lead, the Gut Microbiota, and Multi-Drug Resistant Organism (MDRO) Colonization* 3) *Examining the Potential of the Microbiome in Children to Reduce Antibiotic Resistance: the EPIC Study* 4) **Dr. David Andes** Centers of Excellence for Translational Research U19 grant, *The Human Microbiome in Health and Disease* for which I serve as PI of Project 3: *Novel antimicrobials targeting MDR pathogens from animal microbial symbionts*, which relies on the SHOW-WARRIOR project.

These data have allowed us to not only submit competitive federal applications but to mentor residents, fellows and junior faculty. Few institutions have what SHOW offers and I think that this unique infrastructure is a tremendous resource for advancement of knowledge in Wisconsin and beyond.

I look forward to the SHOW program's renewal and to continuing our microbiome-based collaborative investigations.

Sincerely,

Nasia Safdar, MD, PhD
Associate Chief of Staff for Research, Madison VAH
Professor, Infectious Diseases
Healthcare Epidemiologist, UW Health
Vice-chair for Research, Department of Medicine
UW-Madison School of Medicine and Public Health

May 13, 2019

Kristen Malecki, PhD, MPH
Associate Professor
Department of Population Health Sciences
Principal Investigator and Director,
Survey of the Health of Wisconsin
University of Wisconsin School of Medicine and Public Health

Dear Dr. Malecki:

I am pleased to provide this letter of support for your 2019-2022 renewal application to the Wisconsin Partnership Program for the Survey of the Health of Wisconsin (SHOW). SHOW aims to improve health in Wisconsin through the use of its innovative, population-based research infrastructure. SHOW's mission to improve health and health equity in the state aligns well with that of the Wisconsin Public Health Research Network (WPHRN), a network of 270 members that I co-direct. WPHRN links and supports public health practitioners and researchers in order to answer questions and disseminate discoveries applicable to improving practice and population health. The network promotes collaboration on research proposals and projects, and disseminates research results.

I welcome and look forward to opportunities to work more closely with Dr. Malecki and the SHOW project. Dr. Malecki's research findings and the SHOW dataset are uniquely well suited to inform and improve public health practice and population health in Wisconsin. Due to resource constraints, such as staff time and funding, too often research findings are not reaching public health practitioners in an accessible, timely manner, thus hindering evidence-informed public health practice and population health improvements. WPHRN commits to working with Dr. Malecki and the SHOW project to disseminate information about project finds, such as through WPHRN research briefs and our newsletter, and to facilitate collaboration between public health practitioners and researchers, such as that related to SHOW ancillary project opportunities.

On behalf of WPHRN, I enthusiastically support the SHOW renewal application. I look forward to a fruitful collaboration. Should reviewers have questions, I can be reached at sjzahner@wisc.edu or (608) 263-5282.

Sincerely,

Susan J Zahner

Susan Zahner, DrPH, RN, FAAN
Associate Dean for Faculty Affairs
Vilas Distinguished Achievement Professor
Co-director, Wisconsin Public Health Research Network
University of Wisconsin-Madison School of Nursing

Appendix B – SHOW Publications, Presentations and Press Hits

2015 Publications

1. Brennan PF, Ponto K, Casper G, Tredinnick R, Broecker M. Virtualizing living and working spaces: Proof of concept for a biomedical space-replication methodology. Journal of biomedical informatics. 2015; 57:53-61.
2. Casper GR, Flatley PB, Perreault JO, Marvin AG. vizHOME--A context-based home assessment: Preliminary implications for informatics. Studies in health technology and informatics. 2015; 216:842-846.
3. Christensen KY, Thompson BA, Werner M, Malecki K, Imm P, Anderson HA. Levels of nutrients in relation to fish consumption among older male anglers in Wisconsin. Environmental research. 2015; 142:542-548.
4. Dykema J, Jaques K, Cyffka K, et al. Effects of sequential prepaid incentives and envelope messaging in mail surveys. Public Opinion Quarterly. 2015; 79(4):906-931.
5. Givens ML, Malecki KC, Peppard PE, et al. Shiftwork, sleep habits, and metabolic disparities: results from the Survey of the Health of Wisconsin. Sleep health. 2015; 1(2):115-120.
6. Laxy M, Malecki KC, Givens ML, Walsh MC, Nieto FJ. The association between neighborhood economic hardship, the retail food environment, fast food intake, and obesity: findings from the Survey of the Health of Wisconsin. BMC public health. 2015; 15(1):237.
7. Litzelman K, Skinner HG, Gangnon RE, Nieto FJ, Malecki K, Witt WP. The relationship among caregiving characteristics, caregiver strain, and health-related quality of life: evidence from the Survey of the Health of Wisconsin. Quality of Life Research. 2015; 24(6):1397-1406.
8. Malecki K, Wisk LE, Walsh M, McWilliams C, Eggers S, Olson M. Oral health equity and unmet dental care needs in a population-based sample: findings from the survey of the health of Wisconsin. American journal of public health. 2015; 105(S3):S466-S474.
9. Shin J-I, Bautista LE, Walsh MC, Malecki KC, Nieto FJ. Food insecurity and dyslipidemia in a representative population-based sample in the US. Preventive medicine. 2015; 77:186-190.
10. Wahowiak L. Wisconsin partners create retail toolkits for healthier eating. 2015.

2016 Publications

1. Beyer KM, Malecki KM, Hoormann KA, Szabo A, Nattinger AB. Perceived neighborhood quality and cancer screening behavior: evidence from the survey of the health of Wisconsin. Journal of community health. 2016; 41(1):134-137.
2. Casper GR, Brennan PF, SMITH CA, Werner NE, He Y. Health@ Home moves all about the house! Studies in health technology and informatics. 2016; 225:173.
3. Christensen KY, Raymond MR, Thompson BA, Anderson HA. Fish Consumption, Levels of Nutrients and Contaminants, and Endocrine-Related Health Outcomes Among Older Male Anglers in Wisconsin. Journal of occupational and environmental medicine. 2016; 58(7):668-675.
4. Christensen KY, Raymond M, Thompson BA, Anderson HA. Perfluoroalkyl

substances in older male anglers in Wisconsin. Environment international. 2016; 91:312-318.

5. Christensen KY, Thompson BA, Werner M, Malecki K, Imm P, Anderson HA. Levels of persistent contaminants in relation to fish consumption among older male anglers in Wisconsin. International journal of hygiene and environmental health. 2016; 219(2):184-194.

6. Eggers S, Remington PL, Ryan K, Nieto FJ, Peppard P, Malecki K. Obesity prevalence and health consequences: Findings from the Survey of the Health of Wisconsin, 2008-2013. WMJ: official publication of the State Medical Society of Wisconsin. 2016; 115(5):238.

7. Escaron AL, Martinez-Donate AP, Riggall AJ, et al. Developing and Implementing "Waupaca Eating Smart" A Restaurant and Supermarket Intervention to Promote Healthy Eating Through Changes in the Food Environment. Health promotion practice. 2016; 17(2):265-277.

8. Martinez-Donate AP, Espino JV, Meinen A, et al. Neighborhood disparities in the restaurant food environment. WMJ: official publication of the State Medical Society of Wisconsin. 2016; 115(5):251.

9. Mathur MB, Epel E, Kind S, et al. Perceived stress and telomere length: a systematic review, meta-analysis, and methodologic considerations for advancing the field. Brain, behavior, and immunity. 2016; 54:158-169.

10. Raymond MR, Christensen KY, Thompson BA, Anderson HA. Associations between fish consumption and contaminant biomarkers with cardiovascular conditions among older male anglers in Wisconsin. Journal of occupational and environmental medicine. 2016;58(7):676-682.

11. Saiz Jr AM, Aul AM, Malecki KM, et al. Food insecurity and cardiovascular health: Findings from a statewide population health survey in Wisconsin. Preventive medicine. 2016; 93:1-6.

2017 Publications

1. Malecki KM, Schultz AA, Severtson DJ, Anderson HA, VanDerslice JA. Private-well stewardship among a general population based sample of private well-owners. Science of the Total Environment. 2017; 601:1533-1543.

2. Schultz AA, Schauer JJ, Malecki KM. Allergic disease associations with regional and localized estimates of air pollution. Environmental research. 2017; 155:77-85.

3. Wisconsin Department of Health Services Division of Care and Treatment Services. Substance Use Among Older Adults. Document P-01739A. July 2017.

2018 Publications: Current Grant Cycle

1. Bhutani S, Schoeller DA, Walsh MC, McWilliams C. Frequency of eating out at both fast-food and sit-down restaurants was associated with high body mass index in non-large metropolitan communities in midwest. American Journal of Health Promotion. 2018;32(1):75-83.

2. Cancel Martinez Y. Unfairly Treated? Housing Discrimination, Residential Disadvantages and Poor Mental Health in Wisconsin, 2009 to 2011. Cityscape Journal. 2018. (Submitted.).

3. Eggers S, Malecki K, Peppard P, et al. The Wisconsin Microbiome Study, a Cross-Sectional Investigation of Dietary Fiber, Microbiome Composition, and Antibiotic-Resistant Organisms: Rationale and Methods. BMJ Open. 2018; 8(3).

4. Johnson BS, Malecki KM, Peppard PE, Beyer KM. <u>Exposure to neighborhood green space and sleep: evidence from the Survey of the Health of Wisconsin</u>. Sleep health. 2018; 4(5):413-419.
5. Malecki K, Schultz A, Bergmans R. <u>Neighborhood Perceptions and Cumulative Impacts of Low Level Chronic Exposure to Fine Particular Matter (PM2. 5) on Cardiopulmonary Health</u>. International journal of environmental research and public health. 2018; 15(1):84.
6. Nikodemova M, Yee J, Carney PR, Bradfield CA, Malecki KM. <u>Transcriptional differences between smokers and non-smokers and variance by obesity as a risk factor for human sensitivity to environmental exposures</u>. Environment international. 2018; 113:249-258.
7. Wisconsin Department of Health Services Division of Care and Treatment Services. <u>Substance Use Among Veterans</u>. 2018.

2019 Publications: Current Grant Cycle

1. Jennings L, Barcelos C, McWilliams C, Malecki K. <u>Inequalities in lesbian, gay, bisexual, and transgender (LGBT) health and health care access and utilization in Wisconsin</u>. Preventive Medicine Reports. 2019:100864.
2. Kates A, Jarrett O, Skarlupka J, et al. <u>Household Pet Ownership and the Microbial Diversity of the Human Gut Microbiota</u>. PLOS One. 2019.

Upcoming Publications

1. Hagen E, Spicer A, Holzhausen E, Gorzelitz J, Peppard P. <u>Associations of cognitive function with accuracy of self-reported sleep duration among adults</u>. (Submitted)
2. Jennings, L., Joyner, H., Lindberg, S., LeCaire, T., Malecki, K. <u>Childhood Obesity, A Socio-Ecological Perspective: Findings from the Survey of the Health of Wisconsin</u>. Wisconsin Medical Journal (Under review).

Presentations/Abstracts

2015 Presentations and Abstracts

<u>Local:</u>
1. Eggers S, Gangnon R, Malecki K. <u>Urbanicity and Bicycle Helmet Use; Findings from the Survey of the Health of Wisconsin</u>. Population Health Sciences Spring Poster Session March 23, 2015; University of Wisconsin, Madison.
2. Frenette P, Gundadottir U, Gorzelitz J. <u>Survey of the Health of Wisconsin Updates and Outreach</u>. Wisconsin Public Health Association Conference. May 2015 Wisconsin Kalahari Dells.
3. Malecki K, Nieto F. <u>The Survey of the Health of Wisconsin Updates and Focus on Polk County in 2015</u>. Polk County Health Department April 23, 2015.
4. Malecki K, Nieto F. <u>The Survey of the Health of Wisconsin Updates and Focus on Ozaukee County in 2015</u>. Ozaukee Public Health Department April 30, 2015.

5. Malecki K, Nieto F. <u>The Survey of the Health of Wisconsin Updates and Focus on Milwaukee and Ozaukee Counties in 2015</u>. Southeast Regional Wisconsin Association of Local Health Departments and Boards April 8, 2015.

6. Malecki K, Schultz A, Severtson L. <u>Reducing human health risks from groundwater: Estimating private well testing behaviors and water use among private well owners in Wisconsin</u>. Groundwater Coordinating Council Meeting November 20, 2015; Madison, WI.

7. Nieto F. <u>The Survey of the Health of Wisconsin Updates and Focus on La Crosse County in 2015</u>. La Crosse Public Health Department May 2015; La Crosse, WI.

8. Schultz A<u>. Findings Reporting: Groundwater / Private Well Results to Stakeholders</u>. Groundwater Coordinating Council, WI Department of Natural Resources and Department of Health Services July 2015; Madison, WI.

National:

9. Eggers S, Gangnon R, Malecki K. <u>Urbanicity and Bicycle Helmet Use; Findings from the Survey of the Health of Wisconsin</u>. Society for Epidemiologic Research Annual Meeting March 23, 2015; Denver, CO.

10. Grabow M, Malecki K, Engelman C, et al. <u>What Moves Us: A Comparison of Perceived and Objective Predictors of Active Transportation Behaviors</u>. April 13, 2015; Washington, DC.

11. Malecki K, Schultz A, Bergmans R, LeCaire T, Palta M. <u>Cumulative Health Impacts of Chronic Exposure to Fine Particulate Matter and Neighborhood Perceptions of Crime on Pulmonary Health</u>. Conference of the International Society of Environmental Epidemiology (ISEE) August 31, 2015; Triangle Park, NC.

12. Malecki K, Schultz A, Severtson D, Vanderslice J, Anderson H. <u>Understanding Chemical and Non-chemical Vulnerability of private well owners: Results from the Survey of the Health of Wisconsin</u>. 143rd Annual Meeting & Exposition of the American Public Health Association November 4, 2015; Chicago, IL.

13. Malecki K, Bergmans R, LeCaire T, Palta M. <u>Cumulative Health Impacts of Chronic Exposure to Fine Particulate Matter and Neighborhood Perceptions of Crime on Pulmonary Health: Results from the Survey of Wisconsin</u>. 143rd Annual Meeting & Exposition of the American Public Health Association November 2015; Chicago, IL.

14. Martinez-Donate A, Valdivia Espino J, Meinen A, et al. <u>Disparities in the restaurant food environment: Evidence from the Assessing the Nutrition Environment in Wisconsin Communities (ANEWC) Study</u>. 143rd Annual Meeting & Exposition of the American Public Health Association November 2015; Chicago, IL.

15. Valdivia Espino J, Meinen A, Escaron A, et al. <u>Disparities in the food store environment: Evidence from the Assessing the Nutrition Environment in Wisconsin Communities (ANEWC) Study</u>. Annual Meeting & Exposition of the American Public Health Association November 2015; Chicago, IL.

16. Yang A, Olson M, Malecki K. <u>Oral Health of Wisconsin Adults: Findings from the Survey of the Health of Wisconsin</u>. The Council for State and Territorial Epidemiology Annual Meeting June 2015; Boston, MA.

International:

17. Malecki K, Schultz A. <u>Disentangling Race and Place: Association of Chronic Fine Particulate Matter Exposure, Racial Segregation and Pulmonary Health</u>. International Society for Environmental Epidemiology 2015; Sao Paolo, Brazil.

18. Malecki K, Schultz A, Bergmans R, LeCaire T, Palta M. <u>Cumulative Health Impacts of Chronic Exposure to Fine Particulate Matter and Neighborhood Perceptions of Crime on Pulmonary Health. Results from the Survey of the Health of Wisconsin</u>. Society for Environmental Epidemiology September 2, 2015; Sao Paolo, Brazil.

19. Malecki K, Schultz A, Severtson D, Vanderslice J, Anderson H. <u>Understanding Chemical and Non-chemical Vulnerability of private well owners: Results from the Survey of the Health of Wisconsin</u>. International Society for Environmental Epidemiology September 2015; Sao Paolo, Brazil.

20. Malecki K, Schultz A, Bergmans R, Severtson L, Vanderslice J, Anderson H. <u>Understanding Chemical And Non-Chemical Vulnerability Of Private Well Owners: Results From The Survey Of The Health Of Wisconsin</u>. ISEE Conference Abstracts 2015; Sao Paolo, Brazil.

21. Schultz A, Gagnon, R, Schauer J, Malecki K. <u>Fine Particulate Matter and Allergies and Asthma. Results from the Survey of the Health of Wisconsin</u>. International Society for Environmental Epidemiology Sept 2, 2015 Sao Paolo, Brazil.

22. Schultz A, Gangnon R, Schauer J, Malecki K. <u>Ambient Air Pollution and Allergic Disease: Results from the Survey of the Health of Wisconsin 2008-2013</u>. International Society for Environmental Epidemiology (ISEE) August 2015 ; Sao Paolo, Brazil.

2016 Presentations and Abstracts

<u>Local:</u>

1. LeCaire T. <u>Survey of the Health of Wisconsin Overview, Outreach and Updates</u>. Brown County Health Department and Brown County Community Health Improvement Steering Committee Meeting 2016.

2. LeCaire T. <u>SHOW as an Infrastructure for Researchers</u>. UWCCC Internal Staff Meeting November 2016; UW-Madison.

3. LeCaire T, Nikodemova M. <u>SHOW, a resource for Population Health Research</u>. WiSOR, WI Surgical Outcomes Research Program August 2016; UW-Madison.

4. LeCaire T, Nikodemova M. <u>Survey of the Health of Wisconsin Overview, Outreach and Updates</u>. Waushara County Health Department February 2016; Waushara, WI.

5. LeCaire T, Nikodemova M. <u>Survey of the Health of Wisconsin Overview, Outreach and Updates</u>. Western Regional Wisconsin Association of Local Health Departments and Boards (WALHDAB) Meeting January 2016; Eau Claire, WI.

6. Malecki K. <u>SHOW as an Infrastructure for Researchers</u>. Population Health Institute All Staff Meeting. April 2016; UW-Madison.

7. Malecki K. <u>The Social and Environmental Ecology of Health: Findings from the SHOW</u>. Weston Roundtable Series, Nelson Institute December, 2016; UW-Madison.

8. Malecki K. <u>SHOW as an Infrastructure for Researchers</u>. UW-CCC Leadership November 2016; UW-Madison

9. Malecki K, LeCaire T. <u>Learn about health services research using SHOW</u>. Health Innovation Program December 2016; UW-Madison.

10. Nikodemova M, Frenette P, LeCaire T, Neito F, Peppard P, Malecki K. <u>SHOW: a Research Resource for UW Faculty, Staff & Student Investigators</u>. PHS Welcome Day Poster Session. Population Health Sciences April 2016; UW-Madison.

11. Nikodemova M, Frenette P, LeCaire T, Neito F, Peppard P, Malecki K. <u>SHOW: a Research Resource for UW Faculty, Staff & Student Investigators</u>. Working Together to prevent Obesity in Wisconsin/WiPOD meeting April 2016; UW-Madison.

12. Nikodemova M, LeCaire T. <u>Survey of the Health of Wisconsin: A Resource for</u>

<u>Population Health Research</u>. UW Madison Health Innovation Program's Access, Quality and Outcomes Research Network (AQORN). University of Wisconsin School of Medicine and Public Health Feb 2016; Madison, WI.

13. Nikodemova M, LeCaire T. <u>SHOW, a resource for Population Health Research</u>. Pathology and Laboratory Medicine Faculty meeting May 2016; UW-Madison.

14. Nikodemova M, LeCaire T. <u>SHOW as an Infrastructure for Researchers</u>. School of Veterinary Medicine, Faculty Meeting November 2016; UW-Madison.

15. Stein E. <u>SHOW data for 2014 from Dane County</u>. Healthy Dane April 2016; Madison, WI.

16. Cadmus-Bertram L, Malecki K, Peppard P, et al. <u>Physical Activity and Neighborhood Characteristics: Findings from the Survey of the Health of Wisconsin (SHOW)</u>. Society of Behavioral Medicine Annual Meetings March 2016; Washington, DC.

17. Halling M, Beyer K, Nieto F, Malecki K. <u>Embodied stress: Pathways between neighborhood environment and increased cardio-metabolic risk</u>. American Public Health Association (APHA) 2016; Denver, CO.

18. Moehr M. <u>Quantifying the loss of information due to geomasking in health survey data</u>. Spacial Information for Human Health: Spatial the un-conference 2016; Santa Barbara, CA.

19. Schultz A. <u>Concentrated animal feeding operation air emissions & respiratory health effects among WI residents</u>. 144t^h American Public Health Association (APHA) Annual Meeting November 2016; Denver, CO.

20. Schultz A, Malecki K. <u>Concentrated Animal Feeding Operation Air Emissions & Respiratory Health Effect</u>. Congress of the Americas and American Public Health Association Conference (APHA) June 2016; Miami, FL.

21. Spahr C. <u>The built environment and health: the role of placemaking in physical activity</u>. Association of Collegiate Schools of Planning (ACSP) 56t^h Annual Conference November 2016; Portland, OR.

22. Stein E, Bersch A, Parvathy P, Remington P, Nasia S, Peppard P. <u>Chronic disease risk factors among male veterans with a history of combat exposure—Survey of the Health of Wisconsin, 2010-2013</u>. American College of Preventive Medicine Annual Conference Feb 2016; Washington, DC.

23. Yngve L, Beyer K, Malecki K, Jackson L. <u>The association between green neighborhood environments and active transportation.</u> Transport and Health Conference June 2016; San Jose, CA.

International:

24. Schultz A, Malecki K. <u>Concentrated Animal Feeding Operation Air Emissions & Respiratory Health Effect</u>. The International Society for Environmental Epidemiology September 2016; Rome, Italy.

25. Yngve L, Beyer K, Malecki K, Jackson L. <u>Street-scale green infrastructure and physical activity.</u> ISEE March 2016 Rome, Italy.

2017 Presentations and Abstracts

Local:

1. Bajwa P, Gudnadottir U, Bersch A, LeCaire T, Peppard P, Malecki K. <u>The Survey of the Health of Wisconsin: A Resource for Monitoring Health and Supporting Research in Wisconsin Communities</u>. Population Health Sciences Annual Poster Series. April 2017; Madison, WI.

