



Department of Family Medicine  
and Community Health

UNIVERSITY OF WISCONSIN  
SCHOOL OF MEDICINE AND PUBLIC HEALTH

Madison and Baraboo Family Medicine  
**Residency Programs**

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**Scholarly Projects and  
Community Health Learning  
Experiences**  
From the Class of 2021

# Megan Bartz, MD

## Projects Completed During Residency:

### Scholarly Project:

Therapeutic Efficacy of Yoga for Common Primary Care Conditions

### Community Health Learning Experience:

Hot-Spotting at Dryden Terrace:

Dryden Terrace is a low-income housing complex that sits right next to the Northeast Clinic. Historically, there have been large numbers of emergency calls to the building, which prompted a coordinated effort from both the Northeast Family Medicine staff and the Madison Fire Department to help address concerns from the community to lower the number of calls. Over the last several years, staff from the Northeast Clinic would visit Dryden Terrace on a monthly basis to provide support to the community and help to prevent some of these 911 calls. COVID-19 changed this in 2020. Due to our inability to gather, we have been putting together a monthly newsletter on different health topics for the residents at Dryden Terrace. The newsletter has been well received, though we look forward to the time when we can gather in person again.



*Thank you to all the patients, my co-residents, faculty, and staff who have taught me so much along the way. I would not be where I am today without each and every one of you. Thank you to my family and friends for supporting me in becoming a doctor. You've been with me during the long hours and difficult situations, for which I am incredibly grateful. Further appreciation goes out to my husband, Josh, who has been with me every step of the way to provide love, support, and encouragement. I couldn't have completed this journey without him.*



Megan Bartz enjoys family medicine because it provides longitudinal care, fosters strong relationships with patients, and cares for all people. She grew up in Eau Claire, WI, and earned her undergraduate degree in biochemistry from the University of Wisconsin – La Crosse. She then

went on to pursue her medical degree at the University of Wisconsin School of Medicine and Public Health. Megan has interests in integrative medicine, which incorporates herbal medications, acupuncture, yoga and many others into clinical practice. She feels integrative medicine is an additional tool that can help patients better their health. In addition to her interests in integrative medicine, she is also passionate about women's health. Outside of medicine, Megan's hobbies include cooking, dog agility, hiking and reading.

# Therapeutic Efficacy of Yoga for Common Primary Care Conditions

Adrienne Hampton, MD and Megan Bartz, MD

## Abstract

Yoga is a popular form of exercise that uses body postures, meditation and breathing techniques. Yoga has been shown to have many health benefits. Our goal for this review is to orient health professionals to the evidence-based uses of yoga most relevant to primary care. A PubMed search was conducted including meta-analyses, reviews, systematic reviews and randomized controlled trials. Results were limited to English language and publication between 2010 and 2020. Yoga was found to help decrease hypertension, relieve back pain, promote overall wellbeing and improve mental health. Yoga is a relatively safe and effective option for patients interested in therapeutic lifestyle change to promote wellbeing, and to help manage hypertension, back pain and overall mental health.

## Introduction

Yoga is a system of health-promoting attitudes and practices arising out of Hindu philosophy. In the West, the elements of yoga most emphasized and widely practiced are breath control practices, bodily postures, and meditation (1, 2). Increasingly, Americans are practicing yoga for overall wellness, and to treat specific health conditions. A 2017 survey of US adults ages 18+ found that 1 in 7 Americans had practiced yoga in the past 12 months (3). As such, primary care clinicians may encounter questions about yoga, including the health benefits and safety of this practice. To orient healthcare professionals to the evidence-based uses of yoga, we will review current literature on the efficacy of yoga to address commonly-encountered health-related concerns. A 2018 systematic review of the top reasons for visits in primary care found that (in descending order) hypertension, upper respiratory tract infection, depression/anxiety, back pain, and routine health maintenance are the 5 the top reasons for visits to primary care clinicians in developed countries (4) Our review will focus on these conditions, excluding URI.

## Search Methods

A PubMed search was completed using the key terms ‘yoga’ and each reported condition, and ‘yoga and safety’. The search parameters included meta-analyses, reviews, systematic reviews, and randomized controlled trials. We limited our inquiry to English language and publication between 2010 and 2020. Search dates: 01 Feb 2020 to 29 May 2020. Two reviewers evaluated articles for inclusion. From this initial search, we prioritized meta-analyses and reviews with adult study populations, though one included study includes incarcerated youth. High quality RCTs were included where meta-analyses and reviews were not available.

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## Patient Case - Linda

*Linda is a 61 year old woman who comes to see you for a routine health maintenance visit. She has a history of hypertension that she prefers to manage without pharmaceuticals. Additionally, she notes her mother suffered a series*

of devastating falls, and she'd like a health maintenance activity to support healthy mobility into advanced age. Based on what she's heard of the health benefits of yoga, she asks if yoga might be a good activity to try.

## Health Maintenance and Wellbeing

According to national survey data from 2012, 78% of people practicing yoga in the US are practicing for general health and disease prevention (5). Yoga has shown benefit for several indicators of wellbeing in otherwise healthy individuals.

Yoga may be an effective intervention for atherosclerotic cardiovascular disease risk reduction. In a 2016 meta-analysis of 32 RCTs with healthy adults and adults with CVD risk factors, diabetes, metabolic syndrome and CAD, asana-based yoga practice was shown to improve cardiovascular risk factors including BMI, systolic blood pressure, LDL and HDL compared to non-exercise controls. Notably, no difference was observed between yoga and other exercise interventions (6). A 2014 Cochrane review evaluating yoga for the prevention of cardiovascular disease reported improvements in diastolic blood pressure, HDL cholesterol and triglycerides with yoga interventions (7).

Table 1. ASCVD risk

Author/year	Study design	Study populations	Outcomes	Number of studies or subgroups	Sample size	Results, (95% confidence interval), P value	Controls
Chu 2016(6)	Meta-analysis	Healthy adults and ASCVD risk, metabolic syndrome, diabetes, CAD	BMI, kg/m <sup>2</sup>	8	654	MD= -0.77(-1.09, -0.44) P < 0.00001	Non-exercise
			Systolic Blood Pressure, mmHg	22	1470	MD= -5.21(-8.01, -2.42) P=0.0003	
			LDL, mg/dl	12	751	MD= -12.14 (-21.80,-2.48) p=0.01	

			HDL, mg/dl	12	751	MD= 3.20(1.86,4.54) p<0.00001	
<b>Hartley 2014(7)</b>	Meta-analysis	Adults with ASCVD risk factors, HIV, menstrual irregularities, and healthy adults	HDL, mg/dl	5	207	MD= 3.09(0.77,5.41) p=0.01	Non-exercise
			Triglycerides, mg/dl	5	207	MD= -23.91 (-38.97,-9.74) p=0	
			Diastolic Blood Pressure, mmHg	8	444	MD= -2.90(-4.52, -1.28) p=0	

BMI = body mass index, MD= mean difference, LDL = low-density lipoprotein, HDL = high density lipoprotein

Yoga shows promise as a health maintenance activity for older adults. A large 2019 meta-analysis of the effects of yoga on physical functioning (17 trials) and health related quality of life (20 trials) in older adults demonstrated that yoga practice is associated with improved balance, flexibility, and strength as compared to inactive controls. Compared to active controls, results for strength and flexibility favored yoga interventions. Results for HRQOL also favored the yoga interventions in the domains of depression, perceived mental health, perceived physical health, sleep quality, and vitality as compared to non-active controls(8). In 2018, Tulloch et al published a meta-analysis of 12 RCTs in people 60+ years of age (n=752) examining the effects of yoga on health-related quality of life and mental wellbeing. They found a significant medium-sized effect on HRQOL and a small, statistically significant effect on mental well-being (9). In a 2016 meta-analysis (n=307), results for yoga trended toward improved balance and mobility in persons 60 years or older, though results did not reach statistical significance(10). A 2019 pilot RCT with 81 participants 55+ years of age with a diagnosis of mild cognitive impairment showed improvements in memory for both the yoga and a memory training intervention, where only the yoga participants showed statistically significant improvements in executive functioning as compared to participants in the memory training group (11). In a 2014 RCT peri and post menopausal women, yoga showed a modest positive effect on menopause-related QOL (12). These results demonstrate that yoga can help older adults improve their physical functioning and quality of life.

Table 2. Wellbeing in older adults

Author/year	Study design	Study populations	Outcomes	Number of studies or subgroups	Sample size	Results, (95% confidence interval), P value	Controls
<b>Sivaramakrishnan 2019(8)</b>	Meta-analysis	Healthy adults mean age 60+	Balance	7	265	ES = 0.7, (0.19, 1.22) p = 0.01	Non-exercise
			Lower limb strength	7	485	ES = 0.45, (0.22,0.68) p < 0.001	
			Lower body flexibility	7	431	ES = 0.50, (0.30,0.69) p < 0.001	
			Depression	8	450	ES = 0.64, (0.32,0.95) p < 0.001	
			Perceived mental health	9	554	ES = 0.60, (0.33,0.87) p < 0.001	
			Perceived physical health	5	400	ES = 0.61, (0.29, 0.94) p < 0.001	
			Sleep quality	4	353	ES = 0.65, (0.41,0.88) p < 0.001	

			Vitality	3	196	ES = 0.31, (0.03,0.59), p = 0.03	
			Lower body flexibility	3	225	ES = 0.28 (0.01,0.54) P=0.04	Exercise
			Lower limb strength	3	225	ES= 0.49 (0.1,0.88) P=0.01	
<b>Tulloch 2018(9)</b>	Meta-analysis	Adults, mean ages 60+, 74% female, community and facility dwelling, healthy and with OA, cancer history, parkinsons, COPD, chronic back pain	HRQOL	12	752	SMD = 0.51, (0.25–0.76), P < 0.001	Non-exercise
			Mental wellbeing	12	752	SMD = 0.38, (0.15,0.62) P =0.001	

ES = effect size, SMD = standardized mean difference, HRQOL = health-related quality of life

In a systematic review of 5 RCTs examining the effects of yoga on workplace wellbeing, four studies evaluating yoga interventions showed statistically significant reductions in workplace stress, and no adverse events were recorded. One study did not report results (13).

In a 2015 meta-analysis examining the effects of yoga on incarcerated women and youth, participants in yoga programs showed improved behavioral functioning (10 trials) and psychological well-being (9 trials), with longer programs tending to show more robust results (14).

## Hypertension

According to America's Health Rankings in 2019, 30.8% of Wisconsin adults have been told they have high blood pressure by a health professional (15). The Wisconsin Chronic Disease Quality Improvement Project found that patients with hypertension and with Wisconsin Health Plans and National Commercial Health Plans had controlled blood pressure an average of 68.6% and 62.2% respectively(16). As of 2017, high blood pressure was estimated to account for \$68 billion in medical care expenses per year in the US(17). Yoga has been considered as a treatment to improve blood pressure control.

There have been 4 systematic reviews and meta-analyses in the last several years looking at patients with high blood pressure and yoga (18,19,20,21) (Table 3). All of the reviews have shown some improvement both SBP and DBP, though they have not always been consistent in the amount of change seen. This is likely due to the low number of studies in this area, high or unclear risk of bias in most of the studies included and high degree of heterogeneity. The three reviews that looked at yoga vs exercise as a control showed that there was no statistical difference between these interventions (18,19,20).

In the 2013 systematic review and meta-analysis by Hagins *et al.*, yoga was found to decrease SBP by -4.17 mmHg ( $p=0.0002$  CI -6.35, -1.99) and DBP by -3.62 mmHg ( $p=0.0001$ , CI -4.92,-1.60)(18). Sub-group analysis showed further reduction of SBP (-8.17 mmHg) and DBP (-6.14 mmHg) when yoga contained all three elements (postures, breathing and meditation) compared to yoga that contained <3 of these elements(18). The systematic review and meta-analysis in 2014 studying yoga and hypertension by Cramer *et al.* showed a reduction in SBP of -9.65 mmHg ( $p=0.01$  CI -17.23, -2.06) and DBP -7.22 mmHg ( $p=0.01$  CI -12.83, -1.62)(19). Another meta-analysis by Cramer *et al.* looked at patients with cardiovascular risk factors, and found that yoga vs. usual care or no intervention was associated with a decrease in SBP of -5.85 mmHg ( $p <0.01$ , CI -8.81,-2.89) and DBP of -4.12 mmHg ( $p <0.01$ , CI -6.55, -1.69). Furthermore, in non-diabetic patients with high cardiovascular risk factors, they found that SBP was decreased by -10.00 mmHg ( $p <0.01$  CI -16.42, -3.59) in the yoga group vs usual care/no treatment (20). Between groups assigned to yoga and to exercise, no significant differences in blood pressure outcomes were observed (18, 19, 20).

In the most recent systematic review and meta-analysis, a meta-regression analysis was done to determine which elements of yoga elicited the greatest blood pressure effects. Reductions of SBP were statistically significantly greater for studies including breathing techniques and higher initial blood pressures. The additive model created for SBP (samples with hypertension, with breathing techniques, with average methodological study quality and controlled for publication bias) showed a decrease in SBP of -11.3 mmHg (CI -14.6, -8.1) (21). Reductions of DBP were statistically significantly greater for studies including meditation, practicing  $\geq 4$ x per week, and higher initial blood pressure. The additive model created for DBP (samples with hypertension, with meditation, with average methodological study quality, with and yoga practiced  $>3$ x per week) showed a reduction of DBP by -5.5 mmHg (CI -7.4, -3.8)(21).

Despite the high amount of heterogeneity and high risk of bias in the randomized controlled trials noted in most of the meta-analyses, all have found a statistically significant decrease in blood pressure with yoga. This suggests that there is evidence that yoga can decrease both SBP and DBP in meaningful amounts ranging from 4-11 and 3-7 mmHg respectively.



Table 3. Hypertension

Author/year	Study design	Study populations	Outcomes	Number of studies or subgroups	Sample size	Results, (95% confidence interval), P value	Controls
<b>Hagins 2013 (18)</b>	Systematic Review and Meta-Analysis	Pre-hypertensive or hypertensive adults	Blood Pressure	17	1013	SBP -4.17 mmHg (-6.35,-1.99) P=0.0002 DBP -3.62 mmHg (-4.92, -1.60) P = 0.0001	Exercise and non-exercise
<b>Cramer 2014 (19)</b>	Systematic Review and Meta-analysis	Pre-hypertensive or hypertensive adults	Blood Pressure	7	452	SBP -9.65 mmHg (-17.23, -2.06) P=0.01 DBP -7.22 mmHg (-12.83, -1.62) P=0.01	Non-exercise
<b>Cramer 2014 (20)</b>	Systematic Review and Meta-analysis	Healthy, non-diabetic adults with risk of cardiovascular disease or adults with diabetes mellitus type 2	Blood Pressure	17	SBP 952 DBP 991	SBP -5.85 mmHg (-8.81, -2.89) P<0.01 DBP -4.12 mmHg (-6.55, -1.69)P<0.01	Non-exercise
<b>Wu 2019 (21)</b>	Systematic Review and Meta-analysis	Adults	Blood Pressure	49	3517	SBP -0.47 weighted mean effect size (-0.62 to -0.32, -5.0 mmHg) P<0.001	Non-exercise

						DBP weighted mean effect size -0.47 (-0.61 to -0.32, -3.9 mmHg) P<0.001	
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SBP = systolic blood pressure, DBP = diastolic blood pressure

However, as with most lifestyle modifications, questions remain about the feasibility and the likelihood that patients will implement these changes in their lives. A matched controlled study by Wolff *et al.* looked at adult patients who were matched by SBP and whether a yoga class vs at home yoga were more effective in lowering blood pressure (22). The yoga at home group was given a CD and a manual by a health professional who was not a qualified yoga instructor. Interestingly, the at home yoga group showed a decrease in DBP by 4.4 mmHg compared to the control (treatment as usual). This is in contrast to no improvement in blood pressure in the yoga class group compared to the control, suggesting that an at home practice could be a feasible lifestyle change (22). Another study by Sarah *et al.* looked at male patients who were hospitalized in Germany for non-cardiac or pulmonary diagnoses and with SBP>135 and <165 mmHg (23). These patients underwent inpatient yoga practice during rehab prior to discharge. The study was evaluating whether telerehabilitation (including telephone check ins) vs no further support increased the likelihood of continued compliance with yoga practice. It was found that adherence was statistically significantly higher in the telerehabilitation group vs the control group (60.5% vs 29.3% p<0.0001 at 6 months and 56.0% vs 23.9% p=0.014) (23). This suggests that phone check ins can be useful in supporting patient adherence to this lifestyle modification.

Overall, yoga has been shown to decrease SBP by 4 to 11 mmHg and DBP by 3 to 7 mmHg and is a feasible option for patients to do at home with some support from primary care providers.

### **Patient Case- Linda *continued***

*You discuss the benefits of yoga with Linda. At a follow up 4 months later, she states that she has been practicing yoga about 3 times a week and finding joy in this practice. Her blood pressure is under control and she thanks you for your recommendation.*

### **Patient Case- Mark**

*Mark is a 50 year old male with a history of depression who presents to your office to discuss low back pain. He has had low back pain for years. He has tried many different treatment modalities including NSAIDs, Tylenol, lidocaine patches, icy-hot, and PT. He is wondering if there is anything else that can be done to help with his pain? He also has a nephew with opioid use disorder and would like to avoid any more medications. His wife has been doing yoga and he's wondering if this would help with his back?*

## Back Pain

Back pain is estimated to generate \$100 billion in healthcare costs annually (24), and back pain consistently ranks among the top 3 diagnoses in claims prevalence and cost for Quartz Health Solutions, a major Wisconsin health insurance company (25).