2. Brown H, LeCaire T, Drewry A, et al. SHOW Me the reach: <u>Who is left out to dry with community-based continence promotion?</u> Women's Health and Healthy Equity Research Lecture and Symposium 2017; Madison, WI.
3. Carey M. <u>Using Data for Public Health Action: The Role Stakeholder Engagement Played in Optimally Disseminating SHOW data</u>. Population Health Sciences Annual Presentation Series March 2017; Madison, WI.
4. Drewry A, Brown H, LeCaire T, et al. <u>SHOW Me The Reach: Who Is Left Hung Out To Dry With Community-Based Continence Promotion?</u> UW Institute for Clinical and Translational Research Community-Academic Partnerships Dissemination and Implementation Program Short Course: Navigating the Steps. October 2017; Madison, WI.
5. Jennings L. <u>Understanding Indicators of Childhood Obesity in Wisconsin using SHOW Survey Data</u>. Obesity Prevention Initiative Surveillance and Evaluation Meeting December 2017; Madison, WI.
6. LeCaire T. <u>Research Opportunities with the Survey of the Health of Wisconsin</u>. School of Nursing March 2017; UW-Madison.
7. Malecki K. <u>SHOW Overview</u>. Department of Family Medicine March 2017; UW-Madison.
8. Malecki K. <u>SHOW Overview</u>. GEM (Genetic and Epigenetic Mechanisms), WIMR (Wisconsin Institutes for Medical Research). March 2017; UW-Madison.
9. Malecki K. <u>SHOW: Opportunities for Research in Epigenetic and Microbial Diversity Across the Life-course</u>. Wisconsin Institute of Discovery May 2017; Madison, WI.
10. Nikodemova M. <u>Survey of the Health of Wisconsin: a Tool for Health and Social Disparity Research</u>. BREAD (Bias Research to Promote Equity and Diversity), Center for Womens Health February 2017; UW-Madison.
11. Nikodemova M. <u>Conducting microbiome and "omic" research with SHOW</u>. SMPH, Family Medicine September 2017; UW-Madison.
12. Nikodemova M, Frenette P, LeCaire T, Neito F, Peppard P, Malecki K. <u>SHOW: a Research Resource for UW Faculty, Staff & Student Investigators</u>. PHS Welcome Day Poster Session. Population Health Sciences April 2017; UW-Madison.

<u>National:</u>
13. Cancel Martinez Y<u>. [Un]Fair and SAD Post-Recession: Exploring the Role of Housing Discrimination on Residential Disadvantage and Poor Mental Health in Wisconsin, 2009 to 2011</u>. Association of Collegiate Schools of Planning (ACSP) conference. Denver, CO. October 2017.
14. Eggers S, Malecki K. <u>The Survey of the Health of Wisconsin and the Human Microbiome</u>. Department of Anthropology, Northwestern University October 2017; Evanston, IL.
15. Hatchell K, Engelman C. <u>Vitamin D deficiency: Analysis shows season and dietary vitamin D intake influence the effect of a polygenic risk score on vitamin D levels</u>. American Society of Human Genetics October 2017; Orlando, FL.
16. Johnson B, Peppard P, Malecki K, Beyer K. <u>Exposure to Neighborhood Green Space and Sleep: Evidence from the Survey of the Health of Wisconsin</u>. Improving Population Health: Now, Across People's Lives and Across Generations to Come Conference October 2017; University of Texas-Austin.
17. Malecki K, LeCaire T, Nieto F, Peppard P. <u>The Survey of the Health of Wisconsin. A Novel Population-Health Research Infrastructure for Dissemination of Health Determinants and Outcomes</u>. American College of Epidemiology Annual Conference September 2017; New Orleans, Louisiana.
18. Malecki K, Schultz A, Nikodemova M, LeCaire T. <u>Obesity, Air Pollution and Lung</u>

Function: Findings from the Survey of the Health of Wisconsin (SHOW). American College of Epidemiology Annual Conference September 2017; New Orleans, Louisiana.

International:

19. Malecki K, Schultz A, Nikodemova M, LeCaire T. Obesity as a Risk Factor for Reduced Lung Function from Air Pollution in Adults. International Society for Environmental Epidemiology September 2017; Sydney, Australia.

2018 Presentations and Abstracts

Local:

1. Bajwa P, Palloni A, Bautista L. Hair cortisol and risk of hypertension. Population Health Sciences Welcome Day Poster Session. March 19, 2018; Madison, WI.
2. Brown H. SHOW Me the REACH. Mind Over Matter: Healthy Bowels. Health Bladder 4th Annual Advisory Board Meeting January 2018; Sun Prairie, WI.
3. Cadmus-Bertram L, Gorzelitz J. Mixed-methods Assessment of Physical Activity Beliefs, Attitudes, and Needs among Rural Wisconsin Women. Wisconsin Public Health Association-Wisconsin Association of Local Health Department and Boards 2018 Annual Conference May 2018; Green Bay, WI.
4. Eggers S. Lead (Pb), the Gut Microbiota, and Colonization by Antibiotic Resistant Bacteria (ARB). Population Health Sciences, University-Wisconsin, Madison; 2018.
5. Eggers S. Urinary Lead and the Composition of the Adult Gut Microbiota. In. University of Wisconsin-Madison 2018.
6. Eggers S, Remington P, Ryan K, Nieto F, Peppard P, Malecki K. Obesity Prevalence and Health Consequences: Findings from the Survey of the Health of Wisconsin 2008-2013. Population Health Sciences Spring Poster Session April 4, 2016; University of Wisconsin, Madison.
7. Eggers S, Safdar N, Sethi A, Peppard P, Malecki K. Urinary Lead level and Gut Colonization by Antibiotic Resistant Bacteria: Evidence from a Population-Based Study. Madison Microbiome Meeting 2018; Madison, WI.
8. Gorzelitz J. Mixed-methods Assessment of Physical Activity Beliefs, Attitudes, and Needs among Rural Wisconsin Women. Department of Kinesiology Graduate Seminar March 2018; Madison, WI.
9. Hatchell K, Engelman C. Vitamin D deficiency: Analysis shows season and dietary vitamin D intake influence the effect of a polygenic risk score on vitamin D levels. Population Health Sciences Welcome Day Poster Session March 19, 2018; Madison, WI.
10. Jennings L, Barcelos C, Malecki K. Inequalities in lesbian, gay, bisexual, and transgender (LGBT) health and health care access and utilization in Wisconsin. Population Health Sciences Welcome Day 2018; Madison, WI.
11. LeCaire T. Update on the Survey of the Health of Wisconsin. Population Health Sciences Welcome Day 2018. March 2018; UW-Madison.
12. Malecki K, LeCaire T, Nikodemova M, Schultz A, McWilliams C, Peppard P. The Survey of the Health of Wisconsin: A Novel Population-Based Health Research Infrastructure. Medical Education Day. May 2018; UW-Madison SMPH.
13. LeCaire T. Update on the Survey of the Health of Wisconsin. School of Nursing March

2018; UW-Madison.

14. LeCaire T, Jackson T. <u>The Survey of the Health of Wisconsin: A Novel Population-Based Health Research Infrastructure</u>. UW-Milwaukee Zilber School of Public Health. Course - Introduction to Epidemiology Methods. April 2018.

15. Malecki K, Gudnadottir U, Gorzelitz J, Spicer A, Cadmus-Bertram L. <u>Do High Levels of Occupational Physical Activity Increase the Likelihood of Meeting Physical Activity Guidelines? Data from the Survey of Health of Wisconsin</u>. Population Health Sciences Welcome Day Poster Session March 2018; Madison, WI.

16. Sethi S, Schultz A, Holzhausen E, et al. <u>Promotion of infrastructure to do microbiome research in the SHOW</u>. Madison Microbiome Meeting (M3): Unmasking Common Principles Governing the Microbiome April 2018; Madison, WI.

17. Sethi S, Schultz A, Holzhausen E, et al. <u>The SHOW Population-based Microbiome Research Core (PMRC)</u>. Population Health Sciences Welcome Day Poster Session March 2018; Madison, WI.

National:

1. Bajwa P, Palloni A, Bautista L. <u>Hair Cortisol and risk of hypertension</u>. Society for Epidemiologic Research Annual Meeting. June 2018; Baltimore, MD.

2. Cancel Y. Association of Collegiate Schools of Planning (ACSP) 58th Annual Conference 2018; Buffalo, New York.

3. Eggers S. <u>Environmental Exposures and the Human Gut Microbiome</u>. Department of Environmental Medicine and Public Health 2018; Icahn School of Medicine at Mount Sinai, New York, NY.

4. Eggers S. <u>Lead (Pb), the Gut Microbiota, and Colonization by Antibiotic Resistant Bacteria (ARB).</u> Meinig School of Biomedical Engineering 2018; Cornell University, Ithaca, NY.

5. Eggers S. <u>Lead (Pb), the Gut Microbiota, and Colonization by Antibiotic Resistant Bacteria (ARB)</u>. Institute for Genome Science 2018; University of Maryland – Baltimore, Baltimore, MD.

6. Eggers S, Safdar N, Sethi A, Peppard P, Malecki K. <u>Urinary Lead level and Gut Colonization by Antibiotic Resistant Bacteria: Evidence from a Population-Based Study</u>. Society for Epidemiologic Research Annual Meeting 2018; Baltimore, MD.

7. Tsai WL, Yngve L, Beyer KMM, Malecki KM, Jackson LE. <u>Greenery along Neighborhood Roads is Linked to BMI and Physical Activity across Four Diverse Communities</u>. A Community on Ecosystem Services 2018; Washington D.C., USA.

International:

18. Eggers S, Skarlupka J, Kates A, et al. <u>Urinary Lead Concentration and its Association with the Composition of the Adult Gut Microbiota</u>. International Society of Environmental Epidemiology Annual Meeting; 2018; Ottawa, Canada.

19. Malecki K, Gudnadottir U, Gorzelitz J, Spicer A, Cadmus-Bertram L. <u>Do high levels of occupational physical activity increase the likelihood of meeting physical activity guidelines? Data from the Survey of the Health of Wisconsin</u>. Active Living Research Conference February 2018; Banff, Alberta, Canada.

2019 Presentations and Abstracts

Local:

1. Flores V, Spicer A, Cummings N, et al. <u>Regulation of body weight and composition by</u>

dietary histidine. UW-Madison Diabetes Research Day 2019; Madison, WI.
2. Flores V, Spicer A, Cummings N, et al. Regulation of body weight and composition by dietary histidine. Interdepartmental Graduate Program in Nutritional Sciences Annual Poster Session 2019; Madison, WI.
3. Holzhausen E, Cadmus-Bertram L, Gangnon R, et al. Sedentary time appears to decrease microbiome diversity and richness in Survey of the Health of Wisconsin participants. Population Health Sciences Welcome Day 2019; Madison, WI.
4. Julius, B., LeCaire, T., Bersch, A., Malecki, K. Walk Score, Neighborhood Perceptions, and Prevalence of Type 2 Diabetes Mellitus in the State of Wisconsin. Department of Medicine. Madison, WI. 2019.
5. LeCaire T. Update on the Survey of the Health of Wisconsin. Population Health Sciences Welcome Day 2019. March 2019; UW-Madison.
6. LeCaire T, Jackson T. The Survey of the Health of Wisconsin: A Novel Population-Based Health Research Infrastructure. UW-Milwaukee Zilber School of Public Health. Course - Introduction to Epidemiology Methods. April 2019.
7. Lee, J., LeCaire, T., Kressin, A., Malecki, K. Survey of the Health of Wisconsin Community Health Report for Brown County. MPH Capstone Paper Presentation. April 26, 2019.

National:

8. Braun E, Wise M, LeCaire T, et al. But Why? Reasons Behind Preferences Regarding Community-Based Continence Promotion. American Public Health Association Annual Meetings November, 2019. Philadelphia, PA.
9. Eggers S, Safdar N, Kates A, et al. Household Water Treatment and its Association with Composition of the Adult Gut Microbiota. American Society for Microbiology: Microbe Annual Meeting 2019; San Francisco, CA.
10. Ersig A, Young E, LeCaire T, Nikodemova M, Malecki K. Identifying Measures of Increased Allostatic Load in Adults, Adolescents, and Children with Food Allergy. International Society of Nurses in Genetics Annual Meeting November, 2019.San Antonio, TX.
11. Flores V, Spicer A, Cummings N, et al. Regulation of body weight and composition by dietary histidine. Central Society for Clinical and Translational Research Annual Meeting 2019; Chicago, IL.
12. Hagen E, Holzhausen E, Sethi A, et al. Sleep Duration and Quality and Diversity of the Gut Microbiome in a General Population Sample of Adults. Poster presentation at Associated Professional Sleep Societies meeting 2019; San Antonio, TX.
13. Holzhausen E, Cadmus-Bertram L, Gangnon R, et al. Sedentary time appears to decrease microbiome diversity and richness in Survey of the Health of Wisconsin participants. Society for Epidemiologic Research 2019; Minneapolis, MN.
14. Yu D, Cummings N, Green C, et al. Dietary isoleucine is a key regulator of metabolic health. Central Society for Clinical and Translational Research Annual Meeting 2019; Chicago, IL.

International:

12. Spicer, A., Schultz, A., Olson, M., Olaiya, O., Selman, S., Schauer, J. Kirkorian, H., Malecki, K., Dilworth-Bart, J. The CREATE study: Pilot testing Cumulative Personal Environmental Exposure and Educational Readiness Assessments in Pre-school Children (ages 3-4). Accepted abstract. Utrecht, The Netherlands. ISEE 2019.
13. Tsai WL, Yngve L, Zhou Y, et al. How Robust are Relationships between Street

Greenery and Fitness Measures across Diver Communities? World Conference on
Forests for Public Health 2019; Athens, Greece.

14. Malecki, K., Schultz, A., Spicer, A. <u>Source-apportionment of fine-particulate matter (PM
< 2.5 ug/m3) and associations with local and regional cardio-pulmonary health risk.</u>
Accepted abstract. Utrecht, The Netherlands. ISEE 2019.

15. Malecki, K., Schultz, A., Spicer, A. <u>Urban and Rural Differences in Gut Microbial
Diversity: Implications for Environmental Health. Accepted abstract.</u> Utrecht, The
Netherlands. ISEE 2019.

SHOW Press / Media Hits, March 2015 – present (current grant-year activities in bold)

Press Hits: March 2015-present		
Date	**Paper/Media**	**Headline**
May 17, 2015	dailyRx	<u>How the Night Shift Might Affect Your Health</u>
May 27, 2015	www.safetyandhealthmagazine.com	Shift workers more likely to have metabolic, sleep issues: study
June 3, 2015	WIZM FM Radio	Surveyors Investigating Health in La Crosse
June 4, 2015	http://www.india.com/	<u>Working in shifts can cause disorder in sleep patterns</u>
June 6, 2015	www.amerymedicalcenter.org	Statewide health survey coming to Polk County in July
June 18, 2015	WLUM Ozaukee	Ozaukee Focus of Public Health Survey
June 19, 2015	Courier Life Newspaper in Onalaska / Holmen	Study to Shed Light on County Health
June 25, 2015	WNOV-AM	Study to Survey Health in Milwaukee County
June 27, 2015	WKBT-TV	UW Researchers Look at Health Trends in La Crosse
June 29, 2015	News.wisc.edu	Cost, Lack of Insurance Coverage are Primary Predictors of Poor Oral
June 29, 2015	WUWM Lake Effect Radio	Survey of the Health of Wisconsin works in Milwaukee
July 2, 2015	County Ledger Press	Study to Shed Light on Health in Polk County
July 5, 2015	WLWK-FM	UW Researchers Visit Milwaukee
July 18, 2015	La Crosse Tribune	UW Survey to Focus on County's Health

Press Hits: March 2015-present		
Date	Paper/Media	Headline
December 9, 2015	CITYLAB of the Atlantic	How to Market Healthy Food in a Rural Town
May 18, 2015	Medical News Today	Shift Work linked to Sleep Problems and Poor Metabolic Health
June 29, 2015	UW SMPH News	Cost, Lack of Insurance Coverage are Primary Predictors of Poor Oral
February 8, 2016	UW SMPH News	Survey of the Health of Wisconsin Shares Health Statistics
April 27, 2016	Eau Claire Leader Telegram	EC County Survey to Glean Health Data
April 27, 2016	WEAU TV – Eau Claire	EC Households Urged to Participate in State Health Survey
May 9, 2016	WRPN Radio	Waushara Families Invited to Join State Public Health Research Study.
May 19, 2016	USA Today	550 Families Involved in Health, Habits Project
May 21, 2016	Green Bay Press Gazette	Green Bay Families to Participate in Health Survey
December 12, 2016	Wisconsin Public Radio	Survey Finds State Obesity Rate Higher than Previously Thought
December 13, 2016	Superior Telegram	Survey Finds State Obesity Rate Higher than Previously Thought
December 15, 2016	Wisconsin Public Television	Survey Finds Wisconsin's Obesity Rate Higher than Previously Thought
February 1, 2017	Health Sense	Obesity Rates in Wisconsin Higher Than Previously Thought
July 27, 2017	WPP e-Newsletter	Meet Our Grantee: Survey of the Health of Wisconsin
August 21, 2017	Wisconsin State Journal	It takes Guts: UW-Madison Health Survey Asks People for Stool
March 13, 2019	**Center for Demography of Health and Aging**	**Trainee Profile: PhD student Leah Foltman**
March 15, 2019	**WUWM 89.7 Milwaukee NPR**	**Research Hopes a Long-Term Survey Helps Improve Health of Wisconsinites**

SHOW Other Dissemination of Project Results, March 2015 – present

SHOW Data Dissemination Portal: Released to Public on March 1, 2016 to-date.

The SHOW Data Dissemination portal (www.show.wisc.edu/data/charts/) was created to visualize changes in over 40 key health indicators, initially selected and compiled from the 3,000 variables in SHOW's database. It was built using open source tools (www.highcharts.com) that allow for interactive data exploration. Public health officers can download high-resolution maps and figures along with the aggregated data. The software design will allow SHOW to add additional indicators and extend the time span without needing any changes in the code. Important features include:

- Built with open source interactive data visualization tools (www.highcharts.com)

- SHOW can add more data any time we want without changing any of the code

- Allows public health officers to download aggregate data or export the charts.

As of April 11, 2019, the portal has been visited by **2,046 users.**

Appendix C – SHOW Ancillary Studies

Applied Pubic Health / Community Health Projects

Study	Start Year	End Year	Funding	Collaborators	Summary
UWCCC Cancer Survivorship Survey	2018	ongoing	UWCCC	Noelle Loconte, SMPH, UWCCC	Wisconsin Comprehensive Cancer Survivor Survey to past SHOW participants reporting a cancer diagnosis. The goal of the survey is to learn about how having cancer impacted their health, quality of life, household income, and ability to work.
Burmese Angler's Study	2017	ongoing	DHS/ATSDR	Henry Anderson, Jon Meiman, WI Dept. of Health Services	This project will implement a biomonitoring program to evaluate body burden of both legacy and emerging contaminants among anglers who are Burmese immigrants and their descendants residing in the Milwaukee Estuary Area of Concern (AOC) community.
Anglers III	2017	ongoing	DHS/ATSDR	Henry Anderson, Jon Meiman, WI Dept. of Health Services	This project will implement a biomonitoring program to evaluate body burden of both legacy and emerging contaminants among anglers residing in the Milwaukee Estuary Area of Concern (AOC) community.
EPHT Carbon Monoxide Monitoring	2017	2018	DHS/CDC	Wisconsin Environmental Public Health Tracking program; Jon Meiman, Mark Werner, WI Dept. of Health Services	The EPHT program is partnering with SHOW to implement a module in the core survey during the next triannual sample in order to assess the prevalence of functional CO detectors in homes and assess characteristics of WI residents who are protected by CO monitors as well as their awareness of CO risk and need for monitoring.
SHOW and Tell	2017	2018	NIH/NIDDK	Heidi Brown, SMPH, Obstetrics & Gynecology/Urology	Tracing Engagement in Lower Urinary Tract Symptoms (LUTS) Learning. This project will help to inform best approaches for targeting dissemination of future lower urinary tract symptoms prevention interventions and clearly define populations of girls and women who are motivated to receive bladder health promotion materials.
Study of the Health of the Wausau Area Hmong Population (SHWAHP)	2015	2017	Aspirus Health Foundation	Kevin Thao, SMPH, Family Medicine, Wausau Area Hmong Association, UW Stevens Point	This project is the Survey of the Health of Wausau Area Hmong Population. Dr. Kevin Thao from the Dept. of Family medicine is working with SHOW to design a community based assessment of health in the Hmong community. Seed funding for this pilot has been awarded by the Aspirus Health Foundation.

vizHOME	2013	2017	AHRQ	Patricia Brennan; Kevin Ponto, Gail Casper, UW College of Engineering and School of Nursing	The purpose of this project is to systematically determine how household context shapes personal health information management (PHIM). PHIM encompasses a suite of cognitive and behavioral tasks that people undertake to accomplish their health goals, including: recording symptoms; communicating with clinicians; determining when and how to reorder medications; monitoring health states; and making sense of discharge summaries, health-related web sites and clinician-provided handouts.
Groundwater Research Project	2015	2015	Wisconsin Groundwater Coordinating Council	Wisconsin Groundwater Coordinating Council, Kristen Malecki, SMPH, Population Health Sciences	This project is a follow-up survey of private well owners regarding private well testing practices and barriers to private well testing. This study will support future health based risk assessments as well as identify possible solutions for improving private well testing rates in the state.
ID-SHOW Improving Dissemination of SHOW Data	2014	2015	ICTR	Kristen Malecki, SMPH, Population Health Sciences	This grant from ICTR will enable translation of SHOW findings into improvements in public health. Wide availability of SHOW data will aid in addressing health disparities and advancing community health by increasing knowledge and providing rigorous data for evaluation, targeted decision-making and policy action.
Great Lakes Fish Consumption Study 'Anglers II'	2013	2015	EPA	Henry Anderson, WI Department of Health Services	Design and implementation of a fish advisory intervention in clinics to facilitate dietary changes and corresponding reductions in exposure to toxic contaminants from consumption of Great Lakes fish among Lake Superior Basin residents. This intervention includes training health care providers, a patient screener to assess fish consumption, testing hair for mercury, screening for emerging toxicants, and education for participants and the general public.
Environmental Public Health Tracking – Biomonitoring Study (EPHT)	2012	2015	DHS/CDC	Mark Werner, WI Department of Health Services, WI Environmental Public Health Tracking program	The CDC funded EPHT program aims to advance environmental health surveillance nationwide by analyzing urine samples from a representative sample of Wisconsin adults. No other such study has been conducted on a population based sample. The primary goals of this study will be to assess the distribution in exposure of state residents to cadmium, arsenic, mercury and uranium and compare these distributions to levels found nationally.

Translational Research Projects

Study	Start Year	End Year	Funding	Collaborators	Summary
The Human Microbiome in Health and Disease	2019	ongoing	NIH	David Andes, SMPH, Medicine, Medical Microbiology & Immunology	Center of Excellence for Translational Research (CETR) application. Project building on the WARRIOR-SHOW data and specimens to explore antimicrobial activity of human associated bacteria as well as the potential role of fecal microbiome in conferring resistance to pathogen invasion.
Role of dietary isoleucine and histidine in regulating health of mice and humans	2019	ongoing	SHOW	Dudley Lamming, SMPH, Medicine; Endocrinology	SHOW biorepository samples and existing data for individuals with dietary intake on isoleucine and histidine will be used to investigate how circulating levels of these amino acids correlate with dietary consumption and BMI and whether a relationship exists between fibroblast growth factor 21 levels and lower diet or plasma amino acid levels.
Emotions and Wellness Study	2019	ongoing	NIH/NIMH	Richard Davidson, SMPH, UW Center for Healthy Minds	The purpose of this study is to determine how our emotions, brain, and body processes interact to learn what factors promote health and well-being. SHOW's role is to identify eligible past SHOW participants (2008-2016) and send them materials about this study so that past SHOW participants can contact them if they are interested in participating.
All of Us	2018	ongoing	NIH	Murray Brilliant, Marshfield Clinical Research Foundation	This is a national study with a goal of recruiting one million participants. SHOW's role is to identify and recruit eligible past SHOW participants (2008-2016) to participate.
Denu metabolism	2018	ongoing	Existing funds, NIH submission	John Denu, WID, Biomolecular Chemistry	WARRIOR-SHOW cohort blood (PBMC) sample collection. This was a pilot study focusing on aging. They are looking for biomarkers to assess the aging process. They are looking for metabolite markers in the PBMCs and the role of themicrobiome in this process.
Systemic Biomarkers of Health Disparities	2018	ongoing	ICTR	Tracy Downs, SMPH Urology and UWCCC, Roz Anderson, SMPH, Medicine and UWCCC	Existing measures from SHOW will be used to identify individuals by obesity class and plasma samples will be used to validate markers of metabolic status. SHOW data and biosamples will be used in the investigation.
Toxoplasma and Protection of Weight Gain	2017	ongoing	VCRGE – Microbiome Initiative	Laura Knoll, Medical Microbiology; Frederico Rey, Bacteriology; Kristen Malecki, SMPH,	Data, biorepository samples and microbiome data from the SHOW-WARRIOR cohort will used to investigate the role of asymptomatic infection with Toxoplasma gondii in preventing

Study				Population Health Sciences	weight gain. Both animal and human models are proposed in the investigation.
Developmental Toxicity Associated with Piperonyl Butoxide Exposure	2017	ongoing	NIH-NIEHS	Robert Lipinski, Comparative Biosciences, Veterinary Medicine	This study investigates the Hedgehog pathway in animal models and correlates developmental toxicity-associated concentrations of pesticide synergist piperonyl butoxide (PBO) in the mouse with those in humans (women of child-bearing age). SHOW biorepository samples and data will be used to provide a foundation for improved risk assessment. The long term goal of the project is prevention of complex birth defects through identification of high-risk populations and defined windows of exposure to environmental agents.
Allostatic Load in Adults ...with Food Allergy	2017	ongoing	SoN pilot	Anne Ersig, School of Nursing	The study will examine clinical measures and genetic markers of allostatic load among young adults with food allergies and matched healthy controls using data and DNA from SHOW.
Vitamin D Tailored	2017	2018	NIH/NIDDK	Corinne Engelman, SMPH, Population Health Sciences	For this project, post-menopausal African American women participants in Milwaukee were identified for supplementing the recruitment pool for a clinical trial of personalized vitamin D supplementation.
Vitamin D	2016	2018	NIH/NIDDK	Corinne Engelman, SMPH, Population Health Sciences	This project will provide information on vitamin D exposure and genotypes in a population-based sample, including in African American individuals, in preparation for a placebo-controlled randomized clinical trial to determine the efficacy of genotype-guided vitamin D supplementation.

University Grant Development Projects

Study	Start Year	End Year	Funding	Collaborators	Summary
Center for inherited disease research high throughput sequencing and genotyping resource	2019	ongoing	NIH/NHGRI	Kristen Malecki, Population Health Sciences; Michal Engelman, Sociology	SHOW DNA was submitted for GWAS and EWAS analysis from 600 participants of the WARRIOR-SHOW cohort for expanding the SHOW data resource for new grants and discoveries;
Asthma Phenotypes and Subclinical CVD	2019	ongoing	AHA	Matthew Tattersall, Medicine, Cardiology	Career Development Award to investigate subclinical cardiovascular disease measures in asthma patients and age and gender-matched SHOW controls.

CREATE	2017	ongoing	UW2020	Janean Dilworth-Bart, SoHE; James Schauer, CoE; Kristen Malecki, Population Health Sciences	Cumulative Risks, Early development and emerging Academic Trajectories (CREATE); the SHOW infrastructure is being used to support this pilot study that will document psychosocial, chemical, and non-chemical stressors among 60 low-income 3- to 4-year old children living and attending preschool.
Population-based Microbiome Research Core (PMRC)	2017	ongoing	UW VCRGE – Microbiome Initiative	Ajay Sethi, Population Health Sciences;	The PMRC will build on the existing SHOW infrastructure and expand upon a data and specimen bank created from a pilot diet and microbiota study that began in 2016. Microbiome built environment samples from households and stool will be collected to serve as a resource for future investigations of the gut microbiome.
Examining Potential of the Microbiome in Children to Reduce Antibiotic Resistance (EPIC)	2017	ongoing	UW VCRGE – Microbiome Initiative	Nasia Safdar, Medicine, Infectious Disease	Examining the Potential of the Microbiome in Children to Reduce Antibiotic Resistance: the EPIC Study. Investigation of the influence of daycare on MDROs and gut microbiome in children aged 6 months to 5 years of age.
Lead and Microbiome Diversity	2017	2018	Dept. of Medicine pilot	Nasia Safdar, Shannah Eggers, Medicine; Kristen Malecki, Population Health Sciences	This project will investigate lead in SHOW biorepository samples for SHOW/WARRIOR participants who provided stool samples for multidrug resistant organism (MDRO) analysis. The project will also utilize SHOW core and WARRIOR risk factor data, such as diet, as well as use GIS to calculate proximity to roadways for these individuals.
Daytime Functioning and Sleep in Children Pilot	2017	2018	UW VCRGE Fall Competition	Paul Peppard, Erika Hagen; VCRGE Fall Competition Funding	This project will pilot data collection on social-emotional-behavioral outcomes and alertness testing as a measure of alertness, as related to sleep duration and quality in SHOW children. This pilot data will serve as preliminary findings for R01 submissions by Drs. Peppard and Hagen.
Winning the War on Antibiotic Resistance in Wisconsin (WARRIOR)	2016	2018	WPP	Nasia Safdar Medicine, Ajay Sethi, Population Health Sciences	The WARRIOR project examines the relationship between fiber-rich food intake and gut microbiota, the prevalence of intestinal colonization of multi-drug resistant organisms (MDRO) and the relationship between fiber in-take with MDRO colonization in 600 SHOW subjects.
Physical Act. in Rural WI Women	2016	2018	VHH pilot, Dept Kinesiology	Lisa Cadmus-Bertram, Kinesiology	SHOW will partner in this assessment of rural women's beliefs about barriers and facilitators to physical activity in Wisconsin, including a mail-based survey as well as qualitative component.

REACH	2016	2018	Start-up / Dept funds	Heidi Brown, Obstetrics & Gynecology/Urology	This project uses SHOW to estimate the prevalence of urinary and bowel incontinence as well as preferences on delivery format for a continence promotion program, Mind Over Matter; Healthy Bowels, Healthy Bladder (MOM), in a representative sample. Implementation of the module allows SHOW to identify women with incontinence who have not sought care for evaluating barriers/facilitators of participation in MOM via interview.
Sleep in Kids Pilot	2016	2017	Vilas Award	Paul Peppard, Population Health Sciences	Preliminary data collected from SHOW children participants by polysomnography for comparison with actigraph and self-reported sleep data previously collected by SHOW, for future R01. The R01 will comprehensively characterize sleep duration and quality including objective measurement by actigraphy in children, to understand associations between sleep and several sleep domains associated with short-term and long-term health and well-being.
Chronic Psychosocial Stress and Risk of MetS (Hair Cortisol) Pilot	2015	2015	Center for Demography of Health and Aging (CDHA) pilot grant	Alberto Palloni, Sociology and Leonelo Bautista Population Health Sciences	This project assessed the usefulness of hair cortisol as a marker of chronic psychosocial stress (CPS), by quantifying its association with self-reported stress, individual and neighborhood SES, and components of the metabolic syndrome (MetS). Data from this study will be used to design of a cohort study of the effects of SES on CPS and MetS in SHOW.
Wisconsin Environ. Exposure Pilot Study (WEEPS)	2013	2013	WPP	Chris Bradfield, Molecular and Environmental Toxicology Center	The WEEPS project expands existing biospecimen testing completed in the first phase of the pilot to include mRNA testing from existing SHOW participants' biorepository specimens and SHOW Core data to evaluate environmental exposures and biomarker response. This work continues to serve as preliminary work for developing a novel Environmental Health Center at the University of Wisconsin with collaborator Chris Bradfield.

Appendix D – SHOW Grants Submitted

NIH or Other Federally Funded Grants Submitted 2015-2019

Study	Funding source	PI(s)/institution or department (SHOW partner)	Description	Status/ Timing
vizHOME	AHRQ R01	Brennan, Casper/IE, Nursing (Nieto)	SHOW is assisting in the identification and recruitment of households of diabetics to participate in a study of home barriers for diabetes care.	**Funded** - 2013-2018 Completed 2018.
Vitamin D Clinical Trial	NIH, NIDDK R01	Engelman/PHS (Nieto)	An investigation to determine factors modifying the effect of vitamin D intake on vitamin D metabolites **(uses SHOW biorepository)**	**R56 funded 10/2015.** Completed.
Great Lakes Research Institute	EPA (Great Lakes Restoration Funds)	Werner, Kanarek/DHS (Malecki)	"Wisconsin's Assessment of Healthy Consumption of Great Lakes Fish"— support for design development and administrative support for recruitment, data collection and processing.	**Funded** – Data collection completed January 2016.
Human Aging Connectome Project (HACP)	NIH U01	Prabhakaran/ Medicine (Peppard)	The Human Aging Connectome Project (HACP) will use state-of-the-art imaging methods to measure connections between brain regions in adults.	Submitted 6/2015; **Not funded.**
Endocrine Disruptors and Obesity in Wisconsin	WPP New Investigator Award; NIEHS R21	Malecki/PHS	Social and biologic pathways that increase the risk for endocrine disrupting compounds and subsequent risk for metabolic dysfunction/obesity **(uses SHOW biorepository)**.	Submitted to WPP 2015; submitted to NIEHS; **Not funded**.
Strategies to Prevent and Reduce Kidney Stones	NIDDK U01	Penniston/ Urology; LeCaire/PHS	SHOW will advise on study design, development of study education, and assessment materials and protocols for biospecimen handling and storage to Dr. Penniston's clinical center for the Urinary Stone Disease Research Network.	Submitted 11/2015. **Not funded.**
All of Us – Wisconsin; Precision Medicine Initiative Cohort	NIH, U24	Brilliant/ Marshfield Clinic Research Foundation	In partnership with the Marshfield Clinic Research Foundation and the Medical College of Wisconsin and the UW SMPH will provide biorepository specimens, data, and linkage to EHR for participant across Wisconsin to contribute to NIH's Precision Medicine Initiative Cohort Program Biobank. SHOW will support biosample and data collection for the project and work to support community engagement. Dual enrollment opportunities for the future are being discussed.	Submitted 1/2016. **Funded. On-going.**

Study	Funding source	PI(s)/institution or department (SHOW partner)	Description	Status/ Timing
Predicting Kidney Disease with Novel Markers in Early Type 1 Diabetes	NIH, NIDDK DP3	Palta, Astor, LeCaire, Peppard/PHS	SHOW's will collect data for the Wisconsin Diabetes Registry Study cohort at 25-30 years' diabetes duration as well as data and biospecimens among non-diabetic persons ("controls") in SHOW to evaluate novel kidney disease biomarkers **(uses SHOW biorepository)**.	Submitted 3/2016. **Not funded**.
Social epi-genomics of health disparities: how different dimensions of disadvantage get under the skin	NIH R01	Malecki/ Engelman Sociology and Pop Health Sciences	SHOW existing data and biorepository will be used to study how different dimension of disadvantage shape health disparities through epigenetic mechanism **(uses SHOW biorepository)**.	Submitted 10/2016 **Not funded.**
Social epigenomics of health disparities	NIH R21	Malecki/ Pop Health Sciences	SHOW biorepository will be used to study DNA methylation in relation to aging across subpopulations with different socioeconomic, neighborhood and individual characteristics **(uses SHOW biorepository)**.	11/2016 **Not funded.**
Effectiveness of Portable Air-Cleaner in Reducing Allergic Response	EPA	Shafer/ Wisconsin State Lab of Hygiene	The goal of the project is to demonstrate the effectiveness of portable air cleaners to mitigate allergic respiratory disease. SHOW infrastructure will be use to recruit subjects diagnosed with asthma and to collect home environmental samples.	Submitted 2/2017 **Not funded.**
Aryl Hydrocarbon Receptor Response as Sensor of Human Sensitivity to Toxins	NIH R01	Malecki/ Dept Pop Health Sciences	SHOW biorepository will be used to identify novel sensitive biomarkers of exposure and response to environmental toxins and to determine if gender, age, diet, and obesity mediate or modify the associations between cigarette smoke, DNA methylation, XRE gene response and systemic inflammation **(uses SHOW biorepository)**.	Submitted 2/2017 **Not funded.**
Objectively-assessed sleep, school start times, weight gain and metabolic outcomes in children	NIH, R01	Peppard/ Pop Health Sciences	SHOW will be used as an infrastructure to recruit children to study associations between sleep, obesity and metabolic disorders. SHOW will collect data using questionnaires, in-home polysomno-graphy and blood spots for biochemical analysis.	Submitted 6/2016 Not funded. Resubmitted 2/2017 **Not funded**.
Fiber and the Human Gut Microbiota: a Longitudinal Investigation of Antibiotic Resistance	NIH R01	Safdar/Sethi Depts of Medicine, Infectious Disease and Pop Health Sciences	SHOW infrastructure will be used to recruit and collect data and samples to examine fiber intake and incidence of MDRO colonization and the relationship between fiber intake and gut microbiota.	Submitted 2/2017 **Not funded.**

Study	Funding source	PI(s)/institution or department (SHOW partner)	Description	Status/ Timing
Wisconsin Environ-mental Health Center Grant	NIH, NIEHS P30	Bradfield/ Molecular Toxicology Center; Malecki/PHS	Develop a center that supports interdisciplinary environmental health research to improve mechanistic understanding of human susceptibility and variability with respect to environmental pollution (uses SHOW biorepository and infrastructure to support this center).	Submitted 5/2016. **Not funded.**
Identifying Actionable T1D Self-Management Barriers for Working-Age Adults	NIH/NIDDK DP3	Cox/Pediatrics	The overall goal of this research is to improve glycemic control and quality of life among working-age adults with type 1 diabetes. SHOW infrastructure will be used to obtain biosamples from 259 Wisconsin Diabetes Registry cohort members.	Submitted 6/2016 **Not funded.**
Developmental toxicity of pesticide synergist and Hedgehog inhibitor piperonyl butoxide	NIH/NIEHS R01	Lipinski/ Veterinary Medicine, Dept Comparative Biosciences	This study investigates the Hedgehog pathway in animal models and correlates developmental toxicity-associated PBO concentrations in the mouse with those in human (women of child-bearing age). The goal is to provide a foundation for improved risk assessment (uses SHOW biorepository).	Submitted 6/2015 Not funded. Resubmitted 3/2017 **Funded. On-going.**
Enhancing the Environmental Public Health Tracking Network (EPHT)	CDC	Meimen, Werner/DHS; Malecki/PHS	SHOW to implement a module in the core survey in 2018 and the next triannual sample in order to assess the prevalence of functional CO detectors in homes and assess characteristics of WI residents who are protected by CO monitors as well as their awareness of CO risk and need for monitoring.	Submitted 5/2017; **Funded. On-going.**
Tracing Engagement in Lower Urinary Tract Symptoms (LUTS) Learning.	NIH/UMN PLUS Consortium	Brown/Obstetrics & Gynecology, Urology	Uptake/reach of intervention to prevent/treat urinary incontinence in women across lifespan. Materials and surveys will be mailed to former SHOW participants and their adolescent daughters.	Submitted 6/2017; **Funded. Completed.**
Center for inherited disease research high throughput sequencing and genotyping resource access	NIH/NHGRI	Malecki, Engelman/PHS	SHOW DNA to be submitted for GWAS and EWAS analysis from 600 participants of the WARRIOR-SHOW cohort for expanding the SHOW data resource for new grants and discoveries (uses SHOW biorepository).	Submitted 9/2017; **Funded. Completed.**
StrokeNet	NIH/NINDS	Dempsey/Neurological Surgery and Neurology	U24 Regional Coordinating Center (RCC) for NIH/NINDS StrokeNet (UW competing renewal application for RCC); SHOW to support future community-based clinical trials.	Submitted 9/2017; **Not funded**.

Study	Funding source	PI(s)/institution or department (SHOW partner)	Description	Status/ Timing
Dysregulation of the epigenetic-metabolism axis as a biomarker of aging	NIH/NIA	Denu/WID, Biomolecular Chemistry	Use of baseline data as well as longitudinal follow-up of the WARRIOR-SHOW cohort including new blood sample collection for investigating the 'Dysregulation of the epigenetic-metabolism axis as a biomarker of aging' **(uses SHOW biorepository)**.	Submitted 2/2018; **Not funded**.
Evaluating the Relationship between triclosan, the gut microbiome and antibacterial resistance	NIH/NIAID	Safdar/ Depts Medicine and Infectious Diseases	The goal of this research is to gain further insight into the relationships between chronic triclosan exposure and the gut microbiota, how triclosan exposure influences MDRO colonization, and how these relationships differ between younger and older adults **(uses SHOW biorepository)**.	Submitted 2/2018; **Not funded**.
The Human Microbiome in Health and Disease	NIH/NIAID	Andes/Depts. Of Medicine, Medical Microbiology & Immunology; Currie/ Bacteriology	Center of Excellence for Translational Research (CETR) application. Project building on the WARRIOR-SHOW data and specimens to explore antimicrobial activity of human associated bacteria as well as the potential role of fecal microbiome in conferring resistance to pathogen invasion **(uses SHOW biorepository)**.	Submitted 3/2018; **Funded. On-going.**
State Public Health Approaches to Addressing Arthritis	CDC	Wegner, DHS	Provide subjective and objective data on arthritis and physical activity to help guide organizational and state level goals and complement BRFSS data for short and intermediate term objectives. Will explore adding an arthritis module to SHOW to improve understanding for barriers to physical activity and awareness among SHOW participants to improve DHS outreach, dissemination and prevention efforts.	Submitted 4/2018; **Not funded.**
T32 Nutritional Sciences Training Grant	NIH/NIDDK	Eisenstein, Nutritional Sciences	Existing SHOW data use for training and mentoring of nutritional sciences graduate students.	Submitted 5/2018; **Not funded.**
Cumulative Risks, Early development And emerging academic TrajEctories (CREATE)	NIH R21	Dilworth-Bart/SoHE; Malecki/PHS; Schauer; Engineering	Interdisciplinary investigation to study effects of cumulative social and environmental risks on child development and school readiness in lower income (<200% of poverty) preschoolers; using the SHOW research infrastructure.	*In preparation, submission planned for 2019/2020.*
Built environment, lead and MDROs	NIH R21	Malecki/PHS; Safdar/Depts Medicine and Infectious Diseases	Investigating the built environment, lead and MDROs in the WARRIOR-SHOW cohort PMRC samples **(uses SHOW biorepository)**.	*In preparation, submission planned for 2019/2020*

Non-Federal and Other Grants Submitted 2015-2019

Study	Funding source	PI(s)/institution or department (SHOW partner)	Description	Status/ Timing
Human Health Risks from Private Well Water in Wisconsin	WI Ground-water Coordinating Council	Anderson/DHS; Malecki/PHS	Study of private well owners' treatment and testing practices in the state. Findings will be used to improve health risk assessment of groundwater contamination in the state.	**Funded** July 2014; Completed October 2015.
Obesity Prevention Initiative	PERC	Adams, Meinen, Remington/DFM (Nieto, Malecki)	Develop a statewide obesity prevention surveillance system. SHOW is a partner in the Obesity Prevention Initiative.	**Funded**; **On-going**.
Chronic Psychosocial Stress, and Risk of Metabolic Syndrome	CDE Pilot Grant	Bautista/PHS; Palloni/ Sociology (Malecki, Nieto)	Assess the usefulness of hair cortisol as a marker of chronic psychosocial stress by quantifying its association with self-reported stress, individual and neighborhood SES, and components of the metabolic syndrome. Data will be used to design of a follow-up SHOW-based cohort study.	**Funded** August 2014; Pilot data collection completed February 2016.
SHWAHP	Aspirin Health Foundation+ ICTR + additional sources	Thao/ Department of Family Medicine (Malecki)	Proposal to support the Survey of the Health of Wausau Hmong Population. Dr. Thao is using the SHOW model and questionnaires to develop a baseline survey of health amongst a Wausau area Hmong population. Partners include the Wausau Hmong Association, UW Stevens Point, and the UW DFM&CH	**Funded**; **On-going** data collection and support from SHOW.
Cumulative Impacts of Exposure to Multi-pollutant/Air Pollution Sources	Fall competition-UW campus	Malecki/PHS; Schauer/WSLH, Civil and Environmental Engineering	The goal is to understand the health impacts of exposure to multi-pollutant sources as well as the cumulative impacts of air pollution.	**Funded**; Submitted September 2014, **On-going**.
WARRIOR	WPP collaborative health sciences grant	Safdar, Sethi/Medicine, PHS (Peppard)	The WARRIOR project will examine the relationship between fiber-rich food intake and gut microbiota, the prevalence of intestinal colonization of multi-drug resistant organisms and the relationship between dietary fiber and colonization; to be conducted within the SHOW sample.	**Funded**. Submitted 6/2015; **On-going**.
Barriers and Facilitators to Physical Activity in Women in Rural WI	UW Dept. of Kinesiology and Virginia Horne Henry Fund pilot	Cadmus-Bertram/ Kinesiology; Malecki/PHS	SHOW infrastructure and data are being used for assessment of rural women's beliefs about barriers and facilitators to physical activity in Wisconsin, including a mail-based survey as well as qualitative component.	**Funded**. Submitted 2/2016. **On-going**.
Biomonitoring of Anglers in Milwaukee	Agency for Toxic Substances and Disease Registry (ATSDR)	Anderson/DHS; Malecki/PHS	SHOW will support biomonitoring of urban Anglers in Milwaukee's area of concern. SHOW will support sampling frame development and design, and provide support for recruitment, data collection and processing.	**Funded**. Submitted 2/2016. **On-going**.