Yoga has been extensively studied for chronic low back pain and function (26, 27, 28) (Table 4). A 2019 meta-analysis of 13 RCTs evaluating the effectiveness of yoga for low back pain demonstrated that yoga practice significantly decreased pain intensity ( $SMD = -0.33$ , 95% CI  $-0.47$  to  $-0.19$ ,  $p < 0.001$ ) (26). In a 2013 meta-analysis of yoga for low back pain and pain-related function, yoga was shown to improve pain based on what the reviewers deemed moderate quality evidence from 6 high quality RCTs. Short term improvements in back-related disability were also observed (27). In a 2017 Cochrane Review, 9 trials compared yoga to non-exercise controls. Yoga was associated with improved function at short and long-term follow-up, with moderate and small effect sizes respectively. Yoga was associated with improved pain at short, intermediate, and long-term follow-up as well; results were statistically significant but did not meet the authors' threshold for clinical significance (28). The same Cochrane review compared yoga to exercise controls (4 trials), and the authors found no difference between yoga and non-yoga exercise for back-related function. For pain, yoga participants demonstrated statistically and clinically significant improvement at intermediate-term follow up (1 trial), but not short-term follow-up. No long-term follow-up results were reported for this comparison (28).

Table 4. Back pain

Author/year	Study design	Study populations	Outcomes	Number of studies or subgroups	Sample size	Results, (95% confidence interval), P value	Controls
<b>Zou 2019 (26)</b>	Meta-analysis	Adults with chronic low back pain	Pain intensity	10	1179	SMD= $-0.33$ , ( $-0.47$ , $-0.19$ ) $P < 0.001$	Exercise and non-exercise
<b>Cramer 2013(27)</b>	Meta-analysis	Adults with chronic low back pain	Pain intensity + pain bothersomeness (short-term)	6	584	SMD= $-0.48$ ; ( $-0.65$ , $-0.31$ ); $P < 0.01$	Exercise and non-exercise
			Back-specific disability (short-term)	8	689	SMD= $-0.59$ ( $-0.87$ , $-0.30$ ) $P < 0.01$	Exercise and non-exercise

<b>Wieland 2017 (28)</b>	Meta-analysis	Adults with chronic low back pain	Back-specific function (Short-term)	5	256	SMD =-0.45(-0.71, -0.19) P = 0.00070	Non-exercise
			Back-specific function (long-term)	2	365	SMD =-0.26(-0.46, -0.05) P = 0.015	Non-exercise

SMD = standardized mean difference

In addition to meta-analyses, yoga for back pain has also been evaluated in 2 large systematic reviews in the past ten years. In a 2017 review of 14 RCTs, functioning was significantly better in the yoga group as compared to education intervention controls at short-term (5 trials) and long-term (4 trials) follow-up. When compared to exercise, yoga tended to be associated with small improvements in pain and functioning, though results were not always statistically significant (29). In a 2020 systematic review published by the US Agency for Healthcare Research and Quality, when compared to attention or wait-list controls, yoga showed improved function at short (8 trials) and intermediate (3 trials) term follow-up. Additionally when compared with attention or wait-list controls, yoga was associated with improved pain at short (7 trials) and intermediate (2 trials) term follow-up. There were no differences between yoga and other exercise for pain or function at short or intermediate-term follow-up(30).

A 2017 review on the cost-effectiveness of various nonpharmacologic therapies for low back pain suggests that yoga is a cost-effective therapy for chronic low back pain. However, these results must be interpreted with caution in the United States as the studies reviewed were carried out in Europe (31).

Overall, there is a growing body of literature demonstrating that yoga is a moderately effective means of treating chronic low back pain.

**Patient case – Mark** *continued*

*Mark also notes that his mood isn't as good as it used to be despite continuing to take his SSRI regularly. His wife has been saying that yoga has been helping her mood. He's wondering if there is any truth behind this.*

**Mental Health**

Anxiety and depression are, together, the third leading chief complaint for primary care visits in developed countries (4) and in 2018 7.2% of adults had an episode of major depressive disorder in the last year (32). In a national survey on yoga use, 84.7% of people stated that practicing yoga reduced their stress levels and 67.5% of people stated that practicing yoga made them feel better emotionally (5). One proposed mechanism of the feeling of decreased stress levels is that practicing yoga has been found to increase GABA levels in the thalamus (33). While most of the randomized control trials studying yoga and depression/anxiety have high risk of bias and heterogeneity, there is some evidence that yoga can be effective in treating these conditions (34, 35, 36, 37, 38).

A systematic review and meta-analysis looking at yoga and depression found that there was moderate evidence for short term effects of improving severity of depression with yoga vs usual care (SMD=-0.69 CI -0.99, -0.39 P<0.001) (34) (Table 5). There was also limited evidence for improvement of depression for yoga vs relaxation and yoga vs aerobic exercise, though smaller than yoga vs usual care (34). Another systematic review for patients with major depressive disorder found that there was no difference between yoga and exercise or antidepressant medication (imipramine) for treatment of depression (35). This particular systematic review was flawed in that it analyzed very few studies which had few participants. However, given that exercise and antidepressant medications are known to improve depression, it is reasonable to suggest that yoga can also improve depression in those with major depressive disorder.

**Table 5. Depression**

Author/year	Study design	Study populations	Outcomes	Number of studies or subgroups	Sample size	Results, (95% confidence interval), P value	Controls
<b>Cramer 2013 (34)</b>	Systemic Review and Meta-analysis	Adults with depression	Various depression scales	5	284	SMD = -0.69 (-0.99, -0.39) P<0.001	Usual Care
				3	109	SMD = -0.62 (-1.03, -0.22) P = .003	Relaxation
				2	159	SMD = -0.59 (-0.99, -0.18) P = .004	Aerobic Exercise

SMD = standardized mean difference

For anxiety, there is even less research available, however, a recent systematic review and meta-analysis found that there was evidence for short term benefits of yoga on anxiety compared to no treatment (SMD= -0.43 CI -0.74, -0.11 P=0.008) (36) (Table 6). Even greater effects were found for yoga compared to active controls like progressive muscle relaxation (SMD -0.86 CI -1.56, -0.15, P=0.02) (36). In a more recent RCT looking at yoga vs no treatment for anxiety in college students, there was a statistically significant improvement of anxiety symptom scores in those in the yoga group (37).

**Table 6. Anxiety**

Author/year	Study design	Study populations	Outcomes	Number of studies or subgroups	Sample size	Results, (95% confidence interval), P value	Controls
<b>Cramer 2018 (36)</b>	Systematic Review and Meta-analysis	Adults with diagnosis of an anxiety disorder	Improvement of anxiety based on various scales	3	169	SMD = -0.43 (-0.74, -0.11) P=0.008	No Treatment
				3	79	SMD = -0.86 (-1.56, -0.15) P=0.02	Active Controls

SMD = standardized mean difference

While there is at least modest evidence for improvement in the short term for both anxiety and depression with yoga, very few studies have looked at long term benefits. One such study followed patients with cancer for 6 months after the end of a yoga intervention to see if there were decreases in depression and anxiety scores (38). Overall, both symptoms of anxiety and depression were statistically significantly improved compared to their baseline scores prior to the yoga intervention. In addition, 69% of patients in the study were still practicing yoga at 6 month follow up, likely due to reported subjective benefits (38).

Overall, there is moderate evidence that yoga could be an additional tool to treat anxiety and depression.

**Patient case- Mark** *continued*

*Mark's daughter attends classes at a 'power yoga' studio, and their website depicts highly flexible young adults in challenging positions, including headstand. Mark asks if you advise this type of yoga for him?*

**Safety**

In clinical trials, yoga has generally been shown to be a safe activity. Only about 2.2% of participants experience yoga-related adverse events, and only 0.6% of participants experience serious adverse events (39). These numbers are comparable to usual care or other exercise interventions (40). The most common adverse event reported with respect to yoga practice for back pain is temporarily increased pain (41, 30). Serious adverse events include stroke and glaucoma. These complications are rare (42).

The wide variety of yoga interventions studied and variations in reporting generally preclude assessment of risk by specific type of yoga (39). However, certain postures have demonstrated increased risk of adverse events. The yoga practices most frequently associated with serious adverse

events are headstand, shoulder stand, lotus position (where the practitioner is seated and the legs are crossed such that both feet rest on the opposite thighs), postures requiring the placement of one or both feet behind the head, and intense, forceful breathing practices (42). These practices are generally not recommended for a medical population, and may only be considered on a case by case basis for advanced yoga practitioners under the guidance of a certified yoga instructor.

Overall, yoga is regarded as being as safe as other exercise or usual care, and can be safely practiced by most people under the direction of a certified instructor.

### **Patient case- Mark** *continued*

*Mark returns to your clinic 3 months later and states that he has been practicing yoga with his wife 3-4 times per week. He has not gone to the power yoga class with his daughter. He states that his mood has overall improved since starting yoga. While he still has some back pain, he also feels that yoga has improved both his mobility and pain.*

### **Conclusion**

To date, yoga shows promise as a relatively safe and effective option for patients interested in therapeutic lifestyle change to promote wellbeing, and to help manage hypertension, back pain and overall mental health. However, our review is limited by number of studies, small sample sizes, poor quality data and risk of bias. Additionally, there are many different types of yoga and different elements of yoga practice such as meditation, breathing and postures. Preliminary data suggest that a mix of these elements in the treatment of hypertension could be more beneficial than only practicing one or two of these elements of yoga. These results indicate that more studies are needed to determine the optimal components of a yoga intervention for a given health condition, dosing of the intervention, and method of delivery. Additionally, more studies are needed to discern the safety and efficacy profiles of different styles of yoga, which vary widely in emphasis on the different components of yoga and level of exertion. Still, the current data in aggregate are encouraging, and we hope clinicians will feel more comfortable considering yoga as a therapeutic option for the top conditions seen in primary care.

**Table 7. Level of Evidence**

<b>Condition</b>	<b>Evidence</b>	<b>Level of Evidence</b>	<b>Comments</b>
Hyperlipidemia	Yoga practice improves HDL, LDL, and triglycerides	Level 2	As compared to non-exercise controls (6,7)
Wellbeing in older adults	Yoga practice improves HRQOL and physical functioning in older adults	Level 1	As compared to non-exercise controls (8,9,10,11,12)
Workplace Stress	Yoga practice in the workplace reduces workplace stress	Level 1	Consistent results across varied work settings including healthcare (13)
Wellbeing in incarcerated populations	Yoga practice improves behavior and mental wellbeing in incarcerated women and youth	Level 2	Longer programs show more benefit (14)
HTN	Yoga practice improves SBP and DBP.	Level 1	As compared to non-exercise controls (18,19,20,21)
Back pain	Yoga practice improves chronic back pain and overall function	Level 1	Effect sizes are generally small to moderate as compared to non-exercise controls (26, 27,28,29,30,)
Depression	Yoga practice improves symptoms of depression.	Level 1	When compared to non-exercise and non-medication controls and over a short period of time (34,35)
Anxiety	Yoga practice improves symptoms of anxiety.	Level 2	When compared to no treatment and muscle relaxation (36)

Level 1 - SR/meta-analysis of RCTs with consistent findings. High-quality individual RCT.‡ All-or-none study§



Level 2 - SR/meta-analysis of lower-quality clinical trials or of studies with inconsistent findings.  
Lower-quality clinical trial. Cohort study. Case-control study

Level 3 - Consensus guidelines, extrapolations from bench research, usual practice, opinion, disease-oriented evidence (intermediate or physiologic outcomes only), or case series for studies of diagnosis, treatment, prevention, or screening

Adapted from <https://www.mdedge.com/content/strength-recommendation-taxonomy>

## References:

1. National Center for Complementary and Integrative Health. 2018. *Yoga: What You Need To Know*. Accessed online at: <https://www.nccih.nih.gov/health/yoga-what-you-need-to-know>.
2. Geneen LJ, Moore RA, Clarke C, Martin D, Colvin LA, Smith BH. Physical activity and exercise for chronic pain in adults: an overview of Cochrane Reviews. *Cochrane Database Syst Rev*. 2017;4(4):CD011279. Published 2017 Apr 24. doi:10.1002/14651858.CD011279.pub3
3. Clarke TC, Barnes PM, Black LI, Stussman BJ, Nahin RL. [Use of yoga, meditation, and chiropractors among U.S. adults aged 18 and older](#). NCHS Data Brief, no 325. Hyattsville, MD: National Center for Health Statistics. 2018.
4. Finley CR, Chan DS, Garrison S, et al. What are the most common conditions in primary care? Systematic review. *Can Fam Physician*. 2018;64(11):832-840.
5. Cramer H, Ward L, Steel A, Lauche R, Dobos G, Zhang Y. Prevalence, Patterns, and Predictors of Yoga Use: Results of a U.S. Nationally Representative Survey. *Am J Prev Med*. 2016;50(2):230-235. doi:10.1016/j.amepre.2015.07.037
6. Chu P, Gotink RA, Yeh GY, Goldie SJ, Hunink MG. The effectiveness of yoga in modifying risk factors for cardiovascular disease and metabolic syndrome: A systematic review and meta-analysis of randomized controlled trials. *Eur J Prev Cardiol*. 2016;23(3):291-307. doi:10.1177/2047487314562741
7. Hartley L, Dyakova M, Holmes J, et al. Yoga for the primary prevention of cardiovascular disease. *Cochrane Database Syst Rev*. 2014;(5):CD010072. Published 2014 May 13. doi:10.1002/14651858.CD010072.pub2
8. Sivaramakrishnan D, Fitzsimons C, Kelly P, et al. The effects of yoga compared to active and inactive controls on physical function and health related quality of life in older adults- systematic review and meta-analysis of randomised controlled trials. *Int J Behav Nutr Phys Act*. 2019;16(1):33. Published 2019 Apr 5. doi:10.1186/s12966-019-0789-2
9. Tulloch A, Bombell H, Dean C, Tiedemann A. Yoga-based exercise improves health-related quality of life and mental well-being in older people: a systematic review of randomised controlled trials. *Age Ageing*. 2018;47(4):537-544. doi:10.1093/ageing/afy044
10. Youkhana S, Dean CM, Wolff M, Sherrington C, Tiedemann A. Yoga-based exercise improves balance and mobility in people aged 60 and over: a systematic review and meta-analysis. *Age Ageing*. 2016;45(1):21-29. doi:10.1093/ageing/afv175
11. Eyre HA, Siddarth P, Acevedo B, et al. A randomized controlled trial of Kundalini yoga in mild cognitive impairment. *Int Psychogeriatr*. 2017;29(4):557-567. doi:10.1017/S1041610216002155
12. Reed SD, Guthrie KA, Newton KM, et al. Menopausal quality of life: RCT of yoga, exercise, and omega-3 supplements. *Am J Obstet Gynecol*. 2014;210(3):244.e1-244.e11. doi:10.1016/j.ajog.2013.11.016

13. L M Puerto Valencia, A Weber, H Spegel, R Bögle, A Selmani, S Heinze, C Herr, Yoga in the workplace and health outcomes: a systematic review, *Occupational Medicine*, Volume 69, Issue 3, April 2019, Pages 195–203, <https://doi.org/10.1093/ocmed/kqz033>
14. Auty KM, Cope A, Liebling A. A Systematic Review and Meta-Analysis of Yoga and Mindfulness Meditation in Prison. *Int J Offender Ther Comp Criminol*. 2017;61(6):689-710. doi:10.1177/0306624X15602514
15. United Health Foundation. “America’s Health Rankings, Annual Report (2019).” Accessed online at: <https://www.americashealthrankings.org/explore/annual/measure/Overall/state/WI>.
16. “Wisconsin Chronic Disease Quality Improvement Project: HEDIS® 2018 Summary Data.” Accessed online at: <https://uwmadison.app.box.com/s/miouolyz1reru26u3kes3bbf4yqrcy1w>.
17. American Heart Association. “Cardiovascular Disease: A Costly Burden for America. Projections through 2035.” Accessed online at: [https://www.heart.org/-/media/files/about-us/policy-research/fact-sheets/ucm\\_491543.pdf?la=en](https://www.heart.org/-/media/files/about-us/policy-research/fact-sheets/ucm_491543.pdf?la=en)
18. Hagins M, States R, Selfe T, et al. Effectiveness of yoga for hypertension: Systematic review and meta-analysis. *Evidence Based Complement Alternative Medicine* 2013, 649836 (2013) doi:10.1155/2013/649836
19. Cramer H, Haller H, Lauche R, et al. A systematic review and meta-analysis of yoga for hypertension. *American Journal Hypertension* 2014; 27:1146–1151 doi:10.193/ajh/hpu078
20. Cramer H, Lauche R, Haller H, et al. Effects of yoga on cardiovascular disease risk factors: a systematic review and meta-analysis. *International Journal of Cardiology* 2014; 173:170–183 doi:10.1016/j.ijcard.2014.02.017
21. Wu Y, Johnson BT, Acabchuk RL, et al. Yoga as antihypertensive lifestyle therapy: a systematic review and meta-analysis. *Mayo Clinic Proceedings* 2019 Mar;94(3):432-446. doi: 10.1016/j.mayocp.2018.09.023
22. Wolff M, Sundquist K, Larsson Lönn S, Midlöv P. Impact of yoga on blood pressure and quality of life in patients with hypertension - a controlled trial in primary care, matched for systolic blood pressure. *BMC Cardiovasc Disord*. 2013;13:111. Published 2013 Dec 7. doi:10.1186/1471-2261-13-111
23. Sarah S, Wolfgang MB, Claudia P. Effect of telerehabilitation on long-term adherence to yoga as an antihypertensive lifestyle intervention: results of a randomized controlled trial. *Complementary Therapies in Clinical Practice* 2019 May;35:148-153. doi: 10.1016/j.ctcp.2019.02.001.
24. Katz JN. Lumbar disc disorders and low-back pain: socioeconomic factors and consequences [review]. *J Bone Joint Surg Am*. 2006;88(suppl 2): 21-24.
25. Quartz case study: Impact of Kiio on medical utilization and spend. America’s Health Insurance Plans. [https://www.ahip.org/wp-content/uploads/kiioQuartzCaseStudy\\_AHIP.pdf](https://www.ahip.org/wp-content/uploads/kiioQuartzCaseStudy_AHIP.pdf). Published 6/3/2019. Accessed 5/29/2020.