Study	Funding source	PI(s)/institution or department (SHOW partner)	Description	Status/ Timing
A longitudinal investigation into associations of sleep duration and quality with measures of daytime function in children	UW VCRGE pilot	Peppard/PHS	The study will characterize sleep duration and patterns in children to measure association among sleep, social-emotional-behavioral outcomes and objectively measured alertness. SHOW infrastructure is used to recruit 40 children.	**Funded.** Submitted 9/2016. **Completed.**
CREATE: Cumulative risks, early development and emerging academic trajectories	UW2020	Dilworth-Bart/ Human Development & Family Studies	Use SHOW field staff and expertise in household assessments to recruit up to 80 preschool age children and study cumulative social, environmental and inflammatory markers of risks to early child development. Will use SHOW administrative as well as field data collection expertise.	**Funded.** Submitted 10/2016 **On-going.**
Lead (Pb), the Gut Microbiota, and Multi-Drug Resistant Organism (MDRO) Colonization	Dept. of Medicine Pilot	Safdar/Malecki Depts of Medicine and Infectious Diseases and Pop Health Sciences	SHOW data and biological samples in addition to WARRIOR microbiome data will be used to study MDRO colonization in gut and how gut microbiota is affected by exposures to lead **(uses SHOW biorepository).**	**Funded.** Submitted 12/2016. **Completed.**
Waupaca Eating Smart (WES)	WPP Community Opportunity Grant	Martinez-Donate/PHS (Malecki, Nieto)	Intervention for promoting healthy eating by enhancing and sustaining changes in the food environment in a WI community to increase access to healthy foods.	Submitted 3/2015; **Not funded.**
HRSA Primary Care Research Fellowship	HHS Training Grant	Rabago/Family Medicine and Community Health	SHOW will partner with the Department of Family Medicine and Community Health in training clinician-scientists through their HRSA Primary Care Research Fellowship.	Submitted 11/2015. **Not funded**.
Health Behaviors and Chronic Disease in Wood County	Legacy Foundation of Central Wisconsin	Corey Huck, UW Stevens Point	Using SHOW resources to illustrate key health issues in Wood County and working towards establishing a new community model ("Healthy Living Hub") for promoting healthy behaviors and preventing chronic disease with community, academic and public health partners in Wood County	Submitted 3/2016. **Not funded.**
Community-Based Continence Promotion: SHOW Me the Reach	ICTR CAP D&I Research pilot	Brown/OB&GYN and Urology; Nieto/PHS	SHOW will identify older women with incontinence and query about their willingness to participate in a continence promotion program. SHOW will implement questions in the 2016 data collection cycle, support qualitative follow-up of women who have not sought care, provide data on incontinence and workshop preferences, and support data analysis.	Submitted 3/2016. **Not funded. Start-up funds. Completed.**

Study	Funding source	PI(s)/institution or department (SHOW partner)	Description	Status/ Timing
Healthy Children's Meals in Wisconsin	WPP Community Impact Grant	Wright / Winnebago Health Dept	The goal is to implement a program to improve the food environment for children in WI. SHOW will provide data to support the research and data analysis.	Submitted 5/2016 **Not funded.**
Mechanistic analysis of how asymptomatic Toxoplasma infection prevents weight gain in animals fed high fat diet	UW2020 VCGRE	Knoll/ Dept Medical Microbiology and Immunology	The study will test whether latent Toxoplasma infection may cause a reduction in fat absorption and reduce BMI **(uses SHOW biorepository)**.	Submitted 10/2016; **Not funded.** Resubmitted to Microbiome Initiative 3/2017 **Funded. On-going.**
Social epi-genomics of health disparities: how different dimensions of disadvantage get under the skin	UW2020	Malecki/ Engelman Sociology and Pop Health Sciences	SHOW existing data and biorepository will be used to study how different dimension of disadvantage shape health disparities through epigenetic mechanism **(uses SHOW biorepository)**.	Submitted 10/2016 **Not funded.**
AHA Mentored Clinical and Population Research Award	AHA	Wilbrand/ Dept Neurological Surgery	The study will investigate cerebrovascular and cardiovascular disease risk factors to predict the rate of cognitive decline over time. SHOW will provide population-based controls.	Submitted 2/2017 **Not funded.**
Envt Toxicant Exposures & Human Microbiota: Triclosan, Microbial Drug Resistant Organisms and Gut Microbial Diversity	ICTR pilot	Malecki/ Safdar Depts Pop Health Sciences and Medicine	The goal of this research is to gain further insight into the relationships between chronic triclosan exposure and the gut microbiota, how triclosan exposure influences MDRO colonization, and how these relationships differ between younger and older adults **(uses SHOW biorepository)**.	Submitted 3/2017. **Not funded.**
Establishment of a Population-based Microbiome Research Core in the Survey of Health of Wisconsin	UW VCRGE	Sethi/ Pop Health Sciences	SHOW infrastructure and biorepository will be used to create a Population-based Microbiome Core (PMRC) that will provide the UW research community resources and expertise to conduct microbiome research.	Submitted 3/2017 **Funded. On-going.**

Study	Funding source	PI(s)/institution or department (SHOW partner)	Description	Status/ Timing
Examining the Potential of the Microbiome in Children to Reduce Antibiotic Resistance: the EPIC Study	UW VCRGE	Safdar/ Depts Medicine and Infectious Diseases	SHOW infrastructure will be used to identify and enroll participants (children ages 3-5) during 2017-18 to study the structure and function of the nasal, skin, and gut microbiomes in children receiving care in daycare settings and compare the findings with the nasal, skin and gut microbiomes of children not receiving daycare.	Submitted 3/2017 **Funded. On-going.**
Aryl hydrocarbon receptor response and cancer health disparities	UW CCC/ACS	Malecki/PHS	This pilot award will examine differential expression of Aryl Hydrocarbon Receptor pathway genes by population characteristics known to modify cancer risk in the population. The pilot will use RNA and urine samples from 150 past SHOW participants to improve understanding of the role of AhR signaling in whole blood as a potential novel biomarker of cancer risk **(uses SHOW biorepository)**.	Submitted 4/2017; **Funded. On-going.**
Novel statistical methods for analysis of microbiome data	WPP	Tang/ Biostatistics and Medical Informatics, WID	WPP New Investigator Program to analyze microbiome derived data from the WARRIOR-SHOW ancillary project with new statistical methods developed.	Submitted 9/2017; **Not funded.**
Allostatic Load in Adults, Adolescents, and Children with Food Allergy	School of Nursing Pilot Award	Ersig/SoN	The study will examine clinical measures and genetic markers of allostatic load among young adults with food allergies and matched healthy controls using data and DNA from SHOW **(uses SHOW biorepository)**.	Submitted 12/2017; **Funded. On-going.**
Toll-like Receptors Linking Obesity With Health Disparities	ICTR	Malecki/PHS	SHOW data and biosamples will be used for investigating obesity, toll-like receptors and sensitivity to the environment **(uses SHOW biorepository)**.	Submitted 2/2018; **Not funded.**
Systemic Biomarkers of Health Disparities	ICTR	Downs, Anderson/UW CCC	SHOW data and biosamples will be used in the investigation. Existing measures from SHOW will be used to identify individuals by obesity class and plasma samples will be used to validate markers of metabolic status **(uses SHOW biorepository)**.	Submitted 2/2018; **Not funded.**
Identifying Measures of Increased Allostatic Load in Adults with Food Allergy	ISONG; International Society of Nursing Genetics	Ersig, School of Nursing	Using existing SHOW data and biospecimens for analysis of allostatic load in adults with food allergy **(uses SHOW biorepository)**.	Submitted 6/2018; **Not funded.**

Study	Funding source	PI(s)/institution or department (SHOW partner)	Description	Status/ Timing
Late Comorbidities in Adolescent and Adult Survivors of Preterm Birth	WPP	Eldridge/Goss; Pediatrics	Using existing SHOW data and research infrastructure for controls in comparison with cohort of very low birthweight babies followed through adolescence/young adulthood.	Submitted 7/2018; **Not funded.**
Psychosocial Stress and Cardio-Metabolic Risk	WPP	Bautista/PHS	Using SHOW infrastructure to support recruitment and data collection in first-year medical students for measuring stress and cardio-metabolic health including biological samples and objective physical measures **(uses SHOW biorepository)**.	Submitted 7/2018; **Not funded.**
Leveraging data from SHOW to explore stress, sleep, hunger & preferences	UW VCRGE Fall Competition	Ashton/SoHE	Using existing SHOW data to examine relationships between stress, sleep deprivation and hunger biomarkers and economic preferences.	Submitted 9/2018; **Not funded.**

Appendix E – Community Engagement

Community Engagement Events Attended, Milwaukee, 2018

Date	Event	Sponsorship (Y/N)
3/27/2018	Health Science Square	N
4/13/2018	Community Health Worker Conference	N
4/20, 21/2018	Breaking the Silence	Y
4/26/2018	Healthy Equity Summit	N
4/27/2018	Community Engagement Spring Conference	N
4/28/2018	American Cancer Society (ACS) Sankofa	Y
5/19/2018	Bike Day	Y
6/2/2018	American Cancer Society (ACS) - Celebrando Nuestras Familias	Y
6/9, 10/2018	Fiesta Waukesha	Y
6/19/2018	Juneteenth Celebration	Y
6/21/2018	Community Gardens	Y
6/23/2018	United Migrant Opportunity Services (UMOS) Fun Fest	Y
6/30/2018	Be Active Be Healthy Event	Y
7/7/2018	United Migrant Opportunity Services (UMOS) Cervereros Tailgate	Y
7/20, 21/2018	Garfield Days	Y
8/4-11/2018	Bronzeville Days	Y
8/5/2018	Puerto Rican Fest	Y
8/11/2018	United Migrant Opportunity Services (UMOS) Back to School Fair	Y
8/18/2018	IndiaFest	Y
8/24-26/2018	Mexican Fiesta	Y
9/8/2018	Walnut Way Harvest Day	Y
10/1/2018	United Community Center (UCC) Employee Health Fair	Y
10/3/2018	Public Health Fair	Y
10/4/2018	Aurora Blood Drive	N
10/6/2018	Sista Strut	Y
10/11/2018	Center for Urban Population Health (CUPH) Open House	N
10/13/2018	Milwaukee Women's Conference	Y

Appendix F – SHOW Updated Methods Paper

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Title: Cohort Profile: the Survey of the Health of Wisconsin (SHOW);
A Multi-level Population-based Health Research Infrastructure

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Profile in a nutshell

Word count= 212

The Survey of the Health of Wisconsin (SHOW) program serves as a platform for comprehensive statewide community-based surveillance and pioneering population health research. Since its inception in 2008, the program has collected a broad set of data to monitor trends in social determinants of health, objective health measures, blood- and urine-based biomarkers, and self-reported health. The baseline cohort now includes over 6,000 adults ($\geq$18 years) and children (0-17 years) living in geographically diverse urban and rural communities throughout the state. Household addresses are geocoded, providing opportunities for data linkage with existing social and environmental data. Unique features of the data collected include individual experiences of discrimination, neighborhood perceptions, life-events, and social support. Additionally, objective health metrics and biosample collection provide an extensive biorepository that supports translational and multi-omics research. Additional survey components include the use of accelerometry for objective sleep and physical activity measurement. Follow-up data collection is ongoing with 725 repeat participants in 2017. Ongoing efforts include continued follow-up and focused community engagement strategies for oversampling in under-represented populations. A wide array of inter-disciplinary ancillary studies have been conducted within the studies framework, including studies that have collected additional data such as household microbiome, diet, and home environmental sampling. Data are available to investigators by request via the SHOW website.

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Why was the cohort set up?

The Survey of the Health of Wisconsin (SHOW) was established in 2008 at the University of Wisconsin in order to monitor local and contextual drivers of health and well-being, with an understanding that social determinants of health are significant drivers of disparate trends in population health status observed at the state and local level across the United States. These data are often difficult or impossible to capture with national levels surveys. Health outcomes of particular interest include but are not limited to predictors of cardiovascular and metabolic health. SHOW was uniquely designed to increase understanding of the intersection of the individual- and community-level social determinants of health with rigorous, objective measures of overall health status and biological monitoring data. The program began by gathering objective and subjective data on a broad range of health determinants in annual statewide population-based samples. Health examination of a population-based sample was used to improve generalizability and enhance rigor over existing surveillance tools. With both objective and subjective data and household-based recruitment, the program was designed to overcome limitations posed by telephone-based surveys and provide valid objective measures to monitor community and statewide health trends. Data could then be used to evaluate community and statewide policies and programs.

Wisconsin (WI) is an ideal setting for this resource because of the geographic diversity within the state. In 2018, Wisconsin had a population size of 5.8 million people living in 72 counties. One-quarter of the population (26%) lives in rural areas, another in two larger metropolitan areas with others living in more suburban or smaller towns. Milwaukee, the largest urban core in the state, is also one of the most segregated cities in the United States with stark health, racial, urban/rural and socioeconomic disparities (1). The geographic and population diversity offer essential opportunities to examine how context and social determinants can influence population health.

The purpose of this cohort profile is to provide an updated description of the baseline SHOW cohort recruited between 2008 and 2016, and the first phase of longitudinal follow-up conducted in 2017. Modeled after the National Health and Nutrition Exam Survey, SHOW was not designed with one specific hypothesis in mind but with a much broader mission to improve understanding of the multi-level determinants of health and equity, originally emphasizing chronic health in adult populations. Recruitment of children was added in subsequent years (Figure 1). Primary aims of SHOW include supporting an innovative population health research platform — rigorous training for graduate and medical students within the School of Medicine and Public Health - and, establishing an infrastructure to support a variety of ancillary studies and future longitudinal follow-up.

Who is in the SHOW cohort?

The current SHOW cohort includes over 6,000 adults and children recruited from across this diverse geographic landscape and is largely representative of the state population. Approximately one-third of the current sample comprises rural residents across social and economic gradients. Current and ongoing work includes focused population recruitment in under-represented populations in addition to additional follow-up in 5-10 year intervals.

SHOW has completed three waves of sample collection with plans for continued focus population and follow-up recruitment. As of April 2019, a weighted 2008-2016 sample (n=5337) is available for a representative statewide sample of non-institutionalized adults ages 18-74 years. Table 1A summarizes demographics for each phase of data collection. Table 1B describes the child sample (n=867) enrolled between 2014-2017. Select health indicators for adults are presented in Table 2. Weighted proportions reflect survey weights adjusting for the

probability of selection into the sample, nonresponse, and post-stratification adjustment of the sample to United States Census based estimates of the target population by age, race, and sex. Table 3 shows participation rates by SHOW phase and by urbanicity, defined using U.S. Census-based urban and rural classification for census tracts.

Phase I, SHOW 2008-2013, was designed to gather annual data on 21-74 years old adults (2). As previously described by Nieto et al., 2010, a two-stage statewide cluster sampling approach was used to generate an annual statewide representative sample. The annual sample size ranged from approximately 300 to 900 between 2008 and 2013. Response rates ranged from 43-87% depending on region across the state and, on average, tended to be higher in more rural communities and lower in more urban and lower income communities. Approximately 80% of participants who completed the household interview went on to complete all survey components (self-administered, physical exam and biosample collection). Survey weights provide representative statewide estimates matching the U.S. Census, and design variables account for spatial clustering in the sample design.

Phase II, SHOW 2014-2016, was designed to collect data from a tri-annual statewide representative sample of adults (18+) and children (<18 years of age) with no age limitations. The final three-year statewide representative sample included 1,957 adults and 645 children. Similar to Phase I, a probability proportional to size without replacement (PPSWOR) approach was used to randomly select participants. The primary sampling unit was the county and the measure of size was the number of occupied housing units. One county was selected from each of eight strata, which were defined by a measure of premature mortality, and years of potential life-lost. Two counties (Milwaukee and Dane) were selected with certainty (probability of selection=1) based on population size. Census block groups (CBG) served as secondary sampling units, and were again selected using PPSWOR with poverty stratification. Households

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within each CBG were randomly selected using simple random sampling. Individuals were eligible to participate if they were full-time (> 6 months) residents at the address, not under the supervision of the department of corrections and did not show signs of mental incapacity. All participants consented for the use of biosamples for future unspecified research and DNA analyses. Response rates were slightly higher on average in Phase II with 60-68% of screened eligible agreeing to participate.

How often has the population been followed up?

Phase III of SHOW includes follow-up and focused population recruitment. An ongoing goal of SHOW is to continue following participants with repeat biospecimen collection every five to ten years. In 2017, follow-up participants were selected from the Phase I sample. All children currently residing in follow-up participant households were also invited for a first visit. Phase III follow-up included an in-home assessment, physical exam and repeat biospecimen collection (67% participation rate, see Supplemental Figure 1); a subset participated in the microbiome ancillary study.

What has been measured for this cohort?

SHOW survey covers a variety of chronic health outcomes measured by self-administered questionnaire and clinical exam (Table 4). Extensive data on determinants of health of individuals are also assessed via questionnaire. Using geographic information systems, households are also linked to numerous extant databases, affording opportunities to assess associations between community level environment (pollution, built environment) and social

(poverty, crime, and the built environment) context with a wide range of health behaviors, outcomes and measures of overall well-being.

Over time, various additions were made to the study protocols including objective physical activity and sleep monitoring via ActiGraph wGT3X-BT accelerometers (ActiGraph, Pensacola, FL), recruitment of children, and additional biospecimen collection. Additions also include new biosamples including PAXgene tubes for mRNA transcriptional analyses in whole blood. A subset with individual (n=650) and household microbiome samples, genetic variants from a genome-wide array, and genome-wide DNA methylation have also been analyzed to date. Methods for each phase of data collection are briefly described.

Interviews and questionnaires

The in-home visit by field interviewers includes computer-assisted interviews (CASI). Data on sensitive topics (e.g. food security, behaviors etc.) are collected via audio computer-assisted interviews (ACASI). Additional paper questionnaires are left with participants and mailed back to SHOW after completion or delivered by participants to exam visits.

Physical and clinical measurements

Physical exams include blood pressure and heart rate, height, weight, hip and waist circumference, and spirometry to assess lung function following standard protocols. Weight is measured in kilograms (with a precision of 0.1 kg) using digital scales. Height, hip and waist circumference are measured in centimeters in duplicate. Sitting blood pressure and heart rate are measured using digital blood monitors with three measurements taken one minute apart after an initial 5-minute rest period. Lung function is assessed by spirometry that measures lung capacity using a Jaeger AM1+ electronic peak flow meter with filter mouthpiece. Testing provides data on FEV1 (forced expiratory volume in 1 second) and FVC (forced vital capacity).

Objective physical activity and sleep measurements

Actigraphy was used to collect objective data on physical activity and sleep. Participants, both adults, and children >6 years old wear wrist and hip ActiGraph collection devices for 7-8 days. Data are processed and analyzed using ActiLife software.

Biosample collection and biobanking

Following an in-home visit, biological samples are collected either in participant homes or at local exam centers. Several tubes of venous blood (about 55-60 ml in total) are collected and immediately processed for serum and plasma, aliquoted into cryovials and frozen. PAXGene tubes intended for RNA extraction are frozen. Additional blood samples are sent to Marshfield Labs (Marshfield, WI) for complete blood cell count, hematocrit, hemoglobin, HbA1c, glucose, creatinine, triglycerides, total and HDL cholesterol. After removing plasma, collection tubes are sent to Prevention Genetics (Marshfield, WI) for DNA extraction. Urine samples are centrifuged, aliquoted into cryovials and frozen. Frozen biospecimens are transported to SHOW headquarters and stored in the SHOW biobank for future research. The growing biobank includes over 200,000 cryovials of stored urine, plasma, serum, DNA and PaxGene tubes for use by others.

Linkages with Extant Environmental and Socio-Demographic Data -

Socio-demographic and environmental measures can be linked to the data using a street address or other geography indicators (e.g. CBG). Environmental measures include air pollution exposure (fine particulate matter and traffic pollution) (3, 4), access to retail food outlets (5), access to health care facilities (6), measures of green space (vegetation index via satellite imagery and percent coverage from a tree canopy database) (7, 8) and drinking water source (9).

Ancillary Studies

Many ongoing ancillary studies have either extended the focus of the baseline SHOW program or facilitated follow-up with cohort participants around particular health issues. Examples include personalized vitamin D supplementation based on genetic analysis, assessment of physical activity in rural women, incontinence research in older women, epigenetic signatures of aging and health disparities among others (Table 5)**.** SHOW also supports applied public health and surveillance. For example, several collaborations with the Wisconsin Department of Health examine health impacts of Great Lakes fish consumption across the state, among anglers and in high-risk populations (e.g. Burmese immigrants) (10-13).

In 2016, a major ancillary study, The Wisconsin Microbiome Study, was launched to investigate the distribution of multi-drug resistant organisms (MDROs) and to characterize the human microbiome in the population (14). SHOW added questionnaires on risk factors for MDRO colonization, diet history, and food-frequency. Stool and swab samples (skin, nasal, oral) were collected and analyzed for MDRO colonization; 16s rRNA gene sequencing data are available for all stool samples collected with this project. In 2018, 50% of Wisconsin Microbiome Study participants were invited to complete a follow-up visit. Stool and environmental samples (high-touch surface swab, household dust, and soil samples) were collected and are available for future analyses.

What has it found? Key findings and publications

The breadth and nature of the survey allows for multidisciplinary research on various health topics. The main findings to-date have focused on population health priorities including obesity,

cardiometabolic and pulmonary health, mental health, and cancer prevention and control [3,4,6,7,16,18,19]. SHOW supports comprehensive assessment of health disparities, associated with neighborhood environment, access to healthy food, health care, oral health and experiences of discrimination (4-6). Food insecurity is highly prevalent in inner city and rural communities across the state, with several adverse outcomes including metabolic and cardiovascular health (15, 16). Objective and subjective measures of physical activity and the built environment continue to support novel methods for behavioral and built environment research in both child and adult populations. The complete list of over 47 publications is available at www.med.wisc.edu/show. Below is a short summary of key findings.

Environmental Health: SHOW was among the first to examine associations between green space and mental health, now a growing area of research (7). It was also found that a positive neighborhood perception and green space are correlates of better sleep quality (8, 17). Chronic low-level air pollution exposure has also shown adverse effects on lung function, and respiratory allergies, two outcomes not always included in population health research (3, 4).

Obesity and cardiovascular health: Numerous studies examine predictors of obesity, and determinants of metabolic syndrome in the SHOW population (5, 16, 18-21). Objective measures of obesity indicate that over 70% of the population is overweight or obese, and that higher level of obesity is correlated with an multiple co-morbidities (18). Obesity has also been shown to modify associations of respiratory outcomes with air pollution and smoking exposure in the study sample suggesting SHOW is a valuable resource for examining the role of obesity in increasing human susceptibility to environmental exposures and the biological mechanisms underlying these associations.

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Multi-omics Research: Recent analysis of whole blood mRNA levels among SHOW participants revealed differential gene expression in stress and toxicity pathways in obese smokers compared to non-obese smokers (22). This work highlights the future potential for SHOW to serve as an infrastructure for emerging precision-health initiatives. In 2018, NIEHS funded MEGA Chip Array and EPIC Chip Array analysis by the Center for Inherited Disease Research (CIDR) on a subset of Phase II SHOW participants that will enable future investigations of gene-environment interactions and studies of social determinants' influence on epigenetics via DNA methylation pathways.

Community and policy research: The program also offers opportunities for measuring the impact of natural experiments related to significant policy changes [20]. For example, a follow-up survey of private well-owners in rural communities found knowledge, education, and resources to be barriers to well testing, a known evidence-based (23) strategy for identifying potential adverse environmental exposures in drinking water supplies. Examples of community-based research include the implementation of "eating smart" intervention to promote healthy eating (24, 25) and the objective assessment of the social and built environment (20).

What are the main strengths and weaknesses?

Strengths – SHOW has been designed using rigorous sampling strategies, and provides high quality measures of health and well-being that are comparable to other well-known cohorts including the National Health and Nutrition Exam Survey. A breadth of objective and subjective data (over 2000 variables) from a geographically diverse statewide sample offer an invaluable resource for population health research. The biosamples support rigorous translational research including novel biomarkers of response to environmental exposures. Availability of DNA and RNA provides opportunities for future precision health and omic-integration (genomic,

epigenomic and transcriptomic) projects. Similarly, plasma/serum and urine samples offer new opportunities for metabolomics and exposure assessment. The program serves as a cost-effective research infrastructure allowing for investigator-initiated ancillary studies. Existing baseline data support future interventions and community-based partnerships for program planning, and evaluation. Major strengths of the program also include the ability to link SHOW data to other databases and registers including vital statistics, state cancer registry, and environmental exposure data.

The SHOW program also offers an opportunity to study aging across the life course, including a well-characterize large young-adult, middle-aged, and older adult population. Middle-aged adulthood is a time when many pathological changes of disorders begin, but are still clinically undetectable. Thus, SHOW population samples enable studies exploring early biomarkers of age-related disorders and the potential for long-term follow-up. Increasingly new models of research are looking toward electronic health records for understanding health trajectories over time. SHOW also has consented individuals for linkages with electronic records and other administrative data, allowing for new efforts in data integration, and method validation to emerge. Many additional ongoing ancillary studies are capitalizing on this infrastructure for advancing multi-level population health research in children, adults and among under-represented populations. A recent focus of the program has been community engagement and outreach among minority populations and rurally isolated populations to identify opportunities to collect additional data and leverage additional resources to support community-based intervention work.

The SHOW sample includes a significant number of genetically related (parent-child; siblings) and unrelated (husband-wife) participants with similar exposures or lifestyles. Such sample structure allows various types of investigations on health determinants and variability in human responses to similar factors.

Weaknesses – Conducting SHOW as a comprehensive population based survey is both resource and time intensive. SHOW's sampling strategy was designed to ensure a statewide representative sample leading to both logistical and monetary costs. Although the resulting sample characteristics may be a strength for many types of epidemiological studies, it may be a limitation for other studies requiring a more substantial proportion of non-white participants, as the vast majority of state residents are white and less than 12% of the state's total population self-identifies as non-white. A higher proportion of non-white populations is often necessary for NIH-funded grants. SHOW has recognized this need and in 2018-2019 is conducting focused recruitment of persons of color in highly diverse communities.

Can I access SHOW data? Where can I find out more?

Any qualified researcher can request data and biospecimens from the SHOW biobank. Details on survey instruments and variables as well as all request forms are available on the SHOW website https://www.med.wisc.edu/show/. All ancillary study requests are reviewed by the SHOW Scientific Committee to evaluate proposals for scientific soundness and compatibility with SHOW's overall goals.

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Table 1-A. SHOW Cohort Demographics for Adults by Phase, 2008-2017.

Demographic characteristics	Phase I 2008-2013			Phase II 2014-2016			Phase III 2017		
	N*	Mean or %**	95% CI**	N*	Mean or %**	95% CI**	N*	Mean or %**	95% CI***
Age^Δ (years)	3380	45.6	(44.8, 46.4)	1957	48.7	(46.8, 50.6)	725	54.1	(52.8, 55.3)
18 to 29	512	16.6	(14.3, 18.9)	278	15.8	(12.5, 19.1)	29	4.0	(2.2, 5.8)
30 to 39	592	20.7	(18.4, 23.1)	346	20.7	(17.4, 24.1)	114	15.7	(12.7, 18.7)
40 to 49	690	21.3	(19.3, 23.3)	255	14.2	(11.4, 16.9)	128	17.7	(14.5, 20.8)
50 to 59	813	23.1	(21.2, 25.1)	353	19.2	(17.4, 21.0)	157	21.7	(18.3, 25.0)
60 to 74	773	18.2	(16.5, 20.0)	525	22.5	(18.8, 26.2)	238	32.8	(28.9, 36.7)
75 or older	NA	NA	NA	200	7.6	(6.0, 9.1)	59	8.1	(5.9, 10.4)
Gender									
Male	1479	50.1	(48.5, 51.8)	864	49.1	(47.2, 50.9)	288	39.7	(37.0, 42.5)
Female	1901	49.9	(48.2, 51.5)	1093	50.9	(49.1, 52.8)	437	60.3	(57.5, 63.0)
Race / ethnicity									
Non-Hispanic white	2867	85.1	(83.0, 87.3)	1623	85.0	(81.7, 88.2)	575	79.5	(76.1, 82.9)
Non-Hispanic black	243	6.1	(4.7, 7.6)	151	6.3	(3.6, 9.1)	96	13.3	(10,3, 16.2)
Hispanic	108	4.1	(2.8, 5.3)	77	3.9	(2.8, 5.0)	22	3.0	(1.6, 4.5)
Other	154	4.7	(3.3, 6.0)	104	4.8	(3.9, 5.7)	30	4.2	(2.6, 5.7)
Education									
Less than HS	258	7.5	(6.3, 8.7)	132	6.5	(4.9, 8.1)	47	6.5	(4.7, 8.3)
HS degree or some college	1416	40.7	(38.1, 43.3)	775	40.1	(37.7, 42.4)	272	37.5	(33.7, 41.3)
Associate's degree or higher	1701	51.8	(49.1, 54.4)	1048	53.5	(50.2, 56.7)	406	56.0	(52.0, 60.0)
Poverty									
≤ 200% FPL	985	29.0	(26.4, 31.5)	556	30.5	(26.7, 34.2)	167	23.7	(20.1, 27.2)
> 200% FPL	2249	71.0	(68.5, 73.6)	1303	69.5	(65.8, 73.3)	539	76.4	(72.8, 79.9)
Employed (among the economic labor force)									
Yes	2283	91.1	(89.7, 92.5)	1115	92.6	(90.7, 94.5)	450	95.3	(93.4, 97.2)
No	238	8.9	(7.5, 10.3)	92	7.4	(5.5, 9.3)	22	4.7	(2.7, 6.6)
Health insurance coverage over the last 12 months									
0	316	9.1	(7.7, 10.4)	75	4.1	(2.3, 5.9)	12	1.7	(0.7, 2.6)

	N	%	95% CI	N	%	95% CI	N	%	95% CI
1 to 11	216	6.3	(5.3, 7.3)	146	8.3	(7.0, 9.5)	30	4.1	(2.6, 5.7)
12	2833	84.6	(82.9, 86.4)	1742	87.6	(84.7, 90.5)	681	94.2	(92.3, 96.0)
Census 2010 urban / rural classification									
Urban	2139	67.1	(61.4, 72.7)	1339	69.9	(48.8, 90.9)	575	79.3	(75.6, 83.1)
Rural	1241	32.9	(27.3, 38.6)	618	30.1	(9.1, 51.2)	150	20.7	(16.9, 24.4)

* Unweighted

** Weighted and adjusted for the stratification and clustering in the complex survey sampling design.

*** Unweighted but adjusted for clustering at the household level

△ Age range of adult participants in SHOW 2017 was 25 to 82. Age range of adult participants in SHOW 2014-2016 was 18 to 98.

Table 1-B. SHOW Cohort Demographics for Children by Phase, 2014-2017.

		Phase II 2014-2016			Phase III 2017	
Demographic characteristics	N*	Mean or %**	95% CI**	N*	Mean or %**	95% CI***
Age (years)	645	7.7	(7.1, 8.3)	222	8.6	(7.9, 9.4)
0-6	279	44.8	(39.4, 50.2)	71	32.0	(25.3, 38.7)
7-11	182	28.1	(25.5, 30.8)	88	39.6	(33.4, 45.9)
12-17	184	27.1	(22.2, 31.9)	63	28.4	(21.4, 35.4)
Gender						
Male	332	51.1	(46.5, 55.8)	123	55.4	(49.1, 61.8)
Female	313	48.9	(44.2, 53.5)	99	44.6	(38.2, 50.9)
Race / ethnicity						
Non-Hispanic white	472	71.4	(62.9, 79.8)	149	67.4	(57.7, 77.1)
Non-Hispanic black	103	16.8	(8.2, 25.5)	38	17.2	(9.2, 25.2)
Hispanic	15	2.5	(0.2, 4.7)	23	10.4	(4.7, 16.1)
Other	53	9.3	(5.5, 13.2)	11	5.0	(0.0, 10.1)

* Unweighted

** Weighted and adjusted for the stratification and clustering in the complex survey sampling design.

*** Unweighted but adjusted for clustering at the household level

Table 2. Select Health Indicators for SHOW Adults by Phase, 2008-2017.

Select Health Indicators	Phase I 2008-2013			Phase II 2014-2016			Phase III 2017		
	N*	Mean or %**	95% CI**	N*	Mean or %**	95% CI**	N*	Mean or %*	95% CI***
Body Mass Index (kg/m², mean	2930	29.5	(29.1, 29.9)	1914	29.7	(29.1, 30.3)	716	30.9	(30.3, 31.5)
Underweight (<18.5 kg/m²)	36	1.2	(0.8, 1.7)	21	1.1	(0.5, 1.7)	6	0.8	(0.2, 1.5)
Normal weight (18.5 to 24.9 kg/m²)	780	26.5	(24.2, 28.9)	497	26.3	(23.5, 29.0)	156	21.8	(18.6, 24.9)
Overweight (25.0 to 29.9 kg/m²)	935	33.2	(30.7, 35.6)	609	31.6	(28.7, 34.4)	204	28.5	(25.2, 31.8)
Obese (≥ 30 kg/m²)	1179	39.1	(36.5, 41.6)	787	41.1	(37.7, 44.5)	350	48.9	(44.9, 52.8)
Hemoglobin A1c (%), mean	2563	5.7	(5.6, 5.7)	1376	5.5	(5.4, 5.5)	508	5.7	(5.6, 5.8)
< 5.7	1462	59.8	(57.2, 62.4)	1028	77.7	(74.2, 81.1)	348	68.5	(64.2, 72.8)
5.7 to 6.4	885	33.0	(30.7, 35.3)	224	14.1	(11.6, 16.6)	114	22.4	(18.7, 26.2)
≥ 6.5	216	7.2	(6.0, 8.5)	124	8.2	(6.6. 9.8)	46	9.1	(6.3, 11.8)
Diabetes									
HbA1c ≥ 6.5% or previous diagnosis	269	8.8	(7.3, 10.2)	169	11.1	(9.4, 12.8)	60	11.8	(8.8, 14.8)
Diabetes awareness	187	65.6	(59.6, 71.6)	147	87.6	(83.2, 92.0)	49	81.7	(71.7, 91.6)
Diabetes control	72	44.8	(39.1, 50.4)	57	44.8	(35.9, 53.7)	20	48.8	(33.6, 64.0)
Hypertension									
140/90 mmHg or medication use	996	31.3	(29.0, 33.5)	612	34.8	(30.4, 39.1)	303	42.4	(38.7, 46.2)
Hypertension awareness	741	70.0	(66.4, 73.6)	441	71.3	(67.1, 75.5)	223	73.6	(68.6, 78.6)
Hypertension control	475	69.3	(65.1, 73.4)	226	57.9	(52.8, 63.0)	113	56.5	(49.5, 63.5)
Lung function (FEV1/FVC), mean	2597	0.83	(0.83, 0.84)	1745	0.82	(0.79, 0.85)	680	0.84	(0.83, 0.85)
0.80 to 1.00	1939	76.4	(73.9, 78.8)	1212	68.4	(58.4, 78.4)	536	78.8	(75.8, 81.9)
< 0.80	658	23.6	(21.2, 26.1)	533	31.6	(21.6, 41.6)	144	21.2	(18.1, 24.2)
Depression Scale, mean									
Urban	1824	2.54	(2.32, 2.77)	1143	2.86	(2.51, 3.21)	480	2.71	(2.33, 3.09)
Rural	1131	2.20	(1.78, 2.61)	568	2.41	(2.25, 2.56)	137	2.34	(1.71, 2.98)
Anxiety Scale, mean									
Urban	1818	1.59	(1.42, 1.76)	1144	1.90	(1.69, 2.11)	480	1.88	(1.62, 2.13)
Rural	1131	1.31	(1.13, 1.50)	569	1.62	(1.37, 1.86)	138	1.34	(0.96, 1.71)

Stress Scale, mean

Urban	1822	3.52	(3.31, 3.73)	1142	4.12	(3.79, 4.45)	481	3.88	(3.54, 4.22)
Rural	1131	3.01	(2.73, 3.30	569	3.70	(3.47, 3.94)	138	3.28	(2.65, 3.90)

Food insecurity concern in the last 12 months

	352	12.3	(10.5, 14.2)	275	15.1	(12.3, 17.9)	84	11.7	(9.1, 14.2)

Lifetime discrimination instances

0	1319	45.0	(42.3, 47.6)	801	45.7	(40.9, 50.5)	290	45.7	(41.5, 49.8)
1 or 2	1010	34.2	(31.9, 36.6)	549	31.0	(27.4, 34.5)	197	31.0	(27.3, 34.7)
3 or more	628	20.8	(18.6, 22.9)	389	23.3	(21.1, 25.6)	148	23.3	(19.8, 26.8)

Neighborhood safe from crime

Not very safe or not at all safe	84	2.7	(2.1, 3.3)	90	5.3	(3.4, 7.2)	39	6.2	(4.0, 8.5)

* Unweighted

** Weighted and adjusted for the stratification and clustering in the complex survey sampling design.

*** Unweighted but adjusted for clustering at the household level

△ Age range of adult participants in SHOW 2017 was 25 to 82. Age range of adult participants in SHOW 2014-2016 was 18 to 98.

Table 3. SHOW Participation Rates by Phase and Urbanicity. Rates are estimated as the percent of adult individuals who screened eligible who agree to participate based on cohort year and urban/rural status of resident census tract. A more detailed summary of participation rates by health region (2008-2013) and by County (2014-2016) is presented in Supplemental Table 1 and available online.

Response Rates	Overall %	Urban %	Rural %
Phase I	57.5	56.1	60.5
Phase II	63.5	62.0	70.4
Phase III	85.6	84.9	85.9

Table 4. SHOW Survey Components in Phases I-III.

	Phase I 2008-2013 21-74 years old	Phase II 2014-2016 All ages	Phase III* 2017 follow up All ages
Questionnaires			
Demographics	✓	✓	✓
Health and health history	✓	✓	✓
Mental health	✓	✓	✓
Health care and medication	✓	✓	✓
Health related behaviors	✓	✓	✓
Physical and built environment	✓	✓	✓
Social and economic determinants	✓	✓	✓
Clinical measurements			
Weight	✓	≥ 3 years old	≥ 3 years old
Height	✓	≥ 3 years old	≥ 3 years old
Waist and hip circumference	✓	≥ 3 years old	≥ 3 years old
Bioimpedance	✓		
Blood pressure and heart rate	✓	≥ 3 years old	≥ 3 years old
Spirometry (lung function)	✓	≥ 6 years old	≥ 6 years old
Accelerometry (hip, wrist)		≥ 6 years old	≥ 6 years old
Blood testing			
CBC	✓	≥ 18 years old	≥ 18 years old
Triglycerides		≥ 18 years old	≥ 18 years old
Total and HDL cholesterol	✓	≥ 18 years old	≥ 18 years old
HbA1c	✓	≥ 18 years old	≥ 18 years old
Glucose	✓	≥ 18 years old	≥ 18 years old
Creatinine	✓	≥ 18 years old	≥ 18 years old
Biosample collection and banking			
Serum	✓	≥ 18 years old	≥ 18 years old
Plasma	✓	≥ 18 years old	≥ 18 years old
Urine	✓	≥ 18 years old	≥ 18 years old
DNA	✓	≥ 18 years old	≥ 18 years old
PAXgene tubes for RNA		≥ 18 years old	≥ 18 years old
Stool		≥ 18 years old only in 2016	≥ 18 years old subset

* Phase III was a follow-up survey of adults participating in SHOW Phase I during which children were not included. Children living in Phase I households in 2017 were eligible to participate in Phase III. Children enrolled in Phase III completed a baseline survey.

Table 5. SHOW Ancillary Studies in Phase II and Forward.

Project Summary	Additional measures	Target population	Sample size
Private Well Stewardship	Survey on well water testing and treatment	Adults > 18 years old owning private well	719
SHOW Me the Reach	Survey on incontinence symptoms and care seeking	Women > 18 years old	399
Personalized Vitamin D	Survey on vitamin D supplement use and sun exposure	African-American	56
Wisconsin Microbiome Baseline	Stool, skin, oral and nasal microbiome, MDRO colonization and diet	Adults >18 years old	740
Wisconsin Microbiome Follow-up	Stool microbiome, household environmental samples: dust, high-touch swabs, soil	Subset of Wisconsin Microbiome baseline participants	324
Microbiome in Children	Stool, skin, oral and nasal microbiome	0-5 years old	50*
Lead and Microbiome	Lead exposure measured in blood, stool microbiome analysis by 16s rRNA gene sequencing	Wisconsin Microbiome baseline participants	464
Carbone Monoxide Monitoring project	Assessing the presence and functionality of smoke detectors in homes	Ongoing survey households	400*
VizHome	Assessment of health information management inside the home	Households among phase III participants	244
Milwaukee Anglers Study	Measurement of exposure to chemicals serum of anglers eating fish	Anglers living within 3 miles of river or lake	300*
Physical Activity in Rural Women	Survey on factors affecting rural women's physical activity	Women > 18 years old living in rural WI	441

*In progress; target sample size provided

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Figure 1. SHOW Conceptual Framework
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Individual Factors

Health History, Access to and Quality of Care

Individual Behaviors and Experiences
e.g. Lifestyle, Smoking, Diet, Exercise

Genetics and Biology
e.g. DNA, BMI, HbA1c, FEV, Glucose, cholesterol, cell count

Household

Assets and Resources
Access to Health Care, Food Security, Income, Education

Family and Life Experiences
Life Events, Stress, Discrimination, Resilience

Population Health, Equity and Wellbeing

Community Context

Programs and Policies

Physical and Built Environment

Social Circumstances
Networks, Opportunities, Culture

Life Course: **Childhood**   **Young Adulthood**   **Middle-aged**   **Older Adult**

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Appendix G – SHOW Community Health Report

SHOW Community Health Report Brown County, WI, 2016

2018

![show - survey of the health of wisconsin]

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    http://www.med.wisc.edu/show/survey-of-the-health-of-wisconsin/35828

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Executive Summary

The Survey of the Health of Wisconsin (SHOW) Community Health Report for Brown County was completed to provide an in-depth description of the health needs in Brown County, including the identification of health disparities and vulnerable subgroups for the top health concerns in the county. The analyses for this report were focused on the health priorities identified by Beyond Health, the steering committee responsible for creating and implementing the Community Health Improvement Plan (CHIP) of Brown County, and advising on the built-in environment of Brown County.

Data for this report come from the SHOW 2014-2016 triannual sample in which Brown County residents were sampled in 2016. During 2008-2016, SHOW conducted statewide household-based examination surveys modeled after the National Health and Nutrition Examination Survey (NHANES). SHOW collected objective physical measurements, interview-based data, self-reported data, and biological samples. Survey questions surround topics including demographics, health history, and health care utilization and behavior for adults and children. SHOW employed a three-stage sampling design to select a representative sample of the residents of Wisconsin. Data for this report take into account sampling weights to better estimate findings for the sample population.