26. Zou L, Zhang Y, Yang L, et al. Are Mindful Exercises Safe and Beneficial for Treating Chronic Lower Back Pain? A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *J Clin Med*. 2019;8(5):628. Published 2019 May 8. doi:10.3390/jcm8050628
27. Cramer H, Lauche R, Haller H, Dobos G. A systematic review and meta-analysis of yoga for low back pain. *Clin J Pain*. 2013;29(5):450-460. doi:10.1097/AJP.0b013e31825e1492
28. Wieland LS, Skoetz N, Pilkington K, Vempati R, D'Adamo CR, Berman BM. Yoga treatment for chronic non-specific low back pain. *Cochrane Database Syst Rev*. 2017;1(1):CD010671. Published 2017 Jan 12. doi:10.1002/14651858.CD010671.pub2
29. Chou R, Deyo R, Friedly J, et al. Nonpharmacologic Therapies for Low Back Pain: A Systematic Review for an American College of Physicians Clinical Practice Guideline. *Ann Intern Med*. 2017;166(7):493-505. doi:10.7326/M16-2459
30. Skelly AC, Chou R, Dettori JR, et al. Noninvasive Nonpharmacological Treatment for Chronic Pain: A Systematic Review Update. Rockville (MD): Agency for Healthcare Research and Quality (US); 2020.
- 30.
31. Andronis L, Kinghorn P, Qiao S, Whitehurst, DG; Durrell S; et al. Applied Health Economics and Health Policy; Auckland Vol. 15, Iss. 2, (Apr 2017): 173-201. DOI:10.1007/s40258-016-0268-8
32. Substance Abuse and Mental Health Services Administration. "Key Substance Use and Mental Health Indicators in the United States: Results from the 2018 National Survey on Drug Use and Health." Accessed online at: <https://www.samhsa.gov/data/sites/default/files/cbhsq-reports/NSDUHNationalFindingsReport2018/NSDUHNationalFindingsReport2018.pdf>
33. Streeter CC, Whitfield TH, Owen L, et al. Effects of yoga versus walking on mood, anxiety, and brain GABA levels: a randomized controlled MRS study. *J Altern Complement Med*. 2010;16(11):1145-1152. doi:10.1089/acm.2010.0007
34. Cramer H, Lauche R, Langhorst J, Dobos G. Yoga for depression: a systematic review and meta-analysis. *Depress Anxiety*. 2013;30(11):1068-1083. doi:10.1002/da.22166
35. Cramer H, Anheyer D, Lauche R, Dobos G. A systematic review of yoga for major depressive disorder. *J Affect Disord*. 2017;213:70-77. doi:10.1016/j.jad.2017.02.006
36. Cramer H, Lauche R, Anheyer D, et al. Yoga for anxiety: A systematic review and meta-analysis of randomized controlled trials. *Depress Anxiety*. 2018;35(9):830-843. doi:10.1002/da.22762
37. Falsafi N. A Randomized Controlled Trial of Mindfulness Versus Yoga: Effects on Depression and/or Anxiety in College Students. *J Am Psychiatr Nurses Assoc*. 2016;22(6):483-497. doi:10.1177/1078390316663307

38. Lundt A, Jentschke E. Long-Term Changes of Symptoms of Anxiety, Depression, and Fatigue in Cancer Patients 6 Months After the End of Yoga Therapy. *Integr Cancer Ther.* 2019;18:1534735418822096. doi:10.1177/1534735418822096
39. Cramer H, Ward L, Saper R, Fishbein D, Dobos G, Lauche R. The Safety of Yoga: A Systematic Review and Meta-Analysis of Randomized Controlled Trials. *Am J Epidemiol.* 2015;182(4):281-293. doi:10.1093/aje/kwv071
40. Cramer H. The Efficacy and Safety of Yoga in Managing Hypertension. *Exp Clin Endocrinol Diabetes.* 2016;124(2):65-70. doi:10.1055/s-0035-1565062
41. Chang DG, Holt JA, Sklar M, Groessl EJ. Yoga as a treatment for chronic low back pain: A systematic review of the literature. *J Orthop Rheumatol.* 2016;3(1):1-8.
42. Cramer H, Krucoff C, Dobos G. Adverse events associated with yoga: a systematic review of published case reports and case series. *PLoS One.* 2013;8(10):e75515. Published 2013 Oct 16. doi:10.1371/journal.pone.0075515

# Taylor Boland Rigby, MD

## Projects Completed During Residency:

### Community Health Learning Experience:

The Lion Project: Advocating for Addiction Treatment in the Jail System

### Scholarly Project:

Innovative Partnerships to Support the Treatment of Opioid Use Disorder in a Rural Teaching Clinic:

Rural areas face particular challenges in treating opioid use disorder due to the lack of prescribers offering medication for opioid use disorder (MOUD), scarce behavioral health resources, and lack of specialty support. The Rural Health Equity Track (RHET) emphasizes leadership and advocacy skills that help address these challenges. Our clinic collaborates with the Green County Human Services Department, who offers counseling for relapse prevention and refers patients to our clinic for MOUD. At the international WONCA meeting in New Mexico in October 2019, we presented our framework for starting and sustaining a MOUD program, hopefully inspiring primary care clinicians to offer MOUD, particularly in rural residency training tracks.



*I would like to thank my wonderful husband, Michael, and my family for supporting me throughout my residency. I could not have made it through all of the nights and long hours without them. It is my family who has shaped the person I am today and inspired my passions for rural medicine. I am also extremely appreciative of everyone at Belleville Clinic who have helped me to become a compassionate, hopefully competent physician. Lastly, even though she made her appearance late in residency, I am so grateful for my daughter Eliana, who reminds me every day of what is important.*



Taylor Boland views family medicine as more than just patient care. Although she is especially interested in rural, addiction, and integrative medicine, Taylor is also active in advocacy and community engagement. Taylor is from rural Stoddard, WI (near La Crosse). She received

her undergraduate degree in Biological Sciences and Spanish from the University of Notre Dame. Taylor returned to Wisconsin to earn her medical degree from the University of Wisconsin School of Medicine and Public Health. Taylor is an advocate, having been involved with multiple professional societies on local, state, and national levels. She has written resolutions and advocated for a variety of policies including infant mortality, opioid use, and alcohol abuse. She has offered testimony during bill hearings and met with legislators on several occasions to discuss upcoming bills and how they impact the healthcare system. While in medical school, Taylor created "Every Patient Has a Story" which is a narrative medicine project that interviews hospital patients about their life stories in order to provide more holistic care and better understand their medical needs. Taylor also traveled to China to learn about their healthcare system and how to incorporate integrative medicine techniques to supplement Western medicine. Taylor enjoys running, hunting, and cheering on Wisconsin sports; nowadays you can most often find her spending time with her husband and 7 month old daughter.

# **The Lion Project: Advocating for Addiction Treatment in the Jail System**

Taylor Boland Rigby, MD

## **Background**

This learning experience addresses access to medication for opioid use disorder (MOUD) for patients while they are in the jail system. Since initiating MOUD at the UW Belleville clinic, it has been noted that patients who are jailed often have their MOUD stopped, particularly suboxone. This significantly increases our patients' risk of overdose and death; it is well known that those released from jail are 13 times more likely to die of drug overdose within the first 2 weeks after release. In speaking with physicians across the state, it appears it is commonplace that suboxone and methadone are not offered within correctional facilities. So, it was my goal with this project to identify barriers to treating MOUD within the jail system and advocate for full access of all MOUD (naltrexone, methadone, and buprenorphine) within jails. Given my interest in organized medicine, I chose to make formal advocacy an important part of my project in hopes of achieving formal, lasting legislative change in this area. Community partners included Green County Human Services Department, Vernon County Sheriff's Office, La Crosse County Sheriff's Department, Dane County jail system, the Wisconsin Medical Society, the Wisconsin Opioid Task Force, the Wisconsin Department of Health Services, and American Academy of Family Physicians.

## **Objectives**

As noted above, I was attempting to increase access to all MOUD, particularly suboxone, within the jail systems in Wisconsin. It was my goal to achieve this through legislative advocacy and also through local partnerships within jail systems in Wisconsin.

## **Methods**

I initially researched the breadth of this problem and how other states had addressed this concern and achieved broader access to MOUD. Historically, this has happened locally with improved partnerships between physicians and the jail system. So, several members of our clinic met with Green County officials to discuss barriers to offering buprenorphine within the jail system. Several were identified, including discomfort in prescribing opioids among the jail physicians as well as officers taking care of the patients. Recognizing these barriers, I attempted to work with the Wisconsin DHS and several jails within Wisconsin to educate officials about the safety and efficacy of buprenorphine. Unfortunately the COVID-19 pandemic stalled these efforts. On the state level, I worked with the WMS and Opioid Task Force to testify on legislation that would expand MOUD access within all jail and prison systems within the state. Lastly, I reached out to my own patients on MOUD about their experiences with limited access to MOUD within the jail system. I collected their stories with the intention of providing patient-centered insight when educating state officials.

## **Results**

After testifying in the Assembly Committee on Substance Abuse and Prevention in support of Assembly Bill 645 in January 2020, the bill passed. This bill requires the DHS to work with the Department of Corrections to study MOUD within the jail system and develop a pilot project to offer all forms of MOUD, including buprenorphine, within at least one county jail or prison. Again,

due to the COVID-19 pandemic, the start date for this study and pilot has been delayed. I wrote several resolutions exploring the ability for primary care physicians to offer methadone as MOUD for our patients. Despite this being a complicated, nuanced issue, I do think it is important for physicians to be able to provide all forms of MOUD to their patients if appropriate. As a result, the resident group of the AAFP now supports the use of methadone within the primary care setting for trained individuals. Currently, the AMA is researching this issue. After our clinic's meeting with Green County jail staff, I put together a handout of information and guidance on MOUD use within the Green County jail and the best ways to continue buprenorphine use for our patients. This information is available to clinic staff and physicians who may be struggling to advocate for buprenorphine use for their patient within the Green County jail. As mentioned above, due to the current pandemic I am still in the process of forming connections with jail systems and bridging disconnects between patients and jail leadership. I am compiling a handout of facts about MOUD as well as patient perspectives regarding MOUD within the jail system. I plan to utilize this handout when I connect with the sheriff's offices of Green, Dane, Vernon, and La Crosse counties. I am fortunate to be staying an additional year as an Academic Fellow and will continue to prioritize this work as part of my academic projects.

## **Conclusions**

My current handout about MOUD use within the Green County jail is available everyone at the Belleville Clinic and will hopefully help to give guidance when patients are told they will be taken off of MOUD when jailed. I plan to distribute my comprehensive handout of MOUD and patient perspectives to all interested within our clinic and residency program. I learned a lot through this project, most importantly how difficult it is to effect change in a large system. Fortunately I was able to contribute to a bill being passed that would help achieve my primary goal of expanded MOUD access within the jails. However, I know that this will take several years to take effect when our patients need help now. There are several systemic barriers to compassionate addiction care within our jails, but I have learned that direct partnerships with local agencies can help significantly to break down those barriers with education and patient perspectives. As this project continues, I would recommend spending more time directly working with the Green County Human Services Department. I think this would create more tangible change within the course of a resident CHLE, while broader advocacy efforts will take much longer to achieve the goals listed above.

Future steps for this project include continuing to reach out and communicate with jail systems and putting together data from WI county jail systems about barriers to prescribing MOUD. This information is vital as I put together a handout that can educate the Wisconsin DHS and statewide jail systems. Dr. Landeck is part of a group that obtained a grant from the Wisconsin DHS to pilot telehealth services within jail systems. One of this group's goals is to offer addiction treatment and perhaps even begin MOUD prior to leaving the jail. This is in line with my CHLE goals, and I look forward to working with Dr. Landeck's group during my fellowship year to advance this project.

## **Acknowledgments**

I would like to wholeheartedly thank Jillian Landeck for being my mentor not only with this CHLE, but also for MOUD in general. It is a strong interest of mine that has only grown through residency. I also want to extend a big thank you to Green County Human Services Department for their work



on MOUD within the jail system and their assistance with this learning experience. Lastly, I would like to thank my husband for initially getting me involved in advocacy and helping me to find my voice within the large, scary system that is organized medicine. I have met amazing advocates along the way, and because of these people I am hopeful for the future of medicine.

**TO:** Assembly Committee on Substance Abuse and Prevention

**FROM:** Taylor Boland Rigby, MD

**DATE:** January 8, 2020

**RE:** Support for HOPE Legislation  
AB 645 – Medication Assisted Treatment (MAT) for Prisons and Jails  
AB 646 – Recovery Residences and State Employee MAT  
AB 647 – Prescription Drug Monitoring Program Extension  
AB 650 – Peer Recovery Coaches  
AB 651 – Good Samaritan Extension

Good afternoon Mr. Chairman and esteemed members of the Substance Abuse and Prevention Committee. My name is Dr. Taylor Boland Rigby. I earned my medical degree here at the University of Wisconsin and am currently a second year resident at UW in Family Medicine. I work in several of the hospitals here in Madison as well as in the rural community of Belleville, WI. I am here today to testify **in support** of the most recent round of the Heroin, Opioid Prevention and Education (HOPE) bills.

Wisconsin has been a leader in tackling the opioid crisis that has afflicted so many in our community. At national conferences, I have been proud to say that I am from Wisconsin while discussing what further measures can be taken to combat this epidemic. As the state's largest physician organization, the Wisconsin Medical Society has been a vital partner with the Legislature to create solutions to the opioid crisis and to help those who are struggling with addiction. Physicians throughout Wisconsin, like many of yourselves, have witnessed first-hand the impacts that addiction has on our patients, families and communities. The Society has worked tirelessly to promote opioid education throughout the state with the goal of improving both physician practice and patient outcomes. However, much work remains to be done.

This most recent round of HOPE legislation focuses on increasing access to treatment for those suffering from opioid addiction. Specifically, we are supportive of both AB 645 and AB 646 which would increase the use of medication assisted treatment, also known as MAT, for prison populations. They also create needed employee protections for those under a prescribed MAT program. MAT is the use of one of three medicines (methadone, naltrexone, or buprenorphine) to decrease cravings and withdrawal in a monitored medical setting with the goal of achieving sobriety. Evidence proves that MAT is an effective way to manage opioid addiction, allowing patients to live productive and meaningful lives. Increasing access to MAT, particularly for at-risk populations, will help those who would likely suffer from withdrawal and/or relapse and act as a foundation for continued sobriety. Evidence shows persons recently incarcerated are anywhere from 40-120 times more likely to overdose and die. Programs that have offered MAT in jails have led to 60-85% decreases in overdose death. MAT is life-saving and, as one of my patients said last week, "the best decision I have made in my entire life." With patients that are on a particular MAT medicine, it is important that they remain stable by continuing their specific form of MAT. Several of my patients on MAT have fled rather than go to jail due to fear that their buprenorphine would not be continued. Thus, piloting the use of all forms of MAT in the jail system is a crucial step towards successful treatment of opioid addiction. While some people have concerns that MAT medicines can be diverted in the jail, there are several ways to mitigate this risk including monitored

administration and using the dissolvable form of buprenorphine. We are also supportive of the use of recovery residences under AB 646 as a means to help those who suffer from opioid use disorder integrate back into their communities.

The Society is also supportive of AB 650 and the use of peer recovery coaches as another evidence-based treatment for opioid use disorder. The 2018 report stated that peer recovery coaches and recovery specialists are a viable option to help coordinate care for patients upon their discharge for an overdose.<sup>1</sup> Another study showed that the use of a peer recovery coach along with naloxone in the emergency department is an acceptable treatment and one that can be maintained over time.<sup>2</sup> The recent addition of a peer recovery coach in Green County has been an overall positive experience for our patients; this coach is available for therapy sessions, informal conversations, and even rides to appointments.

Lastly, the Society supports the extension of the Prescription Drug Monitoring Program requirement (AB 647) and the repeal of the sunset date for the “Good Samaritan” Law (AB 651). Opioid prescriptions have steadily decreased by 35 percent since 2015.<sup>3</sup> This decrease suggests that the requirement to check the PDMP has helped to reduce opioid prescribing. It is the hope of the Society that checking the PDMP becomes a best practice for Wisconsin physicians and that ultimately this requirement would no longer be needed. However, we support the extension pending future conversations and data. Repealing the sunset on the Good Samaritan Law is a commonsense update to a necessary law that helps people get access to care at the most critical moments.

I thank the Committee for giving me the opportunity to testify in support of this important legislation.

<https://www.mass.gov/files/documents/2017/08/31/legislative-report-chapter-55-aug-2017.pdf>

Ranapurwala SI, Shanahan ME, Alexandridis AA, et al. Opioid Overdose Mortality Among Former North Carolina Inmates: 2000-2015. *Am J Public Health*. 2018;108(9):1207–1213. doi:10.2105/AJPH.2018.304514

Green TC, Clarke J, Brinkley-Rubinstein L, et al. Postincarceration Fatal Overdoses After Implementing Medications for Addiction Treatment in a Statewide Correctional System. *JAMA Psychiatry*. 2018;75(4):405–407. doi:<https://doi.org/10.1001/jamapsychiatry.2017.4614>

Marsden J, Stillwell G, Jones H, Cooper A, Eastwood B, Farrell M, Lowden T, Maddalena N, Metcalfe C, Shaw J, Hickman M. Does exposure to opioid substitution treatment in prison reduce the risk of death after release? A national prospective observational study in England. *Addiction*. 2017 Aug;112(8):1408-18.