An estimated 41.9% of Brown County adults were obese. According to the SHOW survey, obesity was associated with physical inactivity, food insecurity, and mental health. Physical inactivity was more common among female adults and older adults. About a quarter of Brown County adults were food insecure and it disproportionately affected more other race and ethnicity groups, younger adults, and those with low income.

Generally, mental health issues were more frequently reported among female adults, younger adults, other race and ethnicity groups, those with lower income and lower education attainment, and those with no occupation but looking for work at the moment.

17.2% of Brown County adults were heavy drinkers and 36.9% were binge drinkers, recording higher prevalence of heavy drinkers than WI's estimate. Binge drinking was more common among male and younger adults. According to SHOW survey, drinking habit was associated with anxiety and food insecurity. More than half of female adults were negatively impacted by their family member's or friend's alcohol or drug use, and this abuse had continued despite the caused problems.

According to SHOW survey, Brown County was considered as a place that is safe from crime and transit by the residents. However, about 80% of the Brown County adults lived in a place that was not walkable and car-dependent, and more than half lived in a place that was with minimal bike infrastructure.

SHOW Overview

Since 2008, the Survey of the Health of Wisconsin (SHOW) has gathered vital baseline information to present a current and comprehensive picture of the health of the residents of Wisconsin. SHOW is a statewide survey modeled after the National Health and Nutrition Examination Survey (NHANES), which collects physical measurements, interview-based data, self-reported data, and biological samples. Survey questions surround topics based on the social determinants of health model, such as demographics, health history, health care utilization and behaviors for adults and children.

During 2014-2016, data were collected from a representative sample of civilian non-institutionalized Wisconsin residents. This report summarizes data collected in 2016 from participants in Brown County and draws comparisons with summaries for the entire sample of Wisconsin residents during 2014-2016.

SHOW employed a complex sampling design to select a representative sample of the residents of Wisconsin. For 2014-2016, a three-stage sampling approach was taken, with county, stratified by mortality as the first-stage of the approach. Milwaukee and Dane counties were selected with certainty due to their larger population density relative to the other 70 counties; 8 additional counties were selected, one from each strata, for 10 counties in total selected for visits over a three-year period; Brown County was selected for visits in 2016.

Sampling Weights are calculated for each individual surveyed. Each sample person has a known probability of selection. The inverse of these probabilities serves as the starting point for calculating sampling weights. The second component of the sampling weights is an adjustment for non-response. The non-response adjustment factor is the inverse of the response propensity generated from a logistic regression model of response status in relation to various Census and individual demographic variables available for both respondents and non-respondents for the sampled census block groups. The third and last component of the sampling weights is a post-stratification calibration to Brown county population estimates from the 2013 American Community Survey based on age and gender categories. In sum, use of these weights results in each SHOW participant representing an approximate number of people from the population (Brown County or Wisconsin). The sampling weights are used for population estimates to be unbiased.

Community Overview

Geographic / Demographics of Brown County

Situated in northeast Wisconsin at the southernmost end of Lake Michigan's Green Bay, Brown County is the fourth most populous county in state of Wisconsin. As of the 2016 census, the population was 260,401 and the county seat is Green Bay. (Brown County Community Health Improvement Plan, 2018-2020) Table 1 below shows the demographics of Brown County compared to that of the State according to the 2018 County Health Rankings.

Demographics		Brown County, %	WI, %
Age	below 18 years of age	24.1%	22.3%
	65 years and older	14.0%	16.1%
Race & Ethnicity	African American	2.5%	6.3%
	American Indian & Alaskan Native	3.2%	1.1%
	Asian	3.2%	2.8%
	Native Hawaiian/ Pacific Islander	0.1%	0.1%
	Hispanic	8.5%	6.7%
	Non-Hispanic white	81.5%	81.7%
Others	Rural	14.5%	29.8%
	Population growth	3%	1%

Table 1 demographics of Brown County (from: County Health Rankings 2018)

Community Health Priorities

In October 2017, representatives from over 50 agencies across Brown County attended the Community Health Assessment Summit and 3 main health priorities were identified; Obesity, Mental Health, and Alcohol, Tobacco & Drug use. Beyond Health, the steering committee responsible for creating and implementing the Community Health Improvement Plan (CHIP) of Brown County, determined the community goals for each topic:

• Obesity: reduce obesity in Brown County by promoting healthy foods and beverages and encouraging physical activity

• Mental Health: improve access to mental health services, information, and education for all

• Drugs & Alcohol: change community attitudes, behaviors, and beliefs regarding alcohol and drug use and abuse

For 2018-2020, Beyond Health taskforces will work together throughout Brown County to make progress on these three health priorities. This report was aimed to provide a wider and more in-depth picture of the health of Brown County using SHOW data collected in 2016 and to describe potential health disparities around these health topics.

Andrea Kressin, a community engagement manager from Brown County Health Department, has provided the community's perspectives to this report. Initial findings were presented in 2018 Summer, and Emma Kane from Brown County, Natalie Bomstad from Live54218.org/WELLO, and Sarah Inman from Brown County United Way joined the meeting and provided guidance for the direction of final report.

Data Summary - demographics

Statistical Methods

Data analysis, which included frequencies, prevalence, 95% percent confidence intervals was completed using SAS version 9.4. Raw frequencies and weighted prevalence estimates are provided. Population estimates that were considered unreliable were excluded.

Socio-demographics

The sample consisted of adults (n=156) and children (n=48) who were residents of Brown County, representing a county-wide sample who participated in SHOW in 2016. Table 2 and 3 show the demographic characteristics of children and adult SHOW participants, respectively. Since the majority (88%) identified as non-Hispanic white, the other race and ethnicity groups were combined into "others" in order to increase the size of the subgroup. According to the 2010 U.S. Census which estimates that 88.4% of Brown County residents are White, the race and ethnicity distribution of SHOW participants aligned closely with the U.S. Census estimates and the 2016 sample weights were effective in approximating a representative sample of Brown County.

To describe the sociodemographic features of Brown County, income, occupation, educational status, and current insurance status were included in this analysis. Income level was defined as below or above 200% of the Federal Poverty Level (FPL) for 2016. The 2016 FPL for 48 Border States and D.C. was equal to having a total household income of $24,300 for a 4 person-household. Self-reported occupation status was categorized into three groups; working, not working but looking for work, or not working and not looking for a job. Education was categorized into three groups; 1) high school or GED equivalent or less, 2) some college with no degree to associate degree, and 3) bachelor's degree or higher. Whether a participant had health insurance for the past 12 months was asked to define current insurance status.

Table 4 shows the urban, suburban, and rural status of the sample at the block group level using the six state classification based on 2000 Census tract (Census Urban Rural Classification, 2010). This measure of urbanicity is more of a 'continuum' based on a contextual or 'floating' density measure. It classifies the geography into six states; urban, second city, suburb, town, rural, town and country. The six status is then classified into three status; urban status from the six state measure as 'Urban', second city and suburb as 'Suburban', and town, rural, town and country as 'Rural'.

Findings were compared to data from the County Health Rankins (County Health Rankings, 2018), from Healthy Wisconsin (Wisconsin State Health Improvement Plan: 2018 Addendum) or the statewide SHOW data from the triannual 2014-2016 sample.

Data Summary - demographics

Table 2 Demographics of Brown County Adults (SHOW 2016)

Total Adults (n=156)	Frequency	Weighted Prevalence	95% CI (%)
Gender			
Male	71	49.3%	41.1-57.4
Female	85	50.7%	42.6-58.9
Age			
18- ≤ 35 years	35	24.7%	13.1-36.3
35- ≤ 50 years	39	26.2%	17.8-34.7
50- ≤ 65 years	43	29.5%	20.2-38.7
65+ years	39	19.6%	11.1-28.2
Race			
Non-Hispanic White	138	88.6%	83.7-93.5
Others	18	11.4%	6.5-16.3
Income			
At or below 200% FPL*	54	34.6%	19.7-49.4
Above 200% FPL	94	65.4%	50.6-80.3
Occupation			
Working	84	58.5%	42.2-74.8
Not working but looking for work	7	4.6%	0.1-9.1
Not working, not looking for a job	63	36.9%	22.6-51.1
Education			
High school graduate, GED equivalent or less	40	24.2%	13.6-34.8
Some college with no degree to associate degree	63	39.4%	32.2-46.6
Bachelor's degree or higher	52	36.3%	22.8-49.8
Current Insurance			
Yes	145	92.7%	87.6-97.7
No	11	7.4%	2.3-12.4

*FPL: Federal Poverty Level, 200% of the FPL is about equal to a total family income of $54,000 for a family of 4 individuals

Data Summary - demographics

Table 3. Demographics of Brown County Children (SHOW 2016)

Total Children (n=48)	Frequency	Weighted Prevalence	95% CI (%)
Gender			
Male	18	51.2%	42.4-59.9
Female	30	48.8%	40.1-57.6
Age			
0- ≤ 3 years	8	12.0%	4.5-19.4
3- ≤ 5 years	11	24.5%	15.4-33.6
5- ≤ 12 years	18	38.5%	25.5-51.6
12- ≤ 18 years	11	25.0%	10.5-39.5

Table 4 Geographic classification of Brown County (SHOW 2016)

Geography (n=204)	Frequency	Weighted Prevalence	95% CI (%)
Urban	0	0	0
Suburban	158	70.0%	
Rural	46	30.0%	

Data Summary
1) Obesity focus areas

Participants

SHOW enrolled 2602 individuals in Wisconsin from 10 counties during its 2014 to 2016 triannual sample, including 1957 adults and 645 children. In 2016, SHOW completed health surveys on 204 individuals in Brown County including 156 adults and 48 children.

Supplemental questionnaires including a question about food resources were asked to Brown County participants in 2016 and 129 adults completed this.

Adult Obesity

Physical body measures were taken during the in-home visit and Body Mass Index (BMI) was calculated from measured weight in kgs divided by height in meters squared for adults (18+). Obesity was defined if BMI is 30 kg/m^2 or higher by the CDC's definition.

An estimated **41.9%** of Brown County adults were **obese** in 2016, while 40.2% of Wisconsin adults were obese.

These estimates are **relatively higher than other estimates** from Healthy Wisconsin (WI 2015 - 31.2%) and County Health Rankings (WI 2014 – 31%) which were generated by self-reported body measures. SHOW estimates of obesity are generated by objective physical measurements made by trained interviewers.

A greater proportion of adults aged 18-≤35 years and 35-≤50 years were **more obese** than those aged 50 or more yrs.

2016 Brown County   2014-16 Wisconsin

41.9%   40.2%

Age (years)	18-≤35	35-≤50	50-≤65	65+
	47.0%	45.4%	36.5%	38.7%
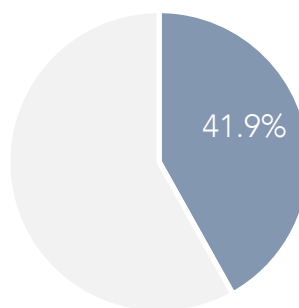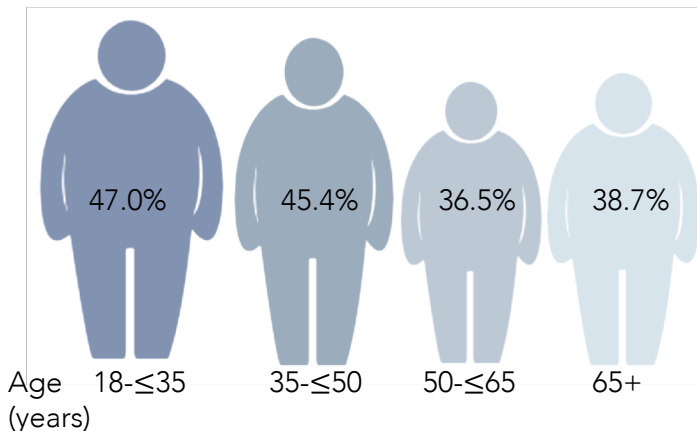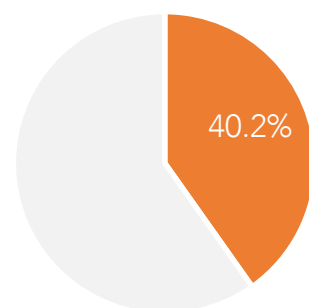
Data Summary
1) Obesity focus areas

Physical Inactivity

According to the World Health Organization (WHO), sedentary lifestyle is a leading cause of chronic disease worldwide that accounts for 2 million deaths a year. For substantial health benefits, WHO recommends consistent moderate physical activity, or 600 metabolic equivalents (MET; multiples of resting energy expenditure) weekly. For example, 600 MET minutes per week is the equivalent of 75 minutes of vigorous activity weekly or 150 minutes of walking weekly. Not meeting this healthy physical activity guidelines was considered as physically inactive.

2016 Brown County
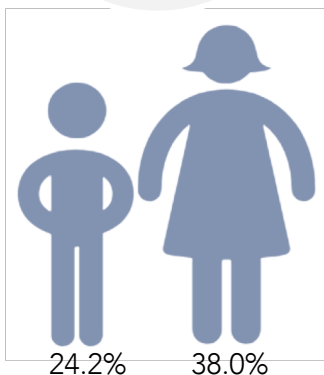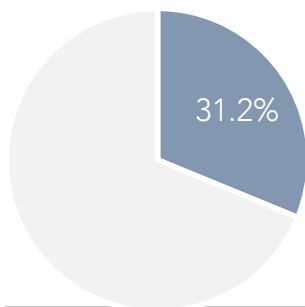
2014-16 Wisconsin

31.2%

24.3%

24.2%   38.0%

20.2%   28.2%
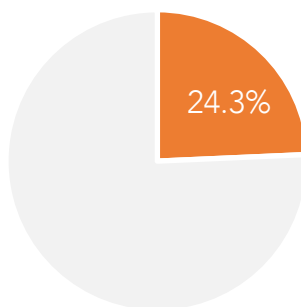
31.2% of Brown County adults were **physically inactive** compared to 24.3% of WI adults.

More female adults were **physically inactive** than male adults in Brown County and this matches the statewide trend.

The prevalence of physical inactivity among female adults was much higher in Brown County (38.0%) than statewide (28.2%).

35.6% of Brown County adults **aged 50-≤65 years old** reported being **physically inactive**.

50.3% of all Brown County adults rated **their community** is **physically active** While only **36.75%** adults **at or below 200% FPL** rated so.

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Data Summary
1) Obesity focus areas

Food Insecurity

Food security status provides specific information relating concerns about having enough food or about the costs of food for the respondent of his/her family. This section is completed during in-home questionnaire and completed by via ACASI directly on a laptop by the respondent (18+). Food security status was defined using the USDA definition of food insecurity, which was calculated using three questions focusing on self-reported food insecurity or use of food assistance programs from the 10-item short form adapted from NHANES.

25.5% of Brown County adults were food insecure compared to 23.8% of WI adults.

2016 Brown County

25.5%

2014-16 Wisconsin

23.8%
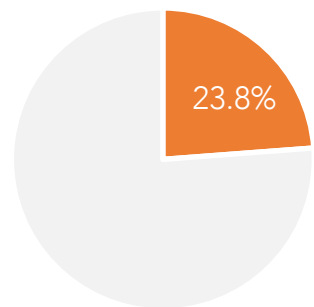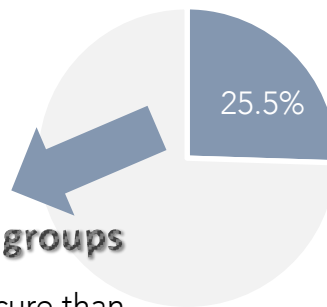
24.2% of Non-Hispanic White

vs. 35.7% of Other race & ethnicity groups

Non-Hispanic White adults were less food insecure than other race & ethnicity groups.**

4 in 10 adults aged 18-≤35 years old were food insecure.

About two times more adults in the 18-≤35 and 35-≤50 age groups reported food insecurity than adults aged over 50 (age group 18-≤35 years: 41.2%, 35-≤50 years: 30.0%, 50-≤65 years: 11.7%, 65+ years: 19.3%).

63.0%

8.2%

At or below 200% FPL   Above 200% FPL
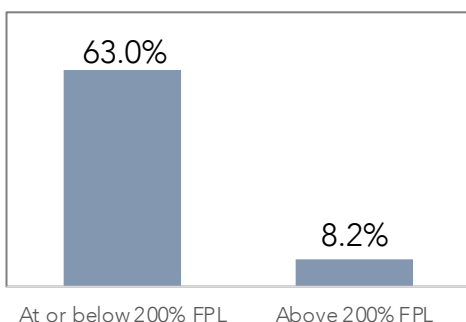
Adults living at 200% of the federal poverty level or below had about **8 times** higher prevalence of **food insecurity**.

** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

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Data Summary
1) Obesity focus areas
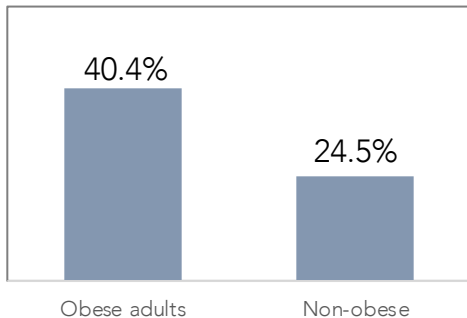
40.4% of obese adults were **physically inactive** while 24.5% of non-obese adults were.
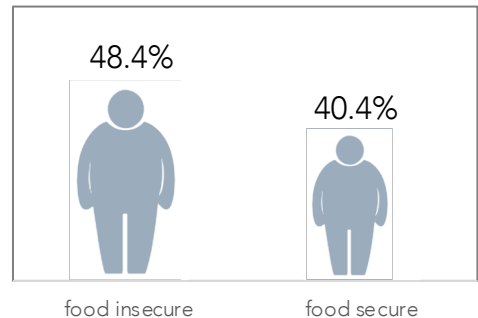
48.4% of food insecure adults were **obese** while 40.4% of food secure adults were obese.

58.0% of adults who were **food insecure** had **moderate to severe anxiety** compared to 20.3% of adults who were food secure.

Brown County had better access to fruits and vegetables than WI

17.1% of Brown County adults reported having **poor poor access to fruits and vegetables** compared to 21.3% of WI adults
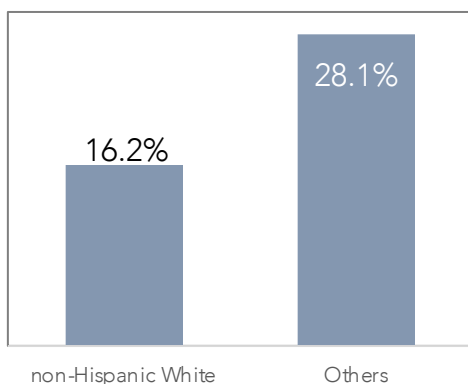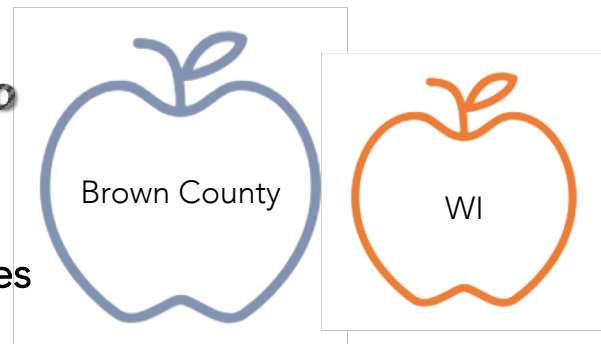
However, there were **greater disparity** between race & ethnicity groups.
28.1% of Others group adults reported having poor access to fruits and vegetables compared to **16.2% of non-Hispanic White** adults.
20.2% of WI Others group adults reported so compared to 29.5% of WI non-Hispanic White adults.**

** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

Data Table
1) Obesity focus areas

1. obesity prevalence		Brown County 2016						Wisconsin 2014-16				
		Freq	N	Percent	Percent*	lower 95% CI*	upper 95% CI*	Freq	N	Percent*	lower 95% CI*	upper 95% CI*
	total	64	156	41.03	41.85			787	1957	40.21		
Gender	male	25	71	35.21	37.50	26.54	48.46	342	864	39.15	35.18	43.11
	female	39	85	45.88	16.08	37.44	54.71	445	1093	41.24	37.08	45.40
Race&ethnicity**	non-Hispanic White	56	138	40.58	41.70	32.78	50.63	633	1623	39.50	35.83	43.18
	Others	8	18	44.44	42.99	19.72	66.25	152	332	43.67	37.26	50.07
Age	18-≤35 years	16	35	45.71	47.04	35.81	58.27	152	454	34.59	28.77	40.41
	35-≤50 years	18	39	46.15	45.38	29.26	61.51	174	425	40.43	32.26	48.60
	50-≤65 years	16	43	37.21	36.46	15.39	57.52	238	544	44.23	38.45	50.00
	65+	14	39	35.90	38.69	17.93	59.46	223	534	41.43	33.59	49.26
200% FPL	below	24	54	44.44	46.73	36.79	56.68	235	556	40.92	34.85	46.99
	above	39	94	41.49	41.67	30.15	53.19	519	1303	40.38	36.23	44.54
Geography	urban	.	.	.	.	.	.	108	277	41.43	33.47	49.38
	suburban	53	158	33.54	35.40	25.72	45.08	295	780	37.35	30.04	44.66
	rural	11	46	23.91	23.35	14.13	32.56	384	900	42.54	37.83	47.26