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<sup>1</sup> <https://legis.wisconsin.gov/assembly/hope/media/1161/wisconsin-final-report-final.pdf>

<sup>2</sup> <https://www.ncbi.nlm.nih.gov/pubmed/30074673>

<sup>3</sup> <https://pdmp.wi.gov/Uploads/2019%20Q1%20CSB.pdf>

1 **RESOLUTION NO. R1-406**

2  
3 **Prescribing methadone for opioid use disorder in the primary care setting**

4  
5 Introduced by: Erika Rothgeb, MD  
6 Taylor Boland, MD  
7

8 WHEREAS, Opioid abuse and addiction has been declared an “epidemic”, and

9  
10 WHEREAS, every day 130 people in the United States overdose on opioids, and

11  
12 WHEREAS, eighty percent of people addicted to opioids do not receive treatment, and

13  
14 WHEREAS, the Narcotic Addiction Treatment Act of 1974 allows for treatment of opioid use  
15 disorder (OUD) with methadone only by federally licensed narcotic treatment programs, and

16  
17 WHEREAS, accessing a federally licensed methadone clinic daily is difficult for several patient  
18 populations including those with long work schedules and in rural areas, because 92% of  
19 methadone clinics are located in urban areas, and

20  
21 WHEREAS, primary care clinics are allowed to prescribe other opioid agonist therapy such as  
22 buprenorphine for OUD without requiring additional federal licensing as a narcotic treatment  
23 program, and

24  
25 WHEREAS, primary care providers are allowed to prescribe methadone for chronic pain and  
26 other pain related conditions without an additional federal license, and

27  
28 WHEREAS, treatment of OUD by the patient’s primary care provider also allows for concurrent  
29 treatment and evaluation of side effects and co-morbidities, thus providing more comprehensive  
30 care, now, therefore, be it

31  
32 **RESOLVED**, That the American Academy of Family Physicians advocate for methadone  
33 maintenance treatment within primary care clinics without a required separate federal license.

# Jonathan Christ, MD

## Projects Completed During Residency:

### Community Health Learning Experience:

Wingra Resource Navigator Program

### Scholarly Project:

Custom vs. Prefabricated Orthotics for Treatment of Plantar Fasciitis:

A summary of evidence for custom and prefabricated orthotics was reviewed, synthesized and submitted to FPIN for evaluation. The review of evidence revealed the lack of evidence supporting custom orthoses for the treatment of plantar fasciitis, especially with regards to cost benefit. The literature review also revealed a need for further research comparing foot orthoses to other conservative cares such as ice, stretching, and anti-inflammatory medication.



Jonathan (Jon) Christ enjoys partnering with his patients to work collaboratively to achieve their health goals. Jon is originally from Kalamazoo, MI and attended Michigan State University for his undergraduate degree in human biology. After graduating from Michigan

State, Jon earned his medical degree from Wayne State University School of Medicine in Detroit. While in medical school, Jon volunteered at many organizations in downtown Detroit to provide medical and social services to the homeless population. This included providing care, making and distributing meals, and working to clean up polluted areas. Jon's interest in family medicine stems from his experience rotating in inner-city hospitals in Detroit as well as coordinating blood pressure screenings for senior citizens. Jon strives to build strong relationships with each of his patients so he can better understand their medical, social, and family situations to provide the best care. Jon has a special interest in sports medicine, but he is always looking forward to work with all patients and conditions. He enjoys spending time with family and friends and playing golf and basketball.



*Thank you to:*

- My Parents for always being available for encouragement and support.*
- My co-residents, I couldn't imagine going through residency with a better crew.*
- DFMCH faculty for the unrelenting encouragement, support, and guidance.*
- DFMCH administrative staff for putting up with my never ending scheduling requests and untimely email responses.*

## **Wingra Resource Navigator Program**

Jonathan Christ, MD & Carly Salter, MD

### **Background**

The Wingra Resource Navigator Program is aimed to identify Wingra patients who are in need of essentials that play a role in their health such as food, housing, transportation, etc. The patient populations we serve at Wingra Clinic are often disadvantaged financially and use our clinic as their main community resource. With the assistance of prior project contributors familiar with the Resource Navigator program at our clinic, undergraduate student navigator volunteers were trained to assist the social work team in connecting our patients with the community resource they needed.

### **Objectives**

Our goal was to further integrate the resource navigators into the workflow at Wingra Clinic since there was little communication between providers and the navigators. We sought to integrate the navigators into clinic huddles and provide them with the list of patients being seen in the clinic the following day so that they could be aware of when their patients were being seen in clinic. This would enable them to reach out to providers in order to work together on addressing the patients' needs since they do not have access to our electronic medical record. We also strove to increase awareness about the Resource Navigator program among providers in clinic.

### **Methods**

We held meetings with clinic leadership and resource navigator leaders to identify disconnects between providers and student navigators.

During a resident education afternoon at Wingra in Fall 2019, we presented the background information about the resource navigators to the providers in clinic and encouraged providers to reach out about patients with concerns about resources.

Screening forms were created during the COVID-19 pandemic and handed to patients at check in and were to be returned and collected by Sheray Wallace to identify individuals in need.

### **Results**

The daily patient schedule was printed out by the reception staff on the day prior and given to the resource navigators so that they could identify when their patients would be seen and would reach out to providers prior to the visits. This was implemented and a few weeks later, the COVID-19 shutdown was implemented and navigators were removed from clinic.

The resident education afternoon increased awareness of the Resource Navigator Program and its potential role in the care of our patients.

The screening forms were infrequently filled out because patients were simply handed the forms without an explanation of what they were for and just threw them away or took them home with them.

### **Conclusions**

The impact of our efforts to connect clinic providers and student navigators was complicated by the onset of the COVID-19 pandemic as the student navigators that were an integral component to our improvement plan were no longer present in the clinic as a precaution. Prior to the pandemic, our efforts at resident education afternoons increased clinic utilization of the student navigators as a resource to identify and connect patients to their needed resources. The implemented screening forms created during the pandemic helped Sheray Wallace and the student navigator team stay connected with in need patients despite their absence at Wingra Clinic.

### **Acknowledgements**

Sheray Wallace, Lane Hanson, Kirsten Rindfleisch, Sean Duffy, Mary Vasquez, John Tovar

# Diana Cowdrey, MD

## Projects Completed During Residency:

### Scholarly Project:

Do Carotid Artery Calcifications Seen on Radiographs Predict Carotid Artery Stenosis in Asymptomatic Adults?

### Community Health Learning Experience:

Community Cooking Classes at Badger Prairie Needs Network:

The Badger Prairie Needs Network (BPNN) is an all-volunteer nonprofit organization that runs one of the busiest food pantries in Dane County. I helped facilitate two cooking classes that are offered at BPNN: ChopChop cooking classes for children and their families and Badger Prairie Cooking Club for seniors. These classes help to frame how individuals approach food by emphasizing the importance of nutrition, cooking, and intentional mealtime.



Diana Cowdrey chose to become a family doctor because of the care they provide throughout a patient's entire life. Diana is from Cambridge, MA, but came to the University of Wisconsin – Madison for her undergraduate degree in biology and for an additional research year

in the Department of Neuroscience. She completed the intensive honors biology program and served as a peer mentor and peer mentor coordinator. While there, Diana also played on the UW Women's Club Ice Hockey team. She then returned to Cambridge to earn her medical degree from Tufts University School of Medicine. While in medical school, Diana worked with a pediatric oncology patient as part of her support team during all her appointments and hospitalizations. Diana also worked as a senior medical student to dissect ahead of the first year anatomy class and to teach them the subject material as well as help them with their own dissections. Within family medicine, Diana is particularly interested in musculoskeletal and sports medicine. She believes that every individual should be active and hopes to treat everyone from those just finding their inner athlete to professional athletes. Diana enjoys playing hockey, watching college football, playing with dogs, sailing, and fitness.



*I would like to thank my co-residents for their support and friendship over the last three years. Thank you to the amazing staff and faculty both at the DFMCH and especially at the Verona Clinic. I am forever grateful to my family and friends who have made this adventure possible.*



## Do Carotid Artery Calcifications Seen on Radiographs Predict Carotid Artery Stenosis in Asymptomatic Adults?

Diana Cowdrey, MD

### CI Question

Do carotid artery calcifications seen on radiographs predict carotid artery stenosis in asymptomatic adults?

### Evidence-Based Answer

In asymptomatic patients, carotid artery calcification seen on radiograph has a positive predictive value of 70% and a negative predictive value of 75% for carotid artery stenosis. (strength of recommendation [SOR]: B, systematic review with observational studies with heterogeneous results and retrospective cohort study). Carotid calcifications on radiographs may be more predictive of carotid stenosis in people with atherosclerotic risk factors (SOR: C, cross sectional study).

### Evidence Summary

A meta-analysis (12 observational studies, n=1002) compared the diagnostic accuracy of panoramic radiography (PR) to Doppler ultrasonography (11 studies) or angiography (1 study) in detecting calcified carotid artery atheroma (CCAA) (1). The studies conducted in eight countries were published after 2006. Patients were 29-71 years old without history of stroke, endarterectomy, angioplasty or renal disease. The pooled analysis sensitivity of PR to detect CCAA was 73% (95% confidence interval [CI], 69 – 77%), ranging from 31 – 95%, and pooled analysis specificity was 72% (95% CI, 25 – 63%), ranging from 19 – 99%. The pooled positive predictive value was 70% (95% CI, 66-74%), ranging from 37- 95%, and negative predictive value was 75% (95% CI, 71-79%), ranging from 43% - 93%. Pooled positive likelihood ratio was 2.32 (95% CI, 1.49 – 3.60) and negative likelihood ratio was 0.40 (95% CI, 0.25 – 0.63). Seven studies had high risk of patient selection bias, and most had methodological limitations.

A retrospective cohort study (n=778) from the United States identified carotid artery calcifications on routine dental radiographs in patients  $\geq 55$  years old and prospectively performed duplex ultrasound (DUS) to assess for significant carotid stenosis ( $\geq 50\%$ ) (2). Twenty-seven patients (3.5%) had carotid artery calcifications on radiographs, and 20 of those patients underwent DUS of bilateral carotid arteries (40 sides). Of twenty-six sides with calcifications on radiograph, 13 (50%) had stenosis confirmed with DUS. Of the 14 sides without calcification on radiograph, three (21%) had stenosis on DUS. The positive predictive value for calcification on panoramic radiograph predicting significant carotid stenosis was between 40-80%.

A cross sectional study from Sweden looking for surgical candidates for asymptomatic carotid endarterectomy performed panoramic radiographs of 1182 patients (3). Calcifications were found in 178 people, and 117 of those were eligible for asymptomatic carotid endarterectomy (age 18-74, no cancer or other serious comorbidity, and no prior stroke or TIA) and underwent ultrasound to assess for significant carotid stenosis  $\geq 50\%$ . Of the 117 participants who underwent ultrasound, eight participants (6.8%; 95% CI, 2.2-11.5%), all men, were found to have significant carotid stenosis. Compared to a sex- and age-matched reference group (n=119) with no calcifications on

PR, the prevalence of carotid stenosis was significantly higher in men (12.5%; 95% CI, 4.2-20.8%) and patients currently smoking (19%; 95% CI, 0.7-37.4%), taking cholesterol medications (13.1%; 95% CI 4.4-21.8%), and with cardiovascular event history (15.9%; 95% CI, 7-27.2%).

## Recommendations from Others

The United States Preventive Services Task Force, Choosing Wisely initiative, and American Academy of Family Physicians do not mention carotid screening with radiographs but recommend against screening for carotid artery stenosis in asymptomatic adults because risks of screening outweigh potential benefits (5,6).

## References

1. Schroder AGD, de Araujo CM, Guariza-Filho O, Flores-Mir C, de Luca Canto G, Porporatti AL. Diagnostic accuracy of panoramic radiography in the detection of calcified carotid artery atheroma: a meta-analysis. *Clin Oral Investig*. 2019;23(5):2021-2040. [STEP 1]
2. Almog DM, Horev T, Illig KA, Green RM, Carter LC. Correlating carotid artery stenosis detected by panoramic radiography with clinically relevant carotid artery stenosis determined by duplex ultrasound. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod*. 2002;94(6):768-773. [STEP 3]
3. Johansson EP, Ahlqvist J, Garoff M, Karp K, Jäghagen EL, Wester P. Ultrasound screening for asymptomatic carotid stenosis in subjects with calcifications in the area of the carotid arteries on panoramic radiographs: a cross-sectional study. *BMC Cardiovasc Disord*. 2011;11:44. [STEP 3]
4. United States Preventive Services Task Force. Carotid artery stenosis: Screening. <https://www.uspreventiveservicestaskforce.org/uspstf/recommendation/carotid-artery-stenosis-screening>. United States Preventive Services Task Force. Published July 8, 2014. Accessed August 29, 2020. [STEP 5].
5. Choosing Wisely. American Academy of Family Physicians: Don't screen for carotid artery stenosis (CAS) in asymptomatic adult patients. <https://www.choosingwisely.org/clinician-lists/american-academy-family-physicians-carotid-artery-stenosis/>. Choosing Wisely. Published February 21, 2013. Accessed August 29, 2020. [STEP 5]

# Robert Freidel, MD

## Projects Completed During Residency:

### Community Health Learning Experience:

Adapting an In-Clinic Community Resource Navigator Program to a Virtual Referral Model

### Scholarly Project:

Reducing Coding and CDI Queries with Advanced Clinical Documentation Tools:

Appropriate clinical documentation is necessary for quality, communication, reimbursement, research, and legal purposes. When documentation is unclear or deficient, clinicians often receive coding and clinical documentation improvement (CDI) queries requesting diagnostic clarification or additional management details. Queries are a source of administrative burden among clinicians and coding specialists. Improved documentation at large healthcare centers can result in millions of dollars of increased charges. We aimed to decrease the frequency of clinical documentation queries on an inpatient family medicine service. Within standardized H&P and progress notes, we implemented clinical documentation tools including disappearing help text, collapsible sections, “carry-forward” components, auto-populated consult assessments, and specialty-tailored CDI tip cards. Data indicate a significant reduction in the CDI query rate from 43% to 26%. Secondary outcomes included improved comorbid condition capture, reduced documentation length and time, and better compliance. We propose ways for other institutions to replicate these results and discuss strategies to navigate implementation challenges.



Bob was raised near cows and cornfields in a small town called Byron just outside of Rockford, Illinois. He grew to appreciate rural and urban living and hoped to one day serve people from all walks of life, which is why he was drawn to Family Medicine. Bob

studied biochemistry at the University of Wisconsin - Madison. After graduating, he worked at Epic Systems Corporation where he focused on software for ambulatory clinics and federal regulations. Bob earned his medical degree from the University of Illinois College of Medicine at Rockford. While in Rockford, Bob analyzed Rockford's social and economic factors of health and identified root causes of poor health and provided recommendations to community leaders and agencies. Among his many interests in providing full-spectrum family medicine, Bob seeks to provide exceptional primary healthcare, inspire lifestyle modification, better utilize healthcare information technology, and advocate for primary care at all levels. Outside of work, Bob can be found downhill skiing, water-skiing, playing piano, running, biking, and mixing fresh cocktails with friends and family.



*I wish to acknowledge the support, patience, and great love of my wife, Makenzie; my parents, Rod and Maria; and my co-residents. They kept me balanced throughout residency and ensured I had some fun along the way!*

# **Adapting an In-Clinic Community Resource Navigator Program to a Virtual Referral Model**

Robert Freidel, MD

## **Background**

As healthcare delivery shifted toward telehealth in spring 2020 due to the COVID-19 pandemic, patient needs for remote social assistance at UW Health Northeast Family Medical Center increased. Northeast Clinic is an academic family medical center in a socioeconomically disadvantaged neighborhood of Madison, Wisconsin, serving approximately 10,000 patients. We work with the Community Resource Navigator Program (CRNP), a group led by social workers and undergraduate student “Navigators” who have extensive knowledge of local social, financial, and legal resources.

Prior to the COVID-19 pandemic, Navigators worked on-site and our clinicians referred patients to an in-person intake or provided a personal introduction to the Navigators for patients who screened positive for socioeconomic needs by a paper screening survey. In response to new infection control guidelines in spring 2020, Navigators transitioned to working remotely and connecting with clinicians and patients by phone. Given the program’s previous reliance on in-person contact (completing a handwritten screening survey and commonly performing an initial intake with Navigators face-to-face), preceding residents and medical students created a series of interviews with clinicians and staff to identify barriers and opportunities to screening and referring patients to the CRNP.

## **Objectives**

Our objectives were to respond to feedback from the interviews, develop multiple opportunities for patients to be screened and connected to the CRNP, and evaluate our clinicians’ perspectives of the new workflows. My specific roles were to develop and communicate new and approved telemedicine referral workflows and to conduct a follow-up assessment of the new screening and referral processes.

## **Methods**

Working with our community partners and clinicians, we designed a multifaceted screening and referral process. We established a “universal screening” protocol, providing all patients at office visits with a small handout about the CRNP and how to contact a Navigator. We developed an approved list of referral options for clinicians to utilize whether their patient was in-person or virtual. The updated list was communicated via email, clinic education sessions, and an electronic health record smartphrase accessible to all Northeast clinicians.

Following a two-month trial period, providers (faculty, residents, and advanced practice providers) were surveyed regarding their referral methods and preferences and were asked to provide feedback on the CRNP and its associated workflows. Questions included:

- Please estimate, on average, how often you suggested a patient connect with the CRNP over the last two months.
- When you identify a patient who may benefit from CRNP's services during an in-person visit, how do you connect the patient to the CRNP?

- When you identify a patient who may benefit from CRNP's services during a telehealth visit, how do you connect the patient to the CRNP?
- Please describe the challenges, if any, you experienced when connecting patients to the CRNP over the past two months.
- What suggestions, questions, comments, or ideas do you have about the CRNP and its related referral workflows?

## **Results**

There were 26 surveys administered and we received 20 completed surveys. Results suggested that most clinicians contact the Navigators on the patients' behalf. In other cases, clinicians provide the CRNP contact information to patients who then contact the Navigators on their own. Top feedback trends included a desire for bidirectional communication with the CRNP to ensure patient follow-up, a lack of time to address resource issues during standard office visits, insufficient education regarding CRNP's services and referral workflows, and recommendations for new or enhanced referral processes. These results were shared with the clinic and CRNP stakeholders.

## **Conclusions**

Despite an increase in telehealth and a shift to new workflows that limit physical interactions in clinics, it has remained a priority in primary care to connect patients with available resources to address their unmet social needs. This can be achieved by integrating off-site community partners into clinic workflows. Clinics can continue to connect patients with Navigators or similar programs by providing team members and patients with multiple pathways for screening and referrals, creating a flexible and telehealth compatible system. These strategies can be used to create and reinforce meaningful community-clinic partnerships that can help patients overcome structural and systemic barriers to health.

We intend to continue working with the CRNP to improve patient accessibility to resources and optimize provider referral processes to the CRNP. Next steps include discussing these results with the Patient/Family Advisory Committee and applying an equity lens to future projects.

## **Acknowledgments**

Community Resource Navigator Program; UW Health Northeast Family Medical Center; KJ Hansmann, MD, MPH; Allison Jenness, MD; Julia Alberth; Lane Hanson, MSW; Jennifer Edgoose, MD, MPH

# Parker Hanson, DO

## Projects Completed During Residency:

### Scholarly Project:

A Case of a Tough Race

### Community Health Learning Experience:

Sugar Creek Elementary Virtual Imagination Fair:

As part of the Community Health Learning Experience, I worked on the planning committee and as a judge for the Sugar Creek Elementary School Imagination Fair. This event had a unique twist this year as it was held in a virtual format for the first time. Students throughout the various grades submitted projects in a variety of subjects including authors, multimedia, and science. My role was primarily focused on the virtual Science Fair. Projects submitted included powerpoints, images of posters, and videos. With the help of multiple volunteer judges, we were able to score and provide feedback on the variety of ways the scientific method came to life in these projects.



For Parker Hanson, being a 'good' doctor means having the skills to treat both acute and chronic illnesses and address mental as well as physical ailments. He strives to be a doctor who builds trusting relationships with patients and works passionately to prevent illness as well as treat it. Parker calls both Sioux Falls, SD and Minneapolis, MN home. He studied biology, society, and the environment at the University of Minnesota – Twin Cities. As a pre-med undergraduate, he served on the board of Colleges Against Cancer to organize the annual Relay for Life event held at the University of Minnesota as well as other fundraiser and awareness campaigns for different types of cancer. Parker attended medical school at the Alabama College of Osteopathic Medicine. While there, he volunteered at the Friday Night Lights clinic to assess and treat injuries sustained during the regional football games. Parker has special interests in sports medicine and will be completing a fellowship in sports medicine at the University of Minnesota.



*A huge thank you goes out to my wife Erin for all of her love and support over the last three years. I would also like to thank my son Cooper who no matter how long of a shift I was away for, always welcomed me home with a smile. I'd like to thank all of the faculty and staff, particularly my Advisor Sarah James and Sports Medicine mentors Erin Hammer and Kathleen Carr. Madison was a special place to live and a special place to train; we will always remember it fondly.*

# A Case of a Tough Race

Parker Hanson, DO PGY-2  
University of Wisconsin-Madison, Department of Family Medicine and Community Health

## Background

- A 53-year-old female with a past medical history of melanoma presented by private vehicle to the emergency department after completing a 2.5-mile swim during the first leg of a triathlon earlier that morning. On arrival, the patient reported persistent shortness of breath and intermittent chest pain. She stated that her symptoms began halfway into the swim, forcing her stop, and included productive cough. As an experienced triathlete, this was a significant decrease in her baseline endurance. After completion of the swim, the patient was assessed by paramedics and found to be hypoxic with oxygen saturations in the 80's. She was advised to seek care at the nearest hospital after declining EMS transport.

## Diagnostic Approach and Assessment

- After arriving in the Emergency Department the patient's respiratory status was assessed and it was determined she was stable for further work up.
- Vital signs: sinus bradycardia (reported to be patient's baseline)
- Serum Labs: elevated troponin x3
- EKG: right bundle branch block with left posterior fascicular block (unchanged from EKG 1 year prior)
- Chest X-Ray: right middle lobe opacity concerning for aspiration versus infection

## Chest X-Ray



## Differential Diagnosis

- Pulmonary Embolism
- Ischemic Heart Disease with subsequent bradyarrhythmia
- Type II NSTEMI
- Aspiration Pneumonitis
- Swimming-Induced Pulmonary Edema

## Hospital Course

- During the hospitalization, the patient was eventually weaned off supplemental oxygen and symptomatically improved.

## Final Working Diagnosis

- Type II NSTEMI secondary to Aspiration Pneumonitis

## Outcome

- Cardiology was consulted and the patient underwent:
  - transthoracic echocardiogram with normal systolic and diastolic function.
  - Treadmill Exercise Stress Test without evidence of demand ischemia.
- The patient was cleared for return to activity as tolerated with Cardiology follow up in 1 year. At discharge, the patient planned to continue competing in upcoming triathlons.

## Community Connection

*“Two Wisconsin Men Die Competing in IronMan 70.3 Triathlon” – NBC News*

*“Recent Triathlon Deaths Highlight Danger of Swimming Portion” – WTMJ-Milwaukee*



# James Ircink, MD

## Projects Completed During Residency:

### Community Health Learning Experience:

Madison Area Cares for the Homeless—  
Madison Street Medicine Initiative

### Scholarly Project:

Standards of Care for Street Medicine: Envisioning a  
Universal Handbook for Providers:

During internship year of residency, I authored two adapted clinical guidelines for the practice of street medicine on the topics of hypothermia and frostbite—common conditions faced by individuals living on the streets. I presented this initial work along with a vision for a universal “adapted standards of care” handbook that could be used by any provider to practice safe and effective street medicine. With the help of the International Street Medicine Institute and many practitioners around the world there now exists an international handbook of compiled guidelines that is free and available to any practitioner or program who desires to provide care to unsheltered populations.



*Thank you to my parents and extended family for their endless support. Thank you to my friends and co-residents for the great memories along the way.*



James Ircink brings a holistic perspective to help patients pursue and maintain wellness in the context of their beliefs, values, family, and community. A native Madisonian, James attended the University of Notre Dame to study business administration.

While in college, James was an amateur boxer which taught him that fighting for a purpose can make challenges surmountable and sacrifices meaningful. After working in Chicago and later at Epic as a financial analyst, James had a change of heart that led him to earn his medical degree from the University of Wisconsin School of Medicine and Public Health. While in medical school, James volunteered at free clinics and with community outreach groups that serve unsheltered women and men. This compelled him to research and advocate for policy and systemic changes to extend healthcare “beyond clinic walls” to people who are unable to access the medical system. James is interested in full-spectrum primary care, care of vulnerable and unsheltered populations, procedures, humanism, technology in primary care, medical ethics, and health care economics. His hobbies include staying active, brewing coffee, and spending time with family and friends.



## **Madison Area Cares for the Homeless (MACH): Madison Street Medicine Initiative (MSMI)**

James Ircink, MD

### **Background**

MACH is a volunteer-based organization in Madison, WI comprised of healthcare professionals and community members with the mission to bridge gaps in the healthcare system by connecting with people experiencing homelessness and housing insecurity with compassion and respect in order to promote access to care and social services. It was started in response to ongoing homelessness in Madison and specifically unsheltered individuals living on State Street who faced barriers to accessing medical care as identified in a needs assessment. MACH community partners include UW Health, UWSMPH, The Beacon, Porchlight, Homeless Services Consortium, International Street Medicine Institute, Friends of the State Street Family, and others.

### **Objectives**

1. Increase understanding of the health needs of individuals experiencing homelessness.
2. Improve understanding of barriers to accessing care within our local healthcare system.
3. Continue building street medicine skill set through outreach, relationships, and practice.
4. Participate in MSMI administrative meetings to become more involved with the organization as a whole.
5. Continue to read texts and contribute to international adapted standards of care guidelines.

### **Methods**

Volunteered as a street medicine physician once monthly. Reviewed “Care of Vulnerable and Unsheltered Populations” textbook. Authored two adapted clinical guidelines that are now published and available for the international street medicine community of practitioners. Participated in development of our narcan distribution program and care connections program.

### **Results**

Direct medical care was delivered to individuals experiencing homelessness (weekly by the group--my involvement was monthly). Connections were made to community resources and housing support. Over 100 narcan vials have been distributed. We are currently working with the UW Emergency Department and in the future community paramedics to streamline connecting individuals with primary care providers for long term care. We hope that our relationships with individuals experiencing homelessness helps build trust and convey that, as medical providers, we care and that they matter.

## **Conclusions**

Street medicine is a safe, effective, inclusive, and compassionate method of care delivery that eliminates barriers to access, builds relationships and trust, and expands continuity of care to the most vulnerable individuals in our community. In order to succeed we need to continue to build our care connections with local healthcare institutions and community partners, continue to build our volunteer base, and increase the frequency of when our teams provide direct services.

## **Acknowledgements**

Dr. Ann Catlett, Dr. David Deci, MACH, MSMI, UW Health, UW Department of Family Medicine, Dr. Jennifer Edgoose, Dr. Karina Atwell, Shelly Shaw, Dr. Kirsten Rindfleisch, Garrett Lee, Mike Horowitz, Dr. Jim Withers, Dr. Jim O'Connell, Brett and Corrine Feldman.

# Allison Jenness, MD

## Projects Completed During Residency:

### Scholarly Project & Community Health Learning Experience:

Adapting an In-Clinic Community Resource Navigator Program to a Virtual Referral Model:

Social determinants of health, such as socioeconomic status and social support, are fundamental in successful management of chronic diseases. As healthcare delivery shifted toward telehealth in spring 2020 due to the COVID-19 pandemic, patient needs for remote social assistance increased. The UW Health Northeast Family Medical Center developed a new multifaceted social screening and referral process for in-person and telehealth visits to ensure social determinants of health could be addressed in both clinical formats. This was achieved with assistance from academic fellow KJ Hansmann, MD, Julia Alberth, medical student, Bob Freidel, MD, and our existing partner, the Community Resource Navigator Program (CRNP).



Allison Jenness is drawn to family medicine by the strong patient – physician relationships that form and enhance patient care. One of her biggest joys in residency has been to connect with her patients over the past 3 years. She will have some difficult goodbyes prior

to graduation. Within family medicine, she is interested in women's health, adolescent medicine, and global health. Allison is originally from Prior Lake, MN and attended the University of Wisconsin – Madison for her undergraduate degree. She earned her medical degree at Chicago Medical School at Rosalind Franklin University of Medicine and Science. Allison was a peer tutor for three years in medical school and has continued to enjoy her love for teaching during residency working with medical students and residents. She has enhanced her leadership skills as a chief resident and is privileged to be an advocate for her co-residents. Allison also loves to travel both across the US and abroad to learn more about people, cultures, and herself. Following graduation, she is looking forward to a 6-month United States road trip with her partner Tony.



*My first thank you is for my parents, Becky and Steve. You have given me endless support and encouragement. I am truly blessed with the most incredible parents and role models. Next is to Tony, the other half of Team Alny. You are the best partner I could imagine and helped make the past 3 years the best of my life. Thank you to all of my co-residents, faculty, and staff here in Madison; you make this program the amazing place that it is. I am so fortunate to have worked with you all. And to my Northeast family, what a joy and privilege to be part of such a beloved clinic, I will dearly miss karaokeing the night away with all of you.*

# **Adapting an In-Clinic Community Resource Navigator Program to a Virtual Referral Model**

Allison Jenness, MD

## **Background**

The Northeast Family Medical Center works with the Community Resource Navigator Program. The goal of the program is to identify patients at Northeast with unmet social needs and connect them with support and resources within our community.

The Community Resource Navigator Program is composed of ‘navigators’ (social workers and undergraduate students) who have extensive knowledge of local social, financial, and legal resources. Previously the navigators were on site at Northeast. Pre-pandemic, referrals were made with a paper screening form and then providers typically introduced the patient to the navigators in person.

At the start of the pandemic, the navigators moved off-site and into a virtual format. Unfortunately, this caused a reduction in patients being screened and referred to the navigators. The cause of this was likely due to reduced screening, fewer patients being seen in person, and the navigators being off site.

## **Objectives**

At Northeast it is important to us to help address the social needs of our patients. We want to ensure that patients are being adequately screened and connected to the resources they need, even if patients or the navigators are not physically in clinic.

There were three parts to this quality improvement project. The first goal was to identify barriers to screening and referral in a more virtual clinical setting. Second, create a new screening and referral process based on provider and staff feedback. Lastly, assess how the new referral process was functioning for providers and what could be improved upon. The first part of the project was conducted by KJ Hansmann, MD, Julia Alberth, medical student, and myself. Bob Freidel, MD, joined the team for the second and third components.

## **Methods**

Our first step involved speaking with the resource navigator team to get their perspective on how the pandemic had impacted their practice. With the transition to being off site and virtual they had received few new referrals from providers at Northeast. However, the navigators were still quite active with patients they had worked with in the past.

KJ was able to connect with Julia through a summer research program. Together they developed a formalized interview to be conducted with providers. I assisted with editing the questions, doing a practice interview, and recruiting providers and clinic staff to participate. The formalized interview asked if staff and providers were screening patients, if they were screening patients how was this being conducted, how were they connecting patients to the navigators, and what barriers there were.

Following those quality improvement interviews; the Northeast team and the navigators created a universal screening form. The form was to be given to all patients and developed multiple workflows to connect patients to the navigators. The options for connecting patients to the

navigators included providers consenting patients to allow them to contact the navigators on the patient's behalf or a dot phrase with the navigators contact information for patients to reach them directly. This was implemented at the end of December 2020 and the process was re-evaluated 2 months later.

After the 2 month trial period, we created a survey for providers to assess how they have been using the new work flows. They were asked questions about how often they were referring patients, what methods they used to refer patients, and what their ideal method for referral was. We also sought feedback on what could be improved upon in the process of screening and referring.

## **Results**

The initial quality improvement interviews revealed that few patients were being screened and even fewer were being referred with the new virtual format. It was found that formal screening had completely ceased since many patients were being seen virtually. There was also little in person screening since work flows had changed when Northeast was consolidated with Wingra Clinic. Many providers noted they relied heavily on the paper screening form as that was often the prompt to discuss those concerns. This information led to the development of the new screening and referral process.

After implementing new workflows in December 2020, the most recent survey, completed spring 2021, showed improvements in connecting patients to resources. Screening was happening more consistently, though not at every visit as intended, and the navigators were receiving more new referrals from providers.

If there was an identified social need, the most common workflow was providers contacting the navigators on the patient's behalf. The most common concerns identified by providers included not all patients received the screening form, not knowing if their patient was able to be reached by the navigators, and what resources their patient was utilizing, if any.

## **Conclusion**

With the new work flows, we have been able to connect patients to the resource navigators despite them not being physically located in clinic. At the start of the transition to the virtual format there was a sharp decline in referrals. The goal of improving this was certainly met with the workflow changes. This has allowed continued access to more social supports that patients highly value and need.

In feedback from providers there are still improvements that need to be made. One of the largest being providers not receiving feedback if the navigators were able to connect with their patients and what resources the navigators are providing. There was also a large desire to have the navigators return to being in person when able. There is less of a barrier to communication when a provider can bring a patient to the navigator desk and connect in-person. These areas would be great next steps to continue to enhance the program.

There is a lot of value in gathering data about the topic/project and getting other people's perspectives. It helps to see multiple perspectives and learn how others practice. By taking a more step wise approach, we were able to be more thoughtful in how we developed workflows that would

benefit the most number of patients and providers. The partnership with the navigators was also key. It was valuable to learn how the virtual format has impacted the navigators work so we could improve the process.

### **Acknowledgments**

First I need to thank the Patient Resource Navigators, Lane Hanson, MSW and all the undergraduate students. They are a huge asset to the patients at Northeast and have continued to go above and beyond in the past year to support patients, despite not being physically present in clinic. Second, to KJ Hansmann, MD who is an excellent leader and teacher. I had minimal experience in quality improvement projects and she was very supportive and patient during the learning process. Third, Jennifer Edgoose, MD, MPH who is always an advocate for patients and a guiding light in community health awareness. Fourth, Julia Alberth for her hard work on the quality improvement interviews and poster she created. And last, but certainly not least, Bob Freidel, MD who is a technology whiz and excellent leader in helping to create work flows and assess how providers are utilizing the new formats.