2. Physical Inactivity		Brown County 2016						Wisconsin 2014-16				
		Freq	N	Percent	Percent*	lower 95% CI*	upper 95% CI*	Freq	N	Percent*	lower 95% CI*	upper 95% CI*
	total	48	155	30.97	31.21			494	1955	24.26		
Gender	male	15	71	21.13	24.24	8.24	40.24	183	864	20.18	16.69	23.66
	female	33	84	39.29	38.01	29.37	46.66	311	1091	28.21	24.29	32.13
Race&ethnicity**	non-Hispanic White	42	138	30.43	31.01	20.94	41.09	405	1623	24.07	21.66	26.48
	Ohters	6	17	35.29	32.75	8.15	57.35	88	331	24.98	19.90	30.07
Age	18-≤35 years	10	35	28.57	33.26	22.17	44.34	88	454	18.33	13.77	22.89
	35-≤50 years	11	39	28.21	24.64	7.38	41.91	82	424	19.64	16.81	22.47
	50-≤65 years	17	42	40.48	35.59	12.03	59.16	153	543	27.71	24.24	31.19
	65+	10	39	25.64	30.89	9.96	51.82	171	534	32.59	29.80	35.38
200% FPL	below	18	53	33.96	35.07	22.93	47.22	157	555	27.17	22.96	31.39
	above	28	94	29.79	30.58	18.21	42.95	304	1303	22.30	19.48	25.13
Geography	urban	.	.	.	.	.	.	74	276	23.86	16.55	31.17
	suburban	38	125	30.40	29.70	19.33	40.08	192	779	24.01	19.54	28.48
	rural	10	30	33.33	35.50	18.02	52.97	228	900	24.63	21.25	28.01
Education	high school graduate, GED equivalent or less	11	39	28.21	25.1	9.40	40.84	156	520	27.17	21.47	32.87
	Some college with no degree or associate degree	20	63	31.75	34.35	19.02	49.68	174	706	24.60	21.50	27.70
	Bachelor's degree or higher	16	52	30.77	30.73	20.97	40.49	162	727	21.72	17.81	25.62

* denotes that the measure of prevalence (percent) is weighted
** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

3. Rate your community as a place to be physically active?		Brown County 2016						Wisconsin 2014-16				
A. Very pleasant		Freq	N	Percent	Percent*	lower 95% CI*	upper 95% CI*	Freq	N	Percent*	lower 95% CI*	upper 95% CI*
	total	61	121	50.41	50.30			808	1657	47.27		
200% FPL	below	15	39	38.46	36.75	14.31	59.18	167	451	36.04	31.51	40.57
	above	46	82	56.10	56.02	38.95	73.08	641	1206	51.55	45.42	57.69

4. Food Insecurity		Brown County 2016						Wisconsin 2014-16				
		Freq	N	Percent	Percent*	lower 95% CI*	upper 95% CI*	Freq	N	Percent*	lower 95% CI*	upper 95% CI*
	total	39	150	26.00	25.47			439	1911	23.70		
Race&ethnicity**	non-Hispanic White	33	133	24.81	24.15	10.63	37.67	277	1586	19.02	14.53	23.51
	Ohters	6	17	35.29	35.74	21.61	49.87	162	324	50.52	42.84	58.21
Age	18-≤35 years	13	35	37.14	41.21	12.28	70.14	160	446	35.94	29.49	42.40
	35-≤50 years	13	39	33.33	29.99	14.49	45.50	121	421	27.65	22.21	33.09
	50-≤65 years	7	42	16.67	11.65	0.02	23.29	93	537	16.64	13.90	19.37
	65+	6	34	17.65	19.33	0.92	37.74	65	507	12.88	8.21	17.55
200% FPL	below	30	50	60.00	63.03	41.92	84.15	310	535	57.95	50.76	65.14
	above	8	93	8.60	8.16	3.87	12.45	106	1288	8.63	6.90	10.37
Geography	urban	.	.	.	.	.	.	83	269	31.50	20.91	42.10
	suburban	31	121	25.62	24.48	14.69	34.27	183	760	23.76	15.25	32.26
	Rural	8	29	27.59	28.30	0.00	60.07	173	882	21.34	18.50	24.18
Insurance**	Yes	32	139	23.02	22.63	9.69	35.57	361	1779	20.78	17.07	24.48
	No	7	11	63.64	60.20	31.83	88.57	74	128	57.46	43.15	71.77

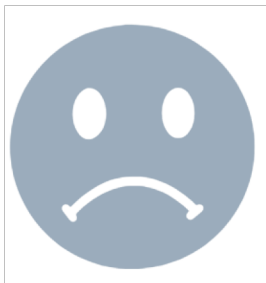| 5. Access to fruit and vegetables		Brown County 2016						Wisconsin 2014-16				
A. Strongly disagree + disagree		Freq	N	Percent	Percent*	lower 95% CI*	upper 95% CI*	Freq	N	Percent*	lower 95% CI*	upper 95% CI*
	total	21	129	16.28	17.05			383	1716	21.34		
Race&ethnicity**	non-Hispanic White	19	120	15.83	16.16	6.17	26.15	303	1466	20.16	17.27	23.04
	Ohters	2	9	22.22	28.12	0.00	67.20	80	250	29.50	19.78	39.22
200% FPL	below	7	39	17.95	18.91	5.42	32.39	123	446	24.89	19.75	30.04
	above	12	83	14.46	14.22	5.61	22.84	245	1194	20.12	16.82	23.42
Geography	urban	.	.	.	.	.	.	46	214	19.48	10.90	28.05
	suburban	17	103	16.50	16.49	6.80	26.19	119	669	16.71	12.21	21.21
	rural	4	26	15.38	18.55	0.00	43.14	219	835	25.94	20.71	31.18

* denotes that the measure of prevalence (percent) is weighted
** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

Data Summary
2) Mental Health

Participants

SHOW enrolled 2602 individuals in Wisconsin from 10 counties during its 2014 to 2016 triannual sample, including 1957 adults and 645 children. In 2016, SHOW completed health surveys on 204 individuals in Brown County including 156 adults and 48 children.

- Males
- Older Adults (>35 years old)
- Non-Hispanic Whites
- Above 200% Federal Poverty Level
- Higher Education (Some College or higher)
- Working

According to SHOW data, those group of people in the right column generally showed having

More Mental Health Issues

- Females
- Younger Adults (18-≤35 yrs old)
- Other Race & Ethnicity Groups
- At or Below 200% Federal Poverty Level
- Lower Education (High School Graduate or less)
- Not working, but looking for work
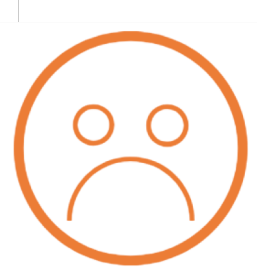
Anxiety and Depression

The Depression Anxiety Stress Scales (DASS) short version (21 item questionnaire) was used to measure the dimensions of depression, anxiety, and stress among Brown County adults. The data were collected as part of the self-administered portion of the SHOW study and the scores and related statistics were calculated for all respondents who answered all 7 questions for each of the stress, anxiety, and depression constructs. The severity of each construct is categorized into five scale; normal, mild, moderate, severe, extremely severe. The variables of stress are dropped in this analysis due to the small number of individuals experiencing stress.

Data Summary
2) Mental Health

	Brown County	WI
Noted anxiety	27.3%	24.0%
Noted having depressive symptoms	13.1%	11.6%

There were disparities between gender, income groups
in mental health issues diagnosed by a provider.

Depressive symptoms

- All Brown County: 23.8%
- Below 200% FPL: 36.6%
- Above 200% FPL: 19.1%
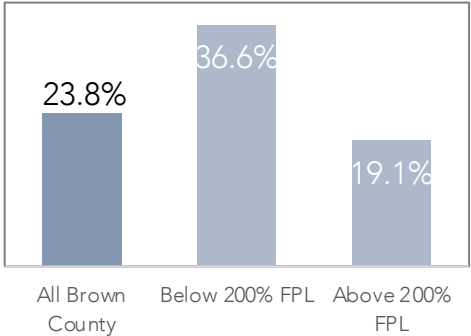
23.8% of all Brown County adults, compared **to 36.6% of adults living at or below 200% FPL** and 19.1% of adults living above 200% FPL.

Anxiety

- All Brown County: 26.8%
- Below 200% FPL: 44.3%
- Above 200% FPL: 18.9%
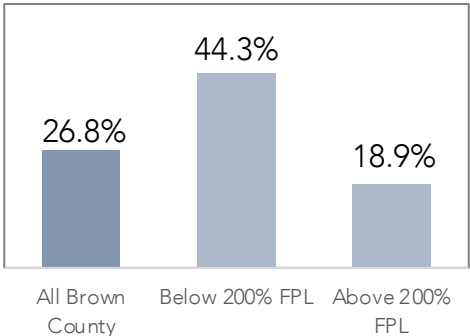
26.8% of all Brown County adults, compared to **44.3% of adults living at or below 200% FPL** and 18.9% of adults living above 200% FPL.

20.7% 32.7%
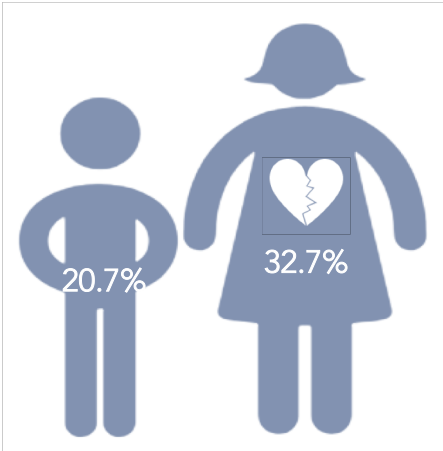
Females were more frequently told by a provider that they **have anxiety** than **males.**

Data Summary
2) Mental Health

Post-Traumatic Stress Disorder

The abbreviated PTSD Checklist – Civilian version (PCL-C) was used to measure symptoms of Post-Traumatic Stress Disorder. The 6-item version consists of items 1,4,7,10,14 and 15 from the longer version. The 6-item version lists problems and complaints that people may have in response to stressful life experiences. Scores and related statistics were calculated for all respondents who answered all 6 items that correspond to the key symptoms of PTSD. An individual is considered to have screened positive if the sum of these items is 14 or greater. The data were collected as part of the self-administered portion of the SHOW survey.

2016 Brown County

2014-16 Wisconsin

15.2%

12.7%

15.2% of Brown County adults had **symptoms of PTSD**, compared to 12.7% of WI adults.
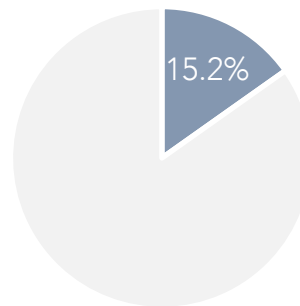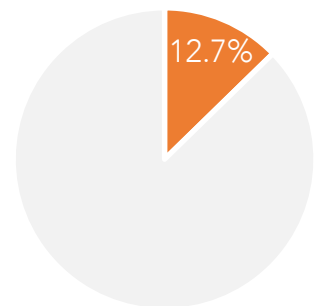
1 in 3

of Brown County adults (34.8%) **living at or below 200% of the FPL** had **symptoms of PTSD** than 6.9% of adults living above the 200% of the FPL.

23.4%

14.5%
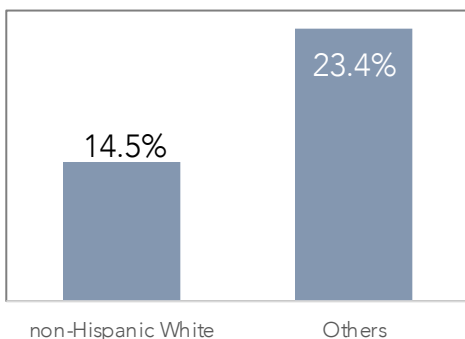
Other race & ethnicity groups frequently had **symptoms of PTSD (23.4%)** than Non-Hispanic White race& ethnicity groups (14.5%).**

non-Hispanic White   Others

** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

Data Summary
2) Mental Health

Stressful life events

The Social Readjustment Rating Scale (SRRS) is used to identify major stressful life events. It is based on the premise that good and bad events in one's life can increase stress levels and make on more susceptible to illness and mental health problems. This questionnaire consists of 43 stressful life events and each life event is assigned a value in arbitrary 'life changing units' chosen to reflect the relative amount of stress the event causes in the population studied. The SRRS score is categorized into three scales; slight risk of illness, moderate risk of illness, at risk of illness. The data were collected as part of the self-administered portion of the SHOW survey.

24.4% of Brown County adults experienced **moderate or more severer levels of stressful life events**, compared to **28.5% of WI adults**.

4 in 10 of Brown County adults aged 18-≤50 years old experienced **moderate or severer levels of stressful life events** versus **1 in 10** adults aged more than 50 years.

23.8%   31.9%
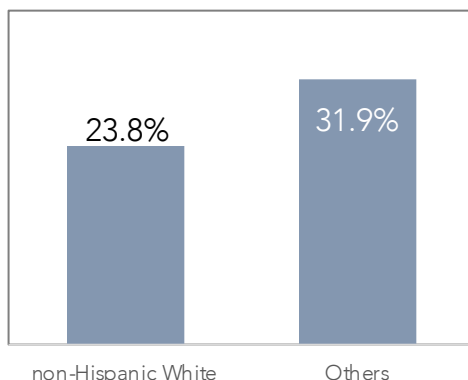
There were **less disparities** between income, race & ethnicity groups than WI.

31.9% of Others group adults, compared to **23.8% of non-Hispanic White** adults.**
45.1% of WI Others group adults reported so compared to 26.1% of WI non-Hispanic White adults.
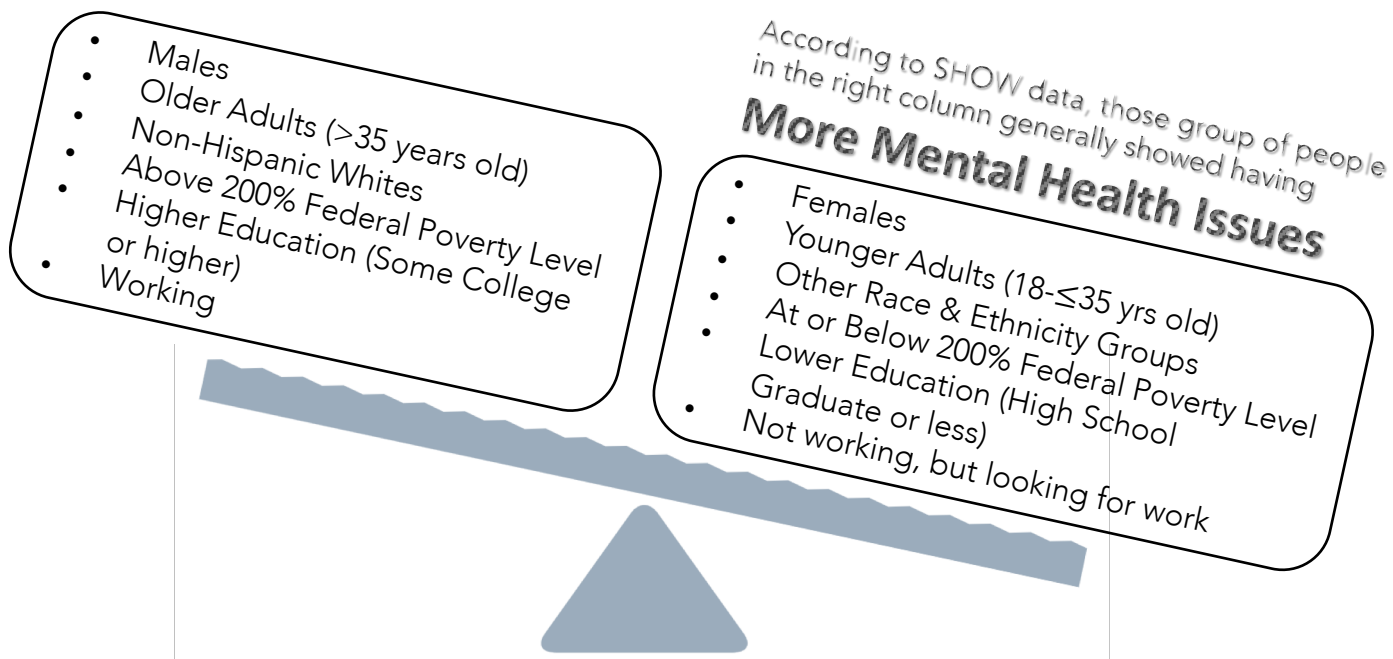
non-Hispanic White   Others

** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

Data Summary
2) Mental Health

Life discrimination

Specific information relating to how the respondent has been treated during his/her life regarding unfair treatment related to race, age, gender, culture, religion, physical appearance, and sexual orientation are collected. If an individual had three or more instances of life discrimination, it is regarded as having considerable life discrimination experience. The data were collected as part of the self-administered portion of the SHOW survey.

---

1 in 5

of **Brown County adults** have experienced **three or more incidents of discrimination**.

14.3%

25.7%
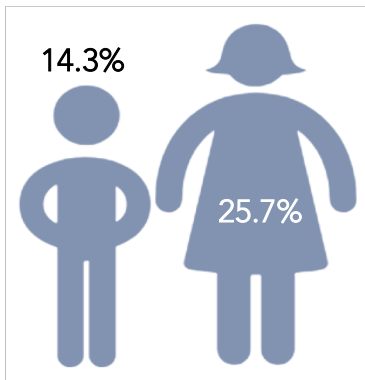
Female adults (25.7%) more frequently reported having **experienced discrimination*** than male adults (14.3%).

Non-Hispanic White adults (17.6%) have **less experienced discrimination*** than other race & ethnicity groups (51.5%).**

*three or more incidents of discrimination

Your health

Participants were asked if they felt they had accomplished less as a result of emotional problems (feeling depressed or anxious) during the past 4 weeks. If an individual answered 'all of the time', 'most of the time', or 'some of the time' to this question, it was regarded as experiencing emotional problems that caused less accomplishment for this analysis. The data were collected as part of the self-administered portion of the SHOW survey.

21.8%

of **Brown County adults** reported they accomplished less than they would have liked in the past 4 weeks because of **emotional problems**, compared to **16.1% of WI adults**.

20

** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

Data Table
2) Mental Health

1. Anxiety (DASS)		Brown County 2016						Wisconsin 2014-16				
A. moderate, severe, extremely severe anxiety		Freq	N	Percent	Percent*	lower 95% CI*	upper 95% CI*	Freq	N	Percent*	lower 95% CI*	upper 95% CI*
	total	36	128	28.13	27.27			299	1219	23.98		
Gender	male	11	57	19.30	18.43	10.12	26.74	111	529	20.39	15.73	25.04
	female	25	71	35.21	35.58	22.64	48.52	188	690	27.29	22.21	32.37
Race&ethnicity**	non-Hispanic White	34	119	28.57	27.57	17.38	37.76	231	1039	22.36	18.04	26.68
	Ohters	2	9	22.22	23.54	0.00	59.04	66	178	34.11	28.06	40.16
Age	18-≤35 years	11	22	50.00	52.90	26.93	78.87	72	226	31.26	26.50	36.02
	35-≤50 years	11	29	37.93	31.87	13.19	50.55	73	245	29.51	20.67	38.36
	50-≤65 years	6	40	15.00	13.69	2.13	25.25	80	378	19.06	14.40	23.73
	65+	8	37	21.62	21.47	7.64	35.30	74	370	18.75	17.18	20.32
200% FPL	below	18	38	47.37	50.54	30.93	70.15	123	321	38.77	33.77	43.77
	above	16	83	19.28	17.94	12.01	23.87	159	837	18.05	14.81	21.29
Education	high school graduate, GED equivalent or less	9	33	27.27	26.68	11.49	41.86	95	301	31.15	28.35	33.94
	Some college with no degree or associate degree	16	50	32.00	32.25	13.66	50.84	126	449	27.11	21.76	32.45
	Bachelor's degree or higher	10	44	22.73	21.33	9.66	33.00	75	466	16.01	12.96	19.07
Occupation **	working	14	66	21.21	16.69	11.31	28.06	132	648	19.95	14.91	24.99
	not working but looking for work	4	6	66.67	58.73	13.15	100.00	27	55	46.50	33.75	59.25
	not working no looking for work	18	56	32.14	34.22	13.12	55.31	137	512	27.38	34.34	30.41

* denotes that the measure of prevalence (percent) is weighted
** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

Data Table
2) Mental Health

2. Depressive symptoms (DASS)		Brown County 2016						Wisconsin 2014-16				
		Freq	N	Percent	Percent*	lower 95% CI*	upper 95% CI*	Freq	N	Percent*	lower 95% CI*	upper 95% CI*
	total	14	128	10.94	13.11			142	1196	11.60		
Gender	male	3	57	5.26	8.37	0.00	19.04	50	524	9.30	7.64	10.96
	female	11	71	15.49	17.57	6.00	29.14	92	672	13.76	10.10	17.42
Race&ethnicity**	non-Hispanic White	11	119	9.24	11.72	0.86	22.59	104	1023	10.24	8.23	12.26
	Ohters	3	9	33.33	30.24	0.00	71.74	36	171	19.91	14.22	25.60
Age	18-≤35 years	5	22	22.73	28.44	0.00	59.11	44	219	19.41	15.27	23.55
	35-≤50 years	3	30	10.00	8.63	0.00	18.62	35	246	12.69	10.17	15.21
	50-≤65 years	3	39	7.69	8.88	0.00	19.08	40	366	10.21	7.35	13.07
	65+	3	37	8.11	11.60	0.00	26.11	23	365	5.37	3.56	7.19
200% FPL	below	8	39	20.51	27.04	4.86	49.23	60	312	19.59	15.35	23.83
	above	5	82	6.10	6.97	0.00	14.33	71	824	8.12	6.68	9.55
Education	high school graduate, GED equivalent or less	7	32	21.88	21.15	8.49	33.80	52	287	18.08	12.39	23.67
	Some college with no degree or associate degree	5	50	10.00	15.25	0.00	33.35	54	441	12.32	10.80	13.84
	Bachelor's degree or higher	2	45	4.44	6.30	0.00	18.17	35	465	6.85	5.23	8.48
Occupation**	working	3	66	4.55	5.76	0.00	11.91	62	637	9.28	7.04	11.52
	not working but looking for work	1	5	20.00	15.09	0.00	47.04	17	52	29.76	19.38	40.14
	not working no looking for work	10	57	17.54	23.11	1.96	44.25	62	503	13.07	10.91	15.22

* denotes that the measure of prevalence (percent) is weighted
** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