# Mark Matusak, DO

## Projects Completed During Residency:

### Scholarly Project:

Increased Sleep is Associated with Physical and Psychological Well-Being in Division I Men's Basketball Student-Athletes

### Community Health Learning Experience:

ChopChop – A Community Partnership to Address Social Determinants of Health:

ChopChop Cooking Class is an established program in partnership with and located at the Badger Prairie Needs Network in Verona, WI. Badger Prairie Needs Network is a community organization established to address food insecurity. The ChopChop program brings together families – children and adults – in the local community to educate on nutrition and engage young community members in the joy of cooking so that they may learn skills needed to establish healthy habits that will reduce the burden of chronic disease. The project allowed me to gain skills necessary to partner successfully with community organizations to address social determinants of health.



*Thank you to my family and friends for their support during residency, and throughout my medical training. Thank you to my wife, Laura. Thanks to my resident colleagues and faculty, for they were indispensable role in my training. Thank you to the staff at Verona Clinic who welcomed me and helped me to grow as a physician. And thank you to my patients who make the journey through medicine worthwhile.*



For Mark Matusak, family medicine provides the versatility to fuse his many interests. He enjoys the relationships with his patients and opportunities to give back to the community. Mark is originally from Torrance, CA and studied integrative biology and psychology

at the University of California, Berkeley. While at Cal, Mark ran track and cross-country, received All-American honors, and ran under four-minutes in the mile. This, along with his research on lactate metabolism during exercise, fostered his passion for exercise as medicine. Mark earned his medical degree from the University of New England College of Osteopathic Medicine. He was selected to be a predoctoral Anatomy and Osteopathic Manipulative Medicine teaching fellow where he honed his osteopathic skill and developed his passion for medical education. Mark was also involved with the Let's Go program where he worked with children in Maine to promote healthy lifestyles to prevent childhood obesity. Mark is inspired by the impact family physicians have on patients and communities through full-spectrum family medicine; he has special interests in osteopathic manipulative medicine (OMM), sports medicine, preventive medicine, integrative medicine, and procedures. Mark enjoys running, cycling, cooking, travel, photography, and rooting for Aaron Rodgers. After graduation, he will continue his training at the Cedars-Sinai Kerlan-Jobe primary care sports medicine fellowship in Los Angeles, CA.

# Increased Sleep is Associated with Physical and Psychological Well-Being in Division 1 Men's Basketball Student-Athletes

**Mark Matusak, DO, PGY-2**  
 Jen Sanfilippo, MS, LAT, Drew Watson, MD, MS  
 Department of Family Medicine and Community Health  
 Department of Orthopedics and Rehabilitation, Division of Sports Medicine  
 University of Wisconsin – Madison

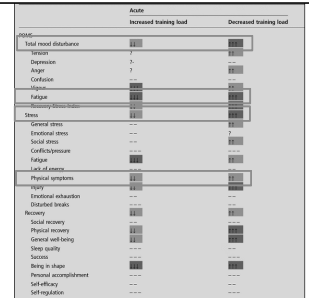
## Background: Training Load and Well-Being

**Monitoring the athlete training response: subjective self-reported measures trump commonly used objective measures: a systematic review**  
 Saw A, Main L, Gastin P, *IJSM* 2016; 50:281-291.

56 studies of effects of acute changes in training load (TL) on subjective and objective well-being measures

Acute increases in training load have negative effect on subjective well-being

- Subjective data > Objective
- Ask the athlete how they feel



## Background: Sleep and Well-Being

**Impaired Sleep Mediates the Negative Effects of Training Load on Subjective Well-Being in Female Youth Athletes**  
 Watson A, Brickson S. *Sports Health* 2018; 10(3):244-49.

65 female soccer athletes (age range, 13-18 years) were monitored for 1 year

- Prior day Training Load
- Prior night sleep
- Fatigue, Mood, Stress, Soreness

Table 2. Independent effects of prior day training load and prior night sleep duration on subjective well-being in female youth soccer athletes using linear mixed-effects models adjusted for age group and individual repeated measures\*

Variable	Fatigue		Mood		Stress		Soreness	
	$\beta$	P	$\beta$	P	$\beta$	P	$\beta$	P
Prior day TL, AU	-0.19	<0.001	-0.000	0.014	-0.005	0.001	-0.31	<0.001
Prior night sleep, hours	0.15	<0.001	0.13	<0.001	0.13	<0.001	0.022	0.042

All arbitrary units. TL, training load.  
 \*Fatigue, mood, stress, and soreness range from -3 (worst) to +3 (best).

- Training load and sleep independently predicted well-being
- However, a significant portion of the effect of TL on subjective well-being was due to the effects of TL on sleep.

**It remains unclear what drives well-being in collegiate student-athletes**

## Purpose

**To examine the independent effects of TL and sleep on subjective well-being among male NCAA Division I student-athletes.**

## Methods

### Study Design

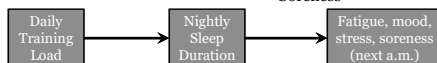
- Prospective Cohort

### Men's basketball

- 2015-16 & 2016-17 seasons
- 19 total athletes
- 18-22 years old

### Daily data entry – every morning

- Training load (sRPE) from the previous day
  - Duration x intensity (1-10)
- Sleep duration (hours)
- Sleep quality (**1=worst, 5=best**)
- Well-being measures (**1=worst, 5=best**)
  - Fatigue
  - Mood
  - Stress
  - Soreness



## Statistical Analysis

Individual training load for each day grouped by z-score:

- < -1: Low; -1 to 0: Moderate-Low; 0 to +1: Moderate-High; > 1: High

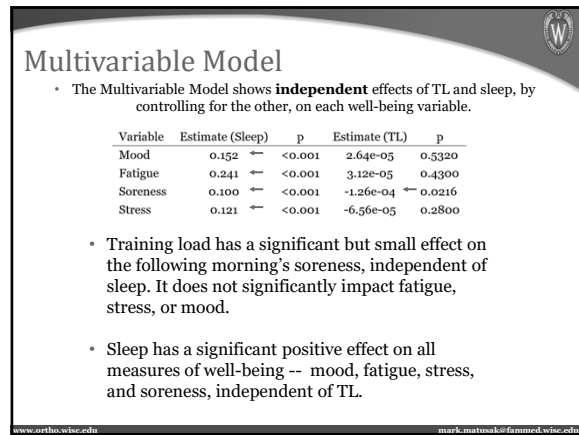
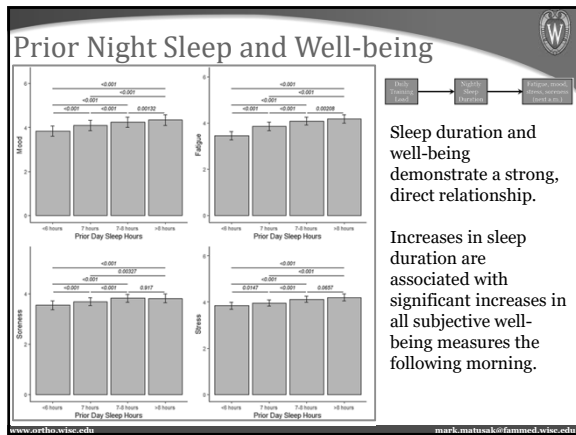
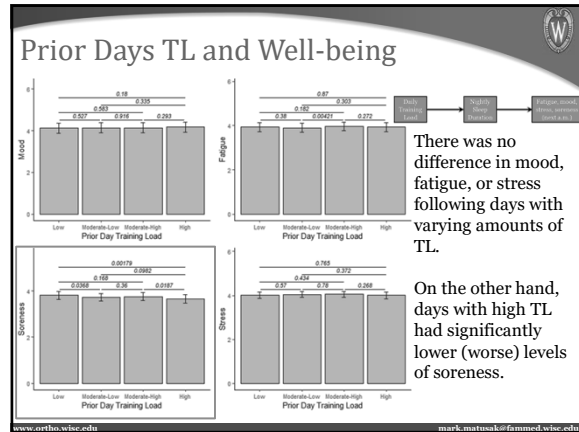
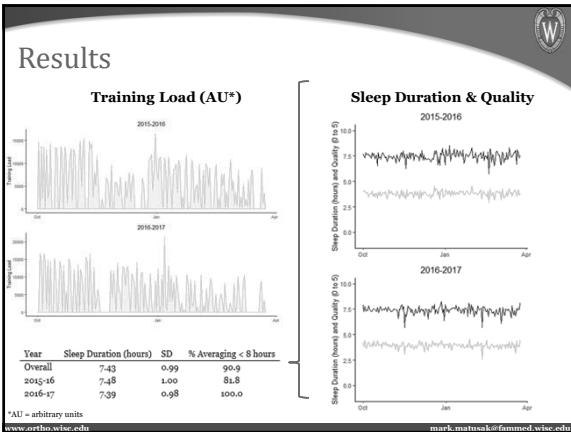
Individual sleep duration for each night grouped by hours:

- < 6, 6-7, 7-8, 8-9, > 9

Linear mixed effects models adjusted for age, day of the week and individual repeated measures:

1. Compare well-being across TL groups
2. Compare well-being by nightly sleep duration
3. Independent effects of sleep and TL on well-being





- ## Conclusions
- Among our studied NCAA Division 1 basketball players, increased sleep is independently associated with improved mood, fatigue, soreness and stress the following day.
  - Increased training load is independently associated with worse soreness the following day, but not mood, fatigue or stress.
  - Individual monitoring may facilitate intervention to improve sleep, optimize training load, and benefit student-athlete well-being and performance
  - Further research is warranted to determine if similar relationships exist in other populations of athletes.
- www.ortho.wisc.edu mark.matusak@fammed.wisc.edu

# THANK YOU

[mark.matusak@fammed.wisc.edu](mailto:mark.matusak@fammed.wisc.edu)  
[www.ortho.wisc.edu/bap](http://www.ortho.wisc.edu/bap)

Based on the 1007 runners, running-related injuries were reported by 389 (39%); 53 major injuries (5%) and 336 minor injuries (33%). There was no significant difference in injury incidence based on sex: 40% of females versus 37% of males [relative risk (RR) 1.1, 95% confidence interval (CI) 0.9-1.3,  $P = 0.38$ ]. Overweight runners (BMI 25-29.9) had a marginally higher incidence of injury compared to runners with a normal BMI (42 vs 37%, RR 1.1, 95% CI 1.0-1.3,  $P = 0.17$ ). There were 224 first-time marathon runners who participated and had a similar injury incidence compared to runners who had previously completed a marathon (38.8 vs 38.6%, RR 1.01, 95% CI 0.84-1.21). Consistent strength-based cross-training during the 16 weeks prior to the marathon was associated with a higher incidence of injuries compared to those who did none (40% vs 29%, RR 1.4, 95% CI 1.0-1.8,  $P = 0.03$ ).

**Conclusions:** Injuries are common among marathon runners, but interestingly, prior marathon experience was not associated with a lower incidence. There were similar rates of injuries between sexes. Overweight runners had marginally higher rates of injuries than normal weight runners. Strength-based cross-training was not protective against injuries, and counterintuitively, was associated with an increased injury incidence, but possibly due to a selection bias.

**Significance:** Considering the high incidence of injuries affecting participation or performance in marathon runners, identifying risk factors is important to guide targeted injury-prevention strategies among both novice and experienced marathon runners.

**Acknowledgements:** The authors wish to thank New York Road Runners for their support of the study.

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### Vestibular, Balance and Oculomotor Function in Pediatric Concussion

**Primary Presenter:** Graham Cochrane, BA

Graham Cochrane, BA, Jennifer Christy, PT, PhD, Anwar Almutairi, PT, PhD, Claudio Busettini, DrEng, PhD, Katherine Weise, OD, MBA, Mark Swanson, OD, MPH, and Sara Gould, MD, MPH

*Affiliation: University of Alabama at Birmingham School of Medicine, Birmingham, Alabama.*

**Purpose:** The purpose of this study was to better understand potential changes in primary vestibular functions, balance function, and oculomotor function in pediatric concussion patients when compared to nonconcussed children.

**Methods:** This study examined the effect of concussion on vestibular, balance, and oculomotor functions in pediatric patients with a current diagnosis of concussion compared to active (participating in an organized sport) children. Eye-tracking rotary chair vestibular and ocular function, sensory organization test balance function, and vestibular evoked myogenic potentials (VEMPs) were assessed.

**Results:** Thirty-three concussed and 30 nonconcussed children ages 8 to 17 (avg ages:  $13.4 \pm 2.8$  vs  $12.5 \pm 2.6$ ,  $P = 0.20$ ) completed the 1.5 hours testing battery. Student's  $t$ -tests were used to compare normally distributed data and Mann-Whitney U tests to compare nonnormal data. Concussed participants demonstrated a significantly lower SOT equilibrium score on con 2 ( $P = 0.032$ ) but no other condition nor total score. Concussed participants demonstrated a significantly lower optokinetic gain ( $P = 0.028$ ) and vestibular-ocular enhancement gain ( $P = 0.022$ ), but there were no

differences in ocular or vestibular-ocular function. Concussed participants showed a significantly increased variance in perception of verticality during subjective visual vertical and horizontal tasks ( $P = 0.024$  and  $P = 0.047$ , respectively). There was no difference in VEMP latency, amplitude, or asymmetry between groups.

**Conclusions:** The majority of vestibular, balance, and ocular functions assessed in this study were the same between concussed and nonconcussed children. Postural sway in one of the 6 conditions of the SOT was significantly worse in the concussed group as was performance on a perception of verticality task. Optokinetic gain was significantly lower in the concussed group and led to immense symptom exacerbation.

**Significance:** Eye-tracking measures, posturography, and specialized vestibular testing may not be beneficial in younger patients with concussion. These discrepancies with adult data may be due to younger children having difficulty performing these tasks.

**Acknowledgements:** UAB School of Medicine UAB School of Health Professions UAB School of Optometry Research for this project was supported by the NIH-NIGMS under award T33GM008361. This content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH.

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### Increased Sleep Is Associated With Physical and Psychological Well-Being in Division I Men's Basketball Student-Athletes

**Primary Presenter:** Mark Matusak, DO

Mark E. Matusak, DO, Jennifer L. Sanfilippo, MS, and Andrew M. Watson, MD

*Affiliation: University of Wisconsin—Madison, Madison, Wisconsin.*

**Purpose:** Increased training load (TL) and impaired sleep are independently associated with decreases in subjective well-being in adult and youth athletes. The purpose of this study was to examine the effects that TL and sleep exert on subjective well-being among male NCAA Division 1 (D1) student-athletes.

**Methods:** For 2 seasons, 19 male NCAA D1 basketball athletes (18-22 years) recorded TL for all activity. Each morning, athletes reported sleep duration (hours) and stress, mood, fatigue, and soreness on a scale from 0 to 5 (worst to best). Multivariable linear mixed-effects models were used to evaluate the independent effects of TL and sleep on well-being, while adjusting for individual repeated measures.

**Results:** Average nightly sleep duration was  $7.43 \pm 0.99$  hours during the study period, with 82% and 100% of the student-athletes averaging less than 8 hours of sleep during the first and second seasons, respectively. In the multivariable models, prior day TL had a significant, negative association with soreness ( $b = -0.001$ ,  $P = 0.022$ ), but no meaningful association with other measures of well-being ( $P > 0.05$  for all). Sleep duration, however, was independently and positively associated with fatigue ( $b = 0.24$ ,  $P < 0.001$ ), mood ( $b = 0.15$ ,  $P < 0.001$ ), stress ( $b = 0.12$ ,  $P < 0.001$ ), and soreness ( $b = 0.10$ ,  $P < 0.001$ ).

**Conclusions:** Among male NCAA Division 1 basketball student-athletes, decreased sleep duration and increased TL are independently associated with impairments of subjective well-being. However, while TL only negatively affected

soreness the following day, decreased sleep had a significant negative effect on mood, fatigue, soreness and stress, even after accounting for the effect of TL.

**Significance:** During the season, increased sleep is associated with significant improvements in physical and psychological well-being. Efforts to promote sleep among male NCAA Division 1 basketball student-athletes may significantly improve subjective well-being.

**Acknowledgements:** We would like to thank the Sports Medicine staff at the University of Wisconsin-Madison Division of Intercollegiate Athletics for their commitment to the welfare of the student-athletes and contributions to the Badger Athletic Performance program.

### Evaluation of Salivary miRNA Gene Expression in Children With Concussion

**Primary Presenter:** James MacDonald, MD, MPH

James MacDonald, MD, MPH, Amanda Hautmann, MS, Lindsay Sullivan, PhD, Lakshmi Prakruthi, Rao Venkata, MS, Katherine Miller, PhD, Junxin Shi, PhD, Christopher Radlicz, MS, MPH, Elaine Mardis, PhD, and Jingzhen Yang, PhD, MPH  
*Affiliations: Nationwide Children's Hospital, Columbus, Ohio; and Ohio State University College of Medicine, Columbus, Ohio.*

**Purpose:** Up to 33% of concussed children develop persistent post-concussion symptoms (PPCS) which may last for months post-injury. This study's aims: (1) prospectively monitor gene expression of salivary miRNAs over time post-concussion; (2) identify biomarkers identifying individuals who may develop PPCS.

**Methods:** Saliva samples were collected from concussed children ages 11 to 17 at  $\leq 1$ -, 2-, and 4-week post-injury. Post-concussion symptoms were monitored daily. PPCS was defined as a symptom score of 5 or higher than pre-injury level  $> 28$  days post-injury. Changes in salivary miRNA expression over time post-injury were analyzed using a proprietary miRNA panel to compare children with/without PPCS.

**Results:** Of the 23 children studied (64 saliva samples provided, 798 miRNAs analyzed): mean age = 14.4 years, 52.2% male, 34.7% ( $n = 8$ ) experienced PPCS. T-tests conducted among the 46 miRNAs between children with and without PPCS revealed 6 that were differentially expressed in the PPCS group and were under expressed within one week of injury ( $P < 0.05$ ). The PPCS group showed significant changes in 18 miRNA expression levels from within 1- to 2-week post-injury [17 increased ( $P < 0.05$ ) 1 decreased ( $P < 0.01$ )]. Significant changes were also observed in 21 miRNA expression levels from 2-weeks to 4-weeks post-injury [19 miRNAs decreased ( $P < 0.05$ ), and 2 miRNAs increased ( $P < 0.05$ )].

**Conclusions:** We observed significant differences in changes in several miRNAs' gene expression levels from 1- to 2-week post-injury and 2- to 4-week post-injury in the PPCS group compared to children without PPCS. Additional studies are needed to verify these findings as well as to examine the biological regulatory or inflammatory mechanism of these miRNAs in the context of brain injury.

**Significance:** Identification of clinically-relevant prognostic biomarker miRNAs accurately detecting concussed children at risk for PPCS is critically needed. Such evidence may inform the development of novel, individualized treatment plans for at-risk patients.

### Validation of a Point of Care Diagnostic for Sport Related Concussion

**Primary Presenter:** Kathleen Roberts, MD

Kathleen Roberts, MD, Mark. A. Lovell, PhD, Yueming Wu, MS, Caitlin EW Conley, PhD, Kimberly A. Kaiser, MD, Robert G. Hosey, MD, and Milton K. Smoot, MD

*Affiliation: Family and Community Medicine, University of Kentucky, Lexington, Kentucky.*

**Purpose:** On field diagnosis of sport-related concussion is challenging. VILIP-1 is a neuron-specific calcium sensor protein and a recognized biomarker for ischemic stroke and TBI. The purpose of this study is to validate ubiquitinated VILIP-1 lateral flow device (LFD) as an objective biomarker for SRC diagnosis.

**Methods:** A double-blind cohort study. A LFD was used to detect ubVILIP-1 with a single drop of blood from a fingerstick in collegiate athletes. Results were interpreted as visually positive or negative. Biomarker levels were obtained at baseline and during early, mid and late season and at 30 minutes, 2 to 4, 24, 48, and 72 hours post-injury for any athlete diagnosed with concussion.

**Results:** To date, we have enrolled 128 Division 1 athletes (89M/39W) with complete data recruited during pre-participation exams. There is quantified ubVILIP-1 at baseline and after contact practice at early, mid and late season time points. Our results show ubVILIP-1 levels do not change significantly following practice over the season for soccer or volleyball players but do demonstrate a small but statistically significant increase over the season for football players. Quantification of levels of ubVILIP-1 in a small number of athletes ( $N = 9$ ) with SRC diagnosed using SCAT5 concussion evaluation show that ubVILIP-1 substantially increases 30 minutes following SRC, doubling from original baseline level. The concussed athletes elevated ubVILIP-1 gradually returns to near normal by 72 hours post injury.

**Conclusions:** ubVILIP-1 does not increase with participation in collegiate volleyball or soccer. A small significant increase in levels of ubVILIP-1 does occur in male football players over the course of a season. In concussed athletes, ubVILIP-1 increases from baseline levels in the first 30 minutes. Limitations include small sample size, no-post season data, and findings specific to collegiate athletes.

**Significance:** Our data suggest VILIP-1 LFD can detect changes of ubVILIP-1 in athletes diagnosed with SRC on field showing potential for this POC diagnostic test. Future studies will be aimed at increasing the number of SRC cases through a multi-centered trial.

**Acknowledgements:** Graduate Research Assistants and Athletic Trainers at the University of Kentucky and Eastern Kentucky University for the collection and processing of samples and data.

### Altered Tibial Angle and Loading Mechanics in Adolescent Runners With History of Lower Leg Bone Stress Injury

**Primary Presenter:** Michelle Lee, MD

Michelle H. Lee, MD, Samuel M. Lyons, MS, Jeff J. Morgan, MS, Salinda K. Chan, DPT, and Emily A. Kraus, MD

*Affiliation: Motion Analysis and Sports Performance Lab, Lucile Packard Children's Hospital, Stanford Children's Health, Palo Alto, California.*

# Samantha Mayhew, MD

## Projects Completed During Residency:

### Community Health Learning Experience:

Increasing Support for Caregivers of Elderly Patients with Dementia in the Belleville Community

### Scholarly Project:

Statin Use in the Elderly:

Working with another resident, Ty Grunow, with support from faculty, Dr. Julia Lubsen, we wrote a clinical inquiry for the Family Physicians Inquiries Network (FPIN) after we reviewed the current literature regarding statin use in elderly patients for primary prevention of cardiovascular disease. After review of several timely, well powered studies including a meta-analysis of RCTs, retrospective cohort study and post-hoc analysis we concluded that current evidence supports that elderly patients do benefit from statin use as soon as 2 years of use. However, these studies were limited and statins do have risks and should be discussed with elderly patients individually. There are two current randomized controlled studies which we hope will provide further evidence for statin use in elderly patients.



Samantha (Sam) Mayhew loves small town rural medicine, women's health, and geriatrics. Originally from Delphi, IN, Sam earned her bachelor's degree in chemistry from Indiana University. During her junior year, she traveled to Honduras for a week to help

educate children about healthy habits, build showers and bathrooms, and do other renovations for the homes. After graduating from Indiana University, Sam attended the University of Cincinnati College of Medicine. While in medical school, Sam was involved in community outreach, including mentoring a middle school girl and participating in geriatric events and fundraisers such as the Alzheimer's Walk. Sam was a Geriatric Medical Student Scholar. She enjoys the close relationships she develops with her patients and their families. Between her first and second years of medical school, Sam worked at Johns Hopkins University doing research on the communication between caregivers and elderly patients in an adult day care center. She works daily to show that good health is more than being free from disease – it is about lifestyle, access to healthcare, and building a strong social network. Sam enjoys playing tennis, kayaking, trying new restaurants, and spending time with family, friends, her husband and their dogs.



*I would like to thank my husband, family and friends who have been so supportive during this journey! I would also like to thank my amazing co-residents and the supportive faculty who I will miss dearly. To the Belleville clinic staff, I can never thank you enough for making Belleville clinic feel like home. To the residency staff, thank you so much for all of your help!*

# **Increasing Support for Caregivers of Elderly Patients with Dementia in the Belleville Community**

Samantha Mayhew, MD

## **Background**

In an effort to decrease acute care services needed by elderly patients with dementia, Dr. Manish Shah of the UW Emergency Department and his research team collaborated with the Belleville clinic to pilot a coaching program for caregivers of patients with dementia. The key community partners included the coaches themselves who were local community paramedics as well as collaboration with the local senior citizen center. Prior programs like REACH (Resources for Enhancing Alzheimer's Caregiver Health) have proven interventions in a community setting improve the caregiver's experience. Our particular pilot program was specific to the population of the Belleville clinic and focused on the effects of the program on the health of the patients with dementia and their care partners as well as the psychosocial effects.

## **Objectives**

The goal of this pilot was to decrease acute care services used by elderly patients as well as their caregivers and to improve the health of patients with dementia and their care partners who lived with them. My role included assisting with inclusion criteria for the program, recruiting patients, reaching out to other resident physicians to recruit their patients and following up every 1-2 weeks with the research and clinical teams via virtual meetings.

## **Methods**

Patients and caregivers would first meet with their primary care physician at Belleville Clinic. If they met the eligibility criteria and had interest in the program, the PCP would refer to the clinic's RN care coordinator. If eligible and they wanted to participate in the pilot they would then be enrolled. A coach would then meet with the patient and caregiver in their home, the coach would then document the visit and any concerns they might have, this would be recorded in the EMR and the PCP could then help act on any concerns. The coach would then schedule follow up at the home based on the patient and caregiver's needs for a total of 6 months.

## **Results**

The current pilot program has been well received by patients, caregivers and their providers thus far. The coaches entering patient's homes has provided significant information to the RN Care Coordinator and PCPs that has allowed for better understanding of patient and caregiver's daily lives, the challenges they may face and allows for higher quality of care from PCPs. My patients and their caregivers who have participated have voiced feelings of support and the caregivers have felt more confident caring for the patient at home. Of my patients who participated, we were able to address concerns through their coaches and the RN Care Coordinator, they did not require any acute office or ER visits while participating in the pilot program.

## **Conclusions**

The use of medically trained coaches for caregivers of elderly patients with dementia residing in rural WI provided benefit to the patient, caregiver and their medical providers. Further analysis of data will be done in the future to assess use of acute care visits and the health of the patient as well as the caregiver. The pilot did occur during the COVID-19 pandemic which halted some visits in the home. Another challenge with the program was patients or caregivers that did not want a coach to enter their home or did not feel they needed any assistance. Next steps for this community activity include broadening the scope of participants to more patients, and likely patients who do not have dementia but would still benefit from a medically trained coach.

## **Acknowledgements**

A huge thank you to Dr. Julia Lubsen whose participation was critical to the pilot itself and whose support was critical to my involvement. Dr. Manish Shah for inviting me to participate in the above pilot as well as his research team with Gwen Jacobsohn and Apoorva Maru who created the pilot, obtained the data and headed the weekly meetings. To Gail Campbell who was a spectacular coach to the Belleville patients. To Caroline Templeton the RN Care Coordinator who kept us all in the loop and communicated with the coaches and patients frequently. Most importantly, to all of the patients and caregivers who participated and hopefully benefited from the program!

# Courtney Reynolds, MD

## Projects Completed During Residency:

### Scholarly Project:

Immune Mechanisms of Breastfeeding and the Role of Vaccinations

### Quality Improvement Project:

Improving Accuracy of Patient Medication Lists:

During my residency I identified that patient medication lists were not always updated. I found this more common with patients that were not part of my panel or with patients who came in for an urgent care type visit. My goal was to improve my percentage of accurate medication lists and I felt the major barrier to this was time. My intervention included carving out a few minutes with each visit dedicated to med list review regardless of a patient's concern. I found my rate of updating/accurate medication lists improved from 63% to 82%.



Courtney Reynolds grew up in Cross Plains and calls Wisconsin her home. Her focus is on the health of her patients and on the health of her community; she enjoys listening to her patients and being an involved community member. She earned her bachelor's and medical

degree from the University of Wisconsin – Madison. Prior to residency, Courtney was a volunteer emergency medical technician in Mazomanie, WI where she provided emergency services and engaged in community events focusing on education and awareness. She helped develop a program in Rice Lake, WI to expand Reach Out and Read principles beyond well child visits into the clinic waiting room and community. Courtney participated in the Medical Students Offering Maternal Support program where she was a member of a first time mom's support system and attended her prenatal appointments and delivery. From this, she learned to appreciate the vulnerabilities of patients, the importance of the doctor-patient relationship, and the necessity of patient education focusing on the individual. During residency Courtney served on the ethics committee as well as obstetric/newborn committee. Courtney has a strong passion for obstetrics, women's health, and treating the entire family. Courtney enjoys the great outdoors through camper camping, traveling, hiking, and spending time on the lake. She relaxes by painting, knitting, crafting, and reading. She is thankful every day for her husband and 2 children.




*I am so thankful to my spouse that has been with me every step of the way. Even on the hardest days: the kids are screaming, dinner plans fell through, they are hungry and need baths, I'm behind on laundry, where are their pajamas? Are we out of diapers again? And the phone rings because my patient's water broke and is in labor. Thank you for always picking up the slack and allowing me to follow my dreams, especially during this year with COVID, the lack of child care back up, and the countless times you sacrificed your own work for mine. Thank you.*

# Immune mechanisms of breastfeeding and the role of vaccinations

Courtney Reynolds, FM PGY-3

## Objectives

- Review basic immune system concepts
- Discuss benefits of breastfeeding
- Discuss composition of breastmilk
- Discuss immunity related to breastmilk
- Review types of vaccines
- Discuss infant vaccination efficacy while breastfeeding
- Discuss maternal vaccination while breastfeeding
- Discuss considerations for specific vaccinations
  - Influenza
  - Tdap
  - COVID19
- Breastfeeding recommendations during COVID19



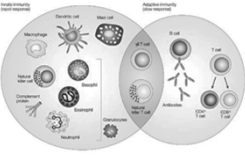
## Brief review of immunity

**Innate Immune system:** Inherited - first-line barrier, rapid-response mechanism

- Pattern recognition receptors (PRRs), toll-like receptors
- Physical barriers - Tight junctions, mucus
- Antimicrobial enzymes (ex. lysozyme)
- Serum proteins (ex. complement components, C-reactive protein (CRP), and lectins (carbohydrate-binding proteins))
- Antimicrobial peptides (AMPs) (ex. defensins, cathelicidins)
- Cells that release cytokines and other inflammatory mediators (ex. macrophages, mast cells, natural killer (NK) cells)
- Phagocytes (neutrophils, monocytes, macrophages)

**Adaptive Immune system:** Learned

- Humoral response: B lymphocytes - Antibodies
- Cellular response: T lymphocytes - helper, cytotoxic, and regulatory







**Passive Immunity:** External antibodies are given

- Maternal to fetal transplacental transfer
- Antibody-containing blood products such as immune globulin
- Protection is immediate but only lasts for a few weeks to months

**Active Immunity:** Internal antibodies are produced

- Natural: Exposure through infection with the actual disease
- Vaccine Induced: introduction of a killed or weakened form of the disease
- Protection takes days to weeks to develop but is longlasting, and sometimes life-long.

ACTIVE IMMUNITY		PASSIVE IMMUNITY	
Natural	Artificial	Natural	Artificial
 Infection	 Vaccination	 Maternal antibodies	 Monoclonal antibodies

## Benefits of Breastfeeding

For preterm infants: increase intestinal lactase, decrease intestinal permeability and decrease risk of necrotizing enterocolitis

Lower incidence of retinopathy of prematurity

Skin to skin for late preterm infants: increase blood glucose levels and improve cardiorespiratory stability

Prevention of acute illness

Decreases risk of developing DMT1

Decreases risk of developing IBD

Has lower incidence of wheezing in early childhood

Decreases rate of dental caries

Slightly higher IQ (even after adjusting for maternal intelligence)

Decreases risk of childhood lymphoma and leukemia

Decreases risk of childhood obesity

Decreases risk of developing DMT2

Decreases risk of Celiac disease

Lower BP (by 1 mmHg)

In low and middle resource countries: decreased childhood mortality

Skin to skin as analgesia

Some evidence for:

## Prevention of acute illness

Lower risk gastroenteritis and diarrhea (both low and high resource settings)

Lower risk of lower respiratory tract infections

Lower risk of otitis media in first 2 years

Decrease risk of sudden infant death syndrome

Decreases risk of neonatal sepsis

Lower risk of urinary tract infections




In the US estimated that "optimizing" breastfeeding would prevent 21,000 hospitalizations and 40 deaths in the first year of life.

Feeding directly at the breast appears more beneficial than EBM.

observations of higher levels of oligosaccharides, lactoferrin, and secretory IgA in their urine

## Benefits of breastfeeding are dose dependent...

### Higher protection with exclusive breastfeeding



## Contraindications for breastfeeding

- Infant
  - Galactosemia type 1 (most severe of 4 types, no enzyme produced)
  - Partially breastfed - Need to be closely followed by genetics team
    - Maple-syrup urine disease
    - Phenylketonuria (PKU)
- Maternal
  - HIV - but can consider with negative viral load
  - Herpes/shingles on breast
  - Active untreated TB (but EBM OK)
  - Brucellosis
  - Ebola
- Medications
  - Chemotherapy
  - Drugs of abuse



## Composition of breastmilk

- Lipids, mostly triacylglycerides. Some diacylglycerides, monoacylglycerides, over 200 free fatty acids, phospholipids and cholesterol.
- 400 proteins in 3 groups:
  - Caseins
  - Whey: Ex:  $\alpha$ -lactalbumin, lactoferrin, serum albumin and lysozyme
  - mucin
- Non-protein nitrogen: urea, creatinine, nucleotides, free amino acids and peptides
- Immunoglobulins: SIgA, SIgG (S meaning secretory)
- Carbohydrate: largely lactose and over 200 human milk oligosaccharides (HMO)



## Components of breastmilk with antimicrobial activity

- Immunoglobulins
- Lysozyme - destroys bacterial cell walls
- Lactoferrin - binds iron and kills bacteria
- Free fatty acids and monoglycerides - membrane destabilization
  - In vitro: breast milk lipids have been shown to inactivate several pathogens. Ex: Group B streptococcus (GBS)
- Human milk bile salt-stimulated lipase
- Mucins - physical barrier and adhesion decoy
- Leukocytes - promote neonate development of active immunity
- Human milk oligosaccharides (HMOs) - prebiotic, anti-adhesive (also immunomodulators)

## Immunomodulators in breastmilk – Help develop the infants immune system

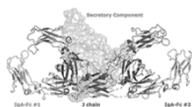
- Platelet-activating factor (PAF) acetylhydrolase
- Interleukins 1, 6, 8 & 10
- Transforming growth factor (TGF)
- Secretory leukocyte protease inhibitors (SLPI)
- Defensin 1
- Intracellular adhesion molecule 1
- Vascular adhesion molecule 1
- Toll-like receptors 2 & 4
- Co-Receptor CD14 & soluble CD14
- HMOs (Human milk oligosaccharides)

- Inhibit inflammation
- Enhance specific-antibody production
- Mediate differentiation and growth of B cells
- Facilitates establishment of beneficial microbiota



## Immunoglobulins – Mostly SIgA, some SIgG

- Relatively resistant to proteolysis
  - Immobilizing pathogens prevents adherence to epithelial cell surfaces
  - Neutralizing toxins and virulence factors.
  - Bind bacterial adhesion sites like pili (often found on *S. pneumoniae* and *Haemophilus influenzae*)
- Not taken into neonatal circulation except in preterm infants
  - Antigen-IgG immune complexes in breast milk induce T cell response (as well as transplacental infant serum IgG)
- SIgA concentrations are around 12 mg/ml in colostrum and only ~1 mg/ml in mature breast milk

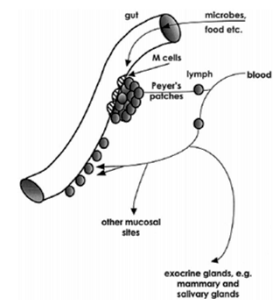


## Entero-Mammary Link

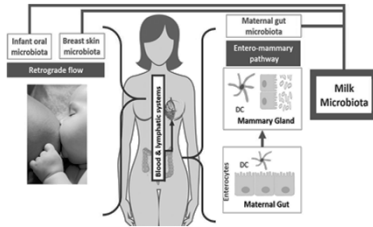
- Maternal gut pathogens stimulate maternal peyer's patches to generate immune response that goes through lymphatics and blood to mammary gland.



Why are moms always kissing their babies?



## Retrograde ductal flow



- Infant oral pathogens can undergo retrograde ductal flow associated with milk ejection during breastfeeding.
- Locally stimulates an immune response in the breast.

## Myth vs. Fact

- Breastmilk can treat eczema...
  - **Fact**, studies have shown it is as effective as 1% hydrocortisone
- Breastmilk can treat diaper dermatitis...
  - **Fact**, has also been shown as effective as 1% hydrocortisone
- Breastmilk can treat AOM...
  - **Myth**, it will not cross the tympanic membrane. It can however be soothing.
- Breastmilk can treat clogged tear ducts and early conjunctivitis...
  - **Myth**, studies have shown no difference compared to spontaneous resolution
- When nasal suctioning, breastmilk can substitute saline...
  - No studies showing benefit or harm.

## Types of vaccinations

- **Live-attenuated vaccines**
    - Measles, mumps, rubella (MMR combined vaccine)
    - Rotavirus
    - Smallpox
    - Chickenpox
    - Yellow fever
    - Polio (OVP - world)
    - Influenza (Nasal)
  - **Inactivated vaccines**
    - Hepatitis A
    - Influenza
    - Polio (IVP - US since 2000)
    - Rabies
  - **Subunit, recombinant, polysaccharide, and conjugate vaccines**
    - Hib (Haemophilus influenzae type b) disease
    - Hepatitis B
    - HPV (Human papillomavirus)
    - Whooping cough (part of the DTaP combined vaccine)
    - Pneumococcal disease
    - Meningococcal disease
    - Shingles
  - **Toxoid vaccines**
    - Diphtheria
    - Tetanus
  - **Genetic vaccines**
    - COVID19
  - **Viral vector vaccines**
    - COVID19
- <https://www.science.com/aandh/KM-ld-M1ev>
- 10 min video from JAMA Network on traditional vaccines and development of 5 different COVID19 vaccines
  - 7:45

**Table 1** Recommended Child and Adolescent Immunization Schedule for ages 18 years or younger, United States, 2020

Vaccine	Birth	1 mo	2 mo	4 mo	6 mo	12 mo	15 mo	18 mo	19-24 mo	2-7 yrs	7-10 yrs	11-12 yrs	13-15 yrs	16-18 yrs
Hepatitis B (HepB)	1 <sup>st</sup> dose	2 <sup>nd</sup> dose						3 <sup>rd</sup> dose						
Rotavirus (RV) (2 dose series; RV 2 dose series)			1 <sup>st</sup> dose	2 <sup>nd</sup> dose	See Notes									
Diphtheria, tetanus, acellular pertussis (DTaP)			1 <sup>st</sup> dose	2 <sup>nd</sup> dose	3 <sup>rd</sup> dose		4 <sup>th</sup> dose							
Diphtheria, tetanus, acellular pertussis (Tdap)								1 <sup>st</sup> dose						
Pneumococcal conjugate (PCV13)			1 <sup>st</sup> dose	2 <sup>nd</sup> dose	3 <sup>rd</sup> dose		4 <sup>th</sup> dose							
Pneumococcal polysaccharide (PPV 23)									1 <sup>st</sup> dose					
Influenza (IIV)									Annual vaccination 1 or 2 doses					
Influenza (IVN)									Annual vaccination 1 or 2 doses					
Measles, mumps, rubella (MMR)					1 <sup>st</sup> dose	2 <sup>nd</sup> dose								
Measles, mumps, rubella, varicella (MMRV)					1 <sup>st</sup> dose	2 <sup>nd</sup> dose								
Poliovirus (IPV)														
Poliovirus (OPV)														
Human papillomavirus (HPV)														
Human papillomavirus (HPV 9-valent)														
Human papillomavirus (HPV 4-valent)														
Human papillomavirus (HPV 2-valent)														
Human papillomavirus (HPV 9-valent)														
Human papillomavirus (HPV 4-valent)														
Human papillomavirus (HPV 2-valent)														
Human papillomavirus (HPV 9-valent)														
Human papillomavirus (HPV 4-valent)														
Human papillomavirus (HPV 2-valent)														

## Roles of vaccination and breastfeeding in relation to:

### Infant Vaccination



## Does breast milk vs. formula affect infant vaccination efficacy?

- Several studies have shown improve response to vaccines in breastfed infants compared to formula fed infants. BUT there is a lot of MIXED data.
  - Review in Am J perinatology, José G. Dorea, Ph.D. reviewed >50 studies.
- A few studies: breast-fed infants showed significantly higher poliovirus vaccine response at 6 and 12 months.
- A few studies: breast-fed infants showed lower rates of seroconversion after rotavirus vaccination.
  - Mexican study: higher maternal antibody concentrations of rotavirus was associated with lower rotavirus vaccine responses during infancy.
  - Demographics/pathogen exposures?
  - Nigerian study: measles antibodies in maternal sera or breast milk did not interfere with measles vaccination

*So far the data is inconclusive.*

## Breastfeeding in several studies has shown to *decrease* infant vaccination efficacy to oral vaccinations

- A possible explanation: mothers tend to breast-feed infants during the immunization visits - higher titers of IgA and neutralizing activity in breast milk
  - One study: evaluated delaying breast-feeding at the time of rotavirus immunization
    - No effect on antibody response.
  - Another study: evaluated withholding breast-feeding for 3 hours before immunization with oral cholera vaccine
    - Did increase antibody response
- Study compared poliovirus and rotavirus vaccinations which both replicate in the gut
  - Simultaneous administration of polio and rotavirus vaccines in breast-fed infants caused a significant reduction in antibody response to rotavirus but not to polioviruses.

### Mostly seen with rotavirus.

- Breast milk contains rotavirus specific (IgA) and nonspecific inhibitors (mucin and anti-trypsin) of rotavirus replication.

## Roles of vaccination and breastfeeding in relation to:

### Maternal Vaccination



## Maternal vaccination and breastfeeding

- Contraindicated: yellow fever (live attenuated)
  - A few infants have been infected with yellow fever via breast milk of vaccinated mothers (few cases of encephalitis).
  - Study: 11 women who were inadvertently vaccinated, none had detectable yellow fever vaccine RNA in their milk
- Contraindicated: small pox (live attenuated)
  - Theoretical



- Per CDC all other vaccinations are OK during lactation.
  - Even live: Influenza, MMR, Varicella and Typhoid (Ty21a). **With a caveat.**

## Mostly...

### Maternal vaccination promotes passive immunity.

- MMR showed measles-specific IgG in colostrum and breast milk and afforded protection to breastfed infants for a few weeks (unclear when vaccinated)
- Neisseria meningococcal vaccine: elevated N. meningitidis-specific IgA antibodies in breast milk, up to six months post-partum (unclear when vaccinated)
- Pertussis immunization during postpartum period: elevated pertussis antigen-specific IgA antibodies in breast milk
- killed polio vaccination: increase in IgA antibodies in breast milk (unclear when vaccinated)

### Maternal vaccination with live vaccinations appears to DECREASE breastmilk SIgA

- Live poliovirus vaccine
- Live salmonella typhi

## Specific Vaccinations:

Influenza  
Tdap  
COVID19

## Influenza

- According to the CDC, on average, about 8% of the U.S. population gets sick (symptomatic) from influenza each season, with a range of between 3% and 11%
  - Children are the **most** likely to get sick from influenza and under 5 are in the high risk category for complications
    - People 65 and older are **least** likely to get sick from influenza but are in the high risk category for complications
- In children under 5, CDC estimates:
  - 7,000 to 26,000 flu-related hospitalizations in the United States since 2010.
  - 37 to 188 deaths per season since 2004-2005
  - During the 2009 H1N1 pandemic, 358 pediatric flu-related deaths were reported to CDC from April 2009 to September 2010
- During 2017-2018, 188 deaths in children were reported to CDC but statistical modeling suggests approximately 600 deaths may have occurred.
- Among reported pediatric deaths, about 80% of those children were not fully vaccinated.

Vaccination is **NOT** recommended if <6 months of age

## Maternal influenza vaccination during pregnancy

- Reduces pregnant women's risk for influenza-associated hospitalization by an average of 40%
- Reduces influenza-associated hospitalization risk in infants aged ≤6 months by an average of 72%
- Study: Maternal immunization during the third trimester and breastfed their infants for an average of 14 weeks. During first 6 months of life infants had:
  - 36% reduction in respiratory illness with fever
  - 63% reduction in laboratory-confirmed influenza
  - This study was not able to differentiate between transplacental vs. breast milk protection



## Maternal influenza vaccination during lactation

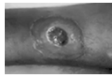
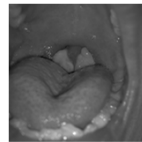
- IgG and IgA antibodies have been identified in breast milk
- Breastmilk antibody responses are higher with the inactivated influenza vaccine than with the live oral vaccine
  - Live attenuated maternal vaccination had more fussiness (60%) when compared to the inactivated vaccine (45%)



*Inactivated over live vaccination is preferred.*

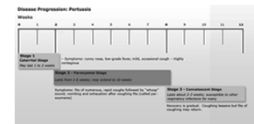
## Diphtheria

- Disease is caused by a toxin produced by bacteria *Corynebacterium diphtheriae* that destroys tissue leading to "pseudomembrane" and swollen "bull neck" - airway obstruction, skin lesions and myocarditis
- Before vaccines, diphtheria was a leading cause of childhood death around the world, including in the United States.
  - Today, is nearly unheard of in the US but still present around the world.
  - In 2018, more than 16,000 cases of diphtheria were reported to the WHO
    - likely more unreported.



## Pertussis – Whooping cough

- Disease caused by bacteria *Bordetella pertussis* which produces a toxin
- About half of babies younger than 1 year old need care in the hospital. The younger the baby, the more likely they will need treatment in the hospital.
- Of hospitalized infants:
  - 1 out of 4 (23%) get pneumonia
  - 1 out of 100 (1.1%) will have seizures
  - 3 out of 5 (61%) will have apnea
  - 1 out of 300 (0.3%) will have encephalopathy
  - 1 out of 100 (1%) will die
- Worldwide, estimated 24.1 million cases of pertussis and about 160,700 deaths per year
- Since the 1950s, Cases of pertussis in the US peaked in 2012, CDC reported 48,277 (likely more unreported)



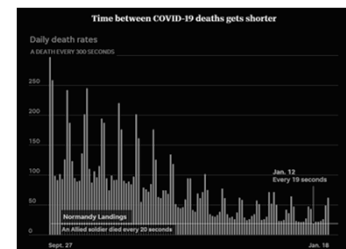
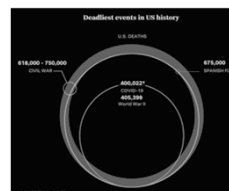
## Maternal Tdap Vaccination

- It is recommended all pregnant women receive Tdap with every pregnancy.
  - Vaccination after 20 weeks of gestation is associated with higher antipertussis IgA levels in their breastmilk
- In infants aged <2 months, Third-trimester maternal Tdap vaccination is
  - 77.7% effective in preventing pertussis cases
  - 90.5% effective in preventing pertussis hospitalizations
- Nursing mothers, who did not receive Tdap previously should be vaccinated with Tdap immediately postpartum.
  - Pertussis-specific antibodies appear in breastmilk within 1 to 2 weeks
  - But, mixed data if breastfed infants are protected from pertussis

*Recommended DURING pregnancy over postpartum*

## COVID19

- As of 1/19/2021:
  - 96,120,244 global cases with 2,054,560 deaths
  - 24,247,006 US cases with 401,586 deaths

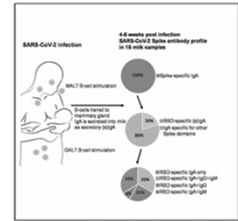


## COVID-19 mRNA Vaccination and Breastfeeding

- **No non-live vaccines have ever been reported to cause infant adverse effects via breastfeeding.**
- Composition:
  - mRNA is encapsulated within lipid nanoparticles
  - Nanoparticles, microscopic spherical-shaped mixtures of specialized fats, cholesterol, and polyethylene glycol
- mRNA translates for the SARS-CoV-2 S "spike" protein. The proteins are processed into peptides that are displayed on the cell surface, which then stimulates the antiviral immune response.
- There is no plausible mechanism for intact viral S proteins to be distributed into the milk from the maternal circulation after immunization.
- Any intact vaccine lipid nanoparticles that are excreted into breastmilk and ingested orally by the infant during feeding would be destroyed in the infant's gastrointestinal tract, which is a major reason why lipid nanoparticle-assisted RNA vaccines are limited to the parenteral route.
- The tiny amount of polyethylene glycol-2000 in Pfizer-BioNTech vaccine is not absorbed orally, so infant breastmilk PEG exposure from maternal immunization is not a concern.
- Neither of the currently available vaccines contains a preservative or adjuvant.

## Breastfeeding during COVID19 infection is recommended

- Is SARS-CoV-2 IN breast milk? Unlikely
  - Review of 14 studies that had tested human milk for human coronaviruses directly, 48 milk samples. All but one of these samples tested negative for SARS-CoV-2, and that result was reported from nonreliable source
- Are SARS-CoV-2 antibodies IN breast milk? YES
  - Study found SARS-CoV-2-specific IgA in breast milk from infected patients. Looked at antibody binding to the Spike protein. All samples exhibited significant specific antibody reactivity to the full Spike protein.
    - 80% exhibited significant IgG binding
    - 67% samples exhibited IgG and/or IgM binding



**No clear demonstration of transmission via breastmilk  
No clear demonstration of breastmilk protection clinically  
But the basic science is there**

## Scenario: Breastfeeding PERSON has suspected or confirmed COVID-19, but breastfed child does not.

- Isolation and quarantine
  - The breastfeeding person COVID-19 should follow home isolation.
  - The child is considered as a close contact of a person with COVID-19, and should be quarantined for the duration of the lactating parent's recommended period of home isolation AND during their own quarantine thereafter.
- Precautions while feeding at the breast, expressing milk, or feeding from a bottle -during their recommended period of home isolation:
  - Wash their hands using soap and water before touching their child or expressing breast milk either by hand expression or with a breast pump.
    - 2<sup>nd</sup> line: hand sanitizer with at least 60% alcohol.
  - Wear a mask when they are less than 6 feet from the child AND when expressing breast milk
  - Clean and sanitize breast pumps
  - If the breastfeeding person is not well enough to feed a caregiver who is not at increased risk for severe illness from COVID-19 may feed expressed breast milk to the child. They should wear a mask for the duration of the lactating parent's recommended period of home isolation and during their own quarantine thereafter.

## Scenario: Breastfed CHILD has suspected or confirmed COVID-19, but breastfeeding person does not.

- Isolation and quarantine
  - The breastfed child with COVID-19 should follow home isolation.
  - Mom is considered as a close contact of a person with COVID-19, and should be quarantined for the duration of the breastfeeding child's recommended period of home isolation AND during their own quarantine thereafter.
- Precautions while feeding at the breast, expressing milk, or feeding from a bottle - during their recommended period of home isolation:
  - Breastfeeding person should wash their hands using soap and water before and after touching their child
    - 2<sup>nd</sup> line: hand sanitizer with at least 60% alcohol.
  - Breastfeeding person should wear a mask
  - **Never use a mask on child less than 2 years old.**



## Summary

- Breastfeeding has many benefits, most are dose dependent. Encourage exclusive breastfeeding. AAP/AAP recommend exclusive feeding until 6 months and continuing through at least the first year as solids are introduced.
- Few contraindications to breastfeed: Galactosemia type 1, HIV.
- Breastmilk has many immune properties: antimicrobial and immunomodulatory that offer protection and help develop the infant immune system.
- Breastmilk CAN treat eczema and diaper dermatitis (NOT AOM or conjunctivitis).
- Infant vaccination efficacy can be affected by but data is inconclusive for most other than improved IPV response and decreased oral rotavirus response. Not breastfeeding prior to immunization may be beneficial but more research needed.
- All vaccinations so far are recommended during lactation other than yellow fever and theoretically small pox.
- Maternal vaccination does generate antibodies in breastmilk. A few live vaccines however decrease breastmilk antibodies (polio and salmonella).
- Influenza vaccination during pregnancy and lactation is recommended and does show clinical benefit.
- During lactation inactivated influenza vaccination is preferred over oral/live for better immune response.
- Maternal Tdap vaccination shows clear benefit when given during pregnancy, less data postpartum but still recommended.
- COVID19 vaccination appears safe during breastfeeding. Antibodies have been found in breastmilk and are functional at the basic