Data Table
2) Mental Health

3. PTSD		Brown County 2016						Wisconsin 2014-16				
		Freq	N	Percent	Percent*	lower 95% CI*	upper 95% CI*	Freq	N	Percent*	lower 95% CI*	upper 95% CI*
	total	18	128	14.06	15.20			164	1233	12.73		
Gender	male	3	57	5.26	6.98	0.00	15.57	56	541	9.88	7.43	12.33
	female	15	71	21.13	22.92	9.37	36.47	108	692	15.40	11.83	18.97
Race&ethnicity**	non-Hispanic White	16	119	13.45	14.54	3.88	25.19	114	1051	11.02	8.67	13.37
	Ohters	2	9	22.22	23.38	0.00	58.76	50	180	25.12	17.49	32.75
Age	18-≤35 years	8	22	36.36	40.12	14.72	65.52	54	228	22.61	18.58	26.64
	35-≤50 years	3	30	10.00	8.63	0.00	18.62	44	248	15.80	11.45	20.16
	50-≤65 years	3	39	7.69	8.12	0.00	16.72	41	381	8.93	6.20	11.67
	65+	4	37	10.81	12.23	0.00	26.54	25	376	5.99	4.02	7.96
200% FPL	below	11	39	28.21	34.82	13.35	57.28	74	324	22.01	16.99	27.04
	above	6	82	7.32	6.86	2.06	11.65	81	848	9.06	7.42	10.70
Education	high school graduate, GED equivalent	7	33	21.21	21.00	6.11	35.88	56	310	17.33	13.30	21.36
	Some college with no degree or associate degree	8	50	16.00	19.71	1.27	38.15	68	454	14.70	11.28	18.11
	Bachelor's degree or higher	2	44	4.55	5.42	0.00	12.60	39	466	7.74	5.45	10.03
Occupation**	working	6	65	9.23	8.57	2.25	14.88	74	658	10.92	8.35	13.49
	not working but looking for work	2	6	33.33	28.18	0.00	63.68	22	54	34.94	23.57	46.32
	not working no looking for work	10	57	5.06	22.80	0.93	44.66	68	517	13.22	10.98	15.45

* denotes that the measure of prevalence (percent) is weighted
** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

Data Table
2) Mental Health

4. Stressful life events		Brown County 2016						Wisconsin 2014-16				
A. moderate risk ~ at risk		Freq	N	Percent	Percent*	lower 95% CI*	upper 95% CI*	Freq	N	Percent*	lower 95% CI*	upper 95% CI*
	total	30	129	23.26	24.39			335	1262	28.54		
Gender	male	13	57	22.81	22.87	10.53	35.21	137	552	26.12	22.28	29.96
	female	17	72	23.61	25.80	12.21	39.40	218	710	30.79	25.99	35.58
Race&ethnicity **	non-Hispanic White	27	120	22.50	23.78	12.43	35.13	264	1070	26.08	21.04	31.11
	Ohters	3	9	33.33	31.92	0.00	65.71	90	190	45.13	38.84	51.43
Age	18-≤35 years	9	22	40.91	40.06	18.33	61.80	103	235	46.45	38.15	48.75
	35-≤50 years	13	30	43.33	42.43	19.78	65.09	87	253	33.85	28.05	39.65
	50-≤65 years	4	40	10.00	10.60	3.40	17.80	105	387	24.81	16.98	32.63
	65+ years	4	37	10.81	12.16	0.00	28.08	60	387	14.76	12.40	17.13
200% FPL	below	10	39	25.64	25.60	9.42	41.78	134	335	39.59	34.21	44.97
	above	17	83	20.48	21.61	12.94	30.29	199	866	23.72	20.40	27.05
Education	high school graduate, GED equivalent or less	10	33	30.30	35.58	14.12	57.05	101	318	31.94	23.95	39.93
	Some college with no degree or associate degree	13	50	26.00	27.07	12.50	41.63	148	459	32.89	27.21	38.57
	Bachelor's degree or higher	7	45	15.56	15.14	2.58	27.70	104	482	21.95	19.61	24.29
Occupation**	working	18	66	27.27	24.68	11.99	37.37	199	672	29.31	25.63	33.00
	not working but looking for work	4	6	66.67	72.75	38.09	100.00	31	56	55.25	46.95	63.54
	not working no looking for work	8	57	14.04	18.35	4.75	31.95	123	530	23.97	19.07	28.87

* denotes that the measure of prevalence (percent) is weighted
** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

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Data Table
2) Mental Health

5. Life discrimination (3 or more)		Brown County 2016						Wisconsin 2014-16				
		Freq	N	Percent	Percent*	lower 95% CI*	upper 95% CI*	Freq	N	Percent*	lower 95% CI*	upper 95% CI*
	total	25	129	19.38	2.90			281	1253	21.92		
Gender	male	8	57	14.04	14.27	4.23	24.31	126	548	22.30	18.70	25.90
	female	17	72	23.61	25.65	11.55	39.76	155	705	21.56	19.23	23.89
Race&ethnicity **	non-Hispanic White	21	120	17.50	17.64	9.90	25.39	186	1065	17.85	15.48	20.21
	Ohters	4	9	44.44	51.51	16.79	86.24	95	186	50.75	42.07	59.42
Age	18-≤35 years	5	22	22.73	23.46	5.47	41.45	71	234	29.14	23.67	34.62
	35-≤50 years	11	30	36.67	36.09	22.26	49.93	72	251	26.42	18.57	34.28
	50-≤65 years	7	40	17.50	16.56	4.06	29.06	90	384	21.62	18.85	24.39
	65+	2	37	5.41	5.13	0.00	11.53	48	384	11.11	8.15	14.07
200% FPL	below	11	39	28.21	29.10	21.29	36.91	111	331	33.94	29.38	38.49
	above	13	83	15.66	17.45	7.16	27.73	154	862	16.91	14.30	19.51
Education	high school graduate, GED equivalent or less	5	33	15.15	13.39	2.24	24.54	73	312	24.73	19.90	29.55
	Some college with no degree or associate degree	9	50	18.00	19.98	9.51	30.46	122	458	25.09	21.34	28.84
	Bachelor's degree or higher	11	45	24.44	25.01	9.63	40.39	86	480	17.20	13.53	20.87
Occupation**	working	13	66	19.70	18.83	10.13	27.54	152	669	21.01	18.60	23.41
	not working but looking for work	2	6	33.33	23.50	0.00	54.20	28	54	47.06	34.23	59.88
	not working no looking for work	10	57	17.54	21.63	13.29	29.98	100	526	20.41	16.32	24.50

* denotes that the measure of prevalence (percent) is weighted
** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

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Data Table
2) Mental Health

6. Less accomplishment because of emotional problems		Brown County 2016						Wisconsin 2014-16				
A. all, most, some of the time		Freq	N	Percent	Percent*	lower 95% CI*	upper 95% CI*	Freq	N	Percent*	lower 95% CI*	upper 95% CI*
	total	29	127	22.83	21.80			91	542	16.09		
Gender	male	11	57	19.3	20.42	4.58	36.26	91	542	16.09	14.36	17.81
	female	18	70	25.71	23.12	9.42	36.82	157	689	23.34	17.98	26.69
Age	18-≤35 years	9	21	42.86	41.76	14.25	69.27	59	231	25.06	19.87	30.24
	35-≤50 years	7	29	24.14	16.81	1.68	31.93	55	250	20.53	14.41	26.65
	50-≤65 years	7	40	17.5	16.76	3.27	30.25	71	377	16.67	12.05	21.30
	65+	6	37	16.22	18.59	0.00	38.73	63	373	16.42	14.14	18.69
200% FPL	below	16	37	43.24	45.75	20.93	70.57	108	327	32.93	29.66	36.20
	above	12	83	14.46	12.90	6.78	19.02	123	843	13.46	10.84	16.08
Education	high school graduate, GED equivalent or less	8	31	25.81	23.97	4.77	43.17	86	308	27.10	23.48	30.72
	Some college with no degree or associate degree	13	50	26	25.91	7.36	44.47	103	447	21.65	18.66	24.64
	Bachelor's degree or higher	7	45	15.56	15.04	4.47	25.62	57	473	11.86	8.89	14.83
Occupation**	working	12	66	18.18	15.64	7.65	23.62	86	656	13.03	10.18	15.87
	not working but looking for work	3	6	50	39.19	0.00	89.71	33	55	56.02	41.67	70.36
	not working no looking for work	14	55	25.45	28.58	2.27	54.89	127	516	24.75	22.27	27.23

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Data Summary
3) Drugs & Alcohol

Participants

SHOW enrolled 2602 individuals in Wisconsin from 10 counties during its 2014 to 2016 triannual sample, including 1957 adults and 645 children. In 2016, SHOW completed health surveys on 204 individuals in Brown County including 156 adults and 48 children.

Supplemental questionnaires including a question about the alcohol and substance abuse were asked to Brown County participants in 2016 and 129 adults completed this.

Alcohol use

At-risk drinking (heavy drinking) was defined as having more than 14 drinks per week for men and more than 7 drinks per week for women. Prevalence of binge drinking was assessed with the question, "In the past 12 months, on how many days did you have 5 or more drinks of any alcoholic beverage?" Individuals who responded 1 or more days to this question were regarded as having engaged in binge drinking in the last 12 months.

	Brown County	WI
Heavy drinking	**17.2%**	13.6%
Binge drinking	36.9%	**39.0%**

More male adults were **binge drinking** than **female adults** in Brown County (Male: 43.1%, Female: 31.1%)
This matches the statewide trend (Male: 48.0%, Female: 30.5%)

More than half of Brown County adults **aged 18-≤50 years** reported **binge drinking,** compared to around 20% of adults aged 50 or more years.

Data Summary
3) Drugs & Alcohol

Alcohol and drug impacted life

To explore the impact of alcohol and drug use among Brown County adults, supplementary questionnaires regarding alcohol-influenced drive and alcohol and drugs impacted life were administered. Those questions include if they have driven under the influence of alcohol, if their family member or friend's alcohol or drug use negatively impacted their lives.

Drinking habit was associated with anxiety and food insecurity.
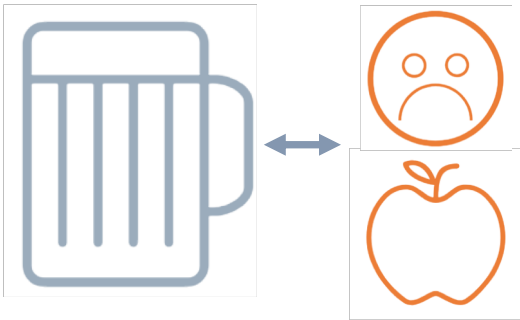
Heavy drinkers more frequently experienced **food insecurity (36.5%),** compared that 17.8% of adults who are not heavy drinkers were food insecure.

More adults with anxiety were **binge drinkers (45.7%)** than adults without anxiety were (33%).

14.3% of Brown County adults reported they **had driven under the influence of alcohol at least one time** in the last six months.

14.3%
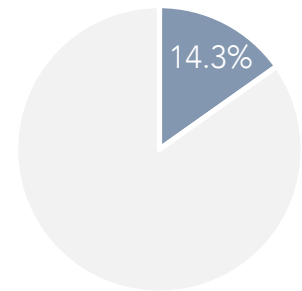
More than half female adults answered **their family member's or friend's abuse of alcohol or drugs negatively impacted their life (51.5%),** versus 17.4% of males.

Younger to middle-aged adults more frequently reported being impacted than older adults (age group 18-35 ≤years: 38.1%, 35-≤50 years: 57.8%, 50-≤65 years: 21.5%, 65+ years: 16.8%), and in **most of the cases (90.5%),** the alcohol or drug abuse of their family member or friend had **continued even though the use caused problems.**

Data Table
3) Drugs & Alcohol

1. alcohol-at risk drinking (heavy drinking)		Brown County 2016						Wisconsin 2014-16				
		Freq	N	percent	percent*	lower 95% CI*	upper 95% CI*	Freq	N	percent*	lower 95% CI*	upper 95% CI*
	total	22	129	17.05	17.24			223	1793	13.10		
Gender	male	7	57	12.28	10.65	0.64	20.66	85	790	11.09	8.74	13.44
	female	15	72	20.83	23.36	7.73	39.00	148	1003	15.01	12.20	17.82
Race& ethnicity**	non-Hispanic White	21	120	17.5	17.52	11.75	23.29	204	1521	13.34	10.96	15.71
	Ohters	1	9	11.11	13.84	0.00	44.16	29	270	11.75	6.31	17.19
Age	18-≤35 years	6	22	27.27	28.24	0.00	62.00	47	374	13.28	8.39	18.17
	35-≤50 years	7	30	23.33	22.71	3.63	41.80	61	388	14.61	10.17	19.04
	50-≤65 years	6	40	15	13.61	1.06	26.16	77	519	14.38	12.20	16.55
	65+	3	37	8.11	7.42	1.27	13.57	48	512	9.35	6.78	11.92
200% FPL	below	7	39	17.95	18.67	0.24	37.10	58	474	12.82	9.25	16.38
	above	14	83	16.87	16.42	9.82	23.02	169	1232	13.63	11.66	15.59
Education	high school graduate, GED equivalent or less	5	33	15.15	15.04	0.61	29.48	56	461	12.50	8.81	16.19
	Some college with no degree or associate degree	7	50	14	15.55	5.57	25.53	86	643	13.16	10.34	15.99
	Bachelor's degree or higher	10	45	22.22	20.61	10.88	30.34	91	686	13.50	10.70	16.31

* denotes that the measure of prevalence (percent) is weighted
** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

Data Table
3) Drugs & Alcohol

2. binge drinking		Brown County 2016						Wisconsin 2014-16					
		Freq	N	percent	percent*	lower 95% CI*	upper 95% CI*	Freq	N	percent*	lower 95% CI*	upper 95% CI*	
	total	44	126	34.92	36.91			619	1701	39.04			
Gender	male	24	56	42.86	43.07	33.62	52.51	336	749	48.05	44.54	51.55	
	female	20	70	28.57	31.13	17.10	45.15	283	952	30.54	27.38	33.70	
Race& ethnicity**	non-Hispanic White	42	118	35.59	37.42	3.21	44.64	526	1460	39.06	36.90	41.22	
	Others	2	8	25.00	30.19	0.00	73.17	92	239	38.88	32.77	44.99	
Age	18-≤35 years	13	22	59.09	57.72	38.88	76.55	179	337	53.34	47.73	58.94	
	35-≤50 years	16	30	53.33	52.02	34.49	69.54	176	373	48.29	43.24	53.33	
	50-≤65 years	8	39	20.51	26.31	9.86	42.76	183	505	36.61	30.95	42.28	
	65+	7	35	20.00	17.55	0.00	35.09	81	486	16.82	14.76	18.89	
200% FPL	below	13	38	34.21	36.99	20.02	49.97	138	437	33.22	27.34	39.11	
	above	29	81	35.80	38.02	30.20	15.84	455	1187	41.53	38.70	44.36	
Education	high school graduate, GED equivalent or less	11	30	36.67	36.25	16.35	56.15	146	415	37.78	31.05	44.51	
	Some college with no degree or associate degree	18	50	36.00	38.13	25.15	51.12	226	617	39.71	34.90	44.53	
	Bachelor's degree or higher	15	45	33.33	36.78	21.84	51.72	246	666	39.16	33.41	44.91	
Anxiety	binge drinkers among anxiety	15	36	41.67	45.71	32.48	58.94	435	1238	37.38	35.04	39.73	
	binge drinkers among no anxiety	28	89	31.46	33.00	21.85	44.16	157	396	43.14	37.72	48.57	

* denotes that the measure of prevalence (percent) is weighted
** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

Data Table
3) Drugs & Alcohol

3. Alcohol-influenced drive		Brown County 2016					
		Freq	N	percent	percent*	lower 95% CI*	upper 95% CI*
	total	19	126	15.08	14.34		
Gender	male	12	54	22.22	18.74	10.58	26.90
	female	7	72	9.72	10.19	3.55	16.83
Race&ethnicity**	non-Hispanic White	19	117	16.24	16.42	10.39	22.46
	Others	0					
Age	18-≤35 years	5	22	22.73	16.79	0.00	37.13
	35-≤50 years	10	30	33.33	31.84	11.81	51.87
	50-≤65 years	0	39				
	65+	4	35	11.43	9.95	0.00	20.33
200% FPL	below	8	37	21.62	18.54	6.16	30.93
	above	11	82	13.41	13.61	5.31	21.91
Education	high school graduate, GED equivalent or less	6	31	19.35	14.58	2.85	26.30
	Some college with no degree or associate degree	5	49	10.20	8.59	0.77	16.42
	Bachelor's degree or higher	8	45	17.78	20.62	9.00	32.25
4. Alcohol & drugs impacted life Q. Was there ever a time in your life when a family member's or friends abuse of alcohol or drugs negatively impacted your life?		Freq	N	percent	percent*	lower 95% CI*	upper 95% CI*
	total	41	129	31.78	48.18		
Gender	male	9	53	16.98	17.35	7.45	27.26
	female	32	69	46.38	51.47	36.37	66.57
Race&ethnicity**	non-Hispanic White	39	113	34.51	36.71	25.20	48.22
	Ohters	2	9	13.92	22.74	0.00	62.50
Age	18-≤35 years	9	22	40.91	38.08	11.95	64.21
	35-≤50 years	17	30	56.67	57.79	36.43	79.16
	50-≤65 years	8	35	22.86	21.49	8.18	34.80
	65+	7	35	20.00	16.80	2.58	31.02
200% FPL	below	11	37	29.73	33.37	8.48	25.26
	above	28	78	35.90	35.91	24.81	47.02

* denotes that the measure of prevalence (percent) is weighted
** Interpretation should be taken with caution when the number of people in a subgroup is smaller than 20.

Data Summary
4) Other (Neighborhood)

Participants

SHOW enrolled 2602 individuals in Wisconsin from 10 counties during its 2014 to 2016 triannual sample, including 1957 adults and 645 children. In 2016, SHOW completed health surveys on 204 individuals in Brown County including 156 adults and 48 children.

Neighborhood

The characteristics of your neighborhood section provides information on walking distances from a participant's home to specific destinations, subjective evaluations of the participant's neighborhood, and the importance of factors that may have influenced the participant's decision on moving to their current residence. The data were collected as part of the self-administered portion of the SHOW survey. The importance of easy access to exercising facilities, healthcare facilities, and public transportation, and safety from crime and traffic were included in this analysis.

97.5%

of Brown County adults answered their neighborhood was **somewhat safe or very safe from crime**

85.3%

of Brown County adults answered their neighborhood was **somewhat safe or very safe for walking or biking**

In their decision to move to their current residence,

17.5%
Reported **easy access to gym or other workout facility** was important

31.8%
Reported **easy access to health care or other services** was important

Data Summary
4) Other (Neighborhood)

Walk, Transit, Bike score

Walk Score®, Bike Score®, and Transit Score® results were calculated by and obtained from the Walk Score website (http://www.walkscore.com) based on respondent addresses. Walk score measures the walkability of any address. For each address, Walk score analyzes hundreds of walking routes to nearby amenities and also measures pedestrian friendliness by analyzing population density and road metrics such as block length and intersection density. Transit score is a measure of how well a location is served by public transit. It is based on data released in a standard format by public transit agencies. Bike score measures whether an area is good for biking. It is calculated by measuring bike infrastructure, hills, destinations and road connectivity, and the number of bike commuters.

79.5% of Brown County adults **lived in a place that was car-dependent**

20.5% of Brown County adults **lived in a place that is walkable or somewhat walkable**

50.5% of Brown County adults **lived in a place that was with minimal bike infrastructure**

5.1% of Brown County adults **lived in a place that biking is convenient for most trips**

9 in 10 of Brown County adults answered **easy access to public transit was not important** in their decision to move to their current residence.

*Ns for Walk score: 204, Transit score: 107, Bike score: 110

Data Table
4) Other (Neighborhood)

Importance of easy access to gym or other workout facility		Brown County 2016					
A. Moderate to very important		Freq	N	percent	percent*	lower 95% CI*	upper 95% CI*
	total	23	128	17.97	17.46		
Physical inactivity	active	18	89	20.22	20.56	10.67	30.46
	inactive	5	39	12.82	10.50	0.00	21.03
Obesity	Obese	6	49	12.24	12.62	1.76	23.49
	Non-obese	17	79	21.52	20.39	11.69	20.10
200% FPL	below	8	39	20.51	20.37	14.12	26.62
	above	14	82	17.07	17.11	8.71	25.50
Geography	suburban	19	102	18.63	18.04	9.31	26.77
	rural	4	26	15.38	15.92	8.55	23.29
Education	high school graduate, GED equivalent or less	4	33	12.12	10.45	0	21.37
	Some college with no degree or associate degree	8	50	16.00	14.21	0.43	27.98
	Bachelor's degree or higher	10	44	22.73	23.69	12.37	35.01
Importance of easy access to health care or other services		Brown County 2016					
A. Moderate ~ very important		Freq	N	percent	percent*	lower 95% CI*	upper 95% CI*
	total	42	129	32.56	31.75		
Gender	male	18	57	31.58	32.06	17.33	46.79
	female	24	72	33.33	31.46	21.82	41.1
Age	18-≤35 years	3	22	13.64	14.81	0	33.63
	35-≤50 years	6	30	20.00	24.48	1.92	47.05
	50-≤65 years	13	40	32.50	30.63	15.48	45.78
	65+	20	37	54.05	55.89	34.56	77.23
200% FPL	below	10	39	25.64	25.18	10.29	40.07
	above	31	83	37.35	36.65	27.76	45.55
Geography	suburban	35	103	33.98	34.46	23.29	45.62
	rural	7	26	26.92	24.51	16.42	32.6
Education	high school graduate, GED equivalent or less	10	33	30.30	32.12	5.05	59.18
	Some college with no degree or associate degree	14	50	28.00	26.99	13.22	40.75
	Bachelor's degree or higher	17	45	37.78	34.94	26.2	43.68

* denotes that the measure of prevalence (percent) is weighted

Data Table
4) Other (Neighborhood)

Importance of easy access to public transit		Brown County 2016					
A. Moderate to very important		Freq	N	percent	percent*	lower 95% CI*	upper 95% CI*
	total	15	129	11.63	10.81		
Gender	male	8	57	14.04	12.98	2.28	23.67
	female	7	72	9.72	8.80	0.92	16.68
Age	18-≤35 years	1	22	4.55	3.86	0.00	12.73
	35-≤50 years	3	30	10.00	11.55	0.00	25.97
	50-≤65 years	1	40	2.50	3.49	0.00	10.68
	65+	10	37	27.03	27.11	9.31	44.90
200% FPL	below	6	39	15.38	16.02	0.00	33.12
	above	8	83	9.64	8.90	0.56	17.24
Geography	suburban	13	103	12.62	12.98	1.80	24.15
	rural	2	26	7.69	5.02	0.00	11.22

* denotes that the measure of prevalence (percent) is weighted

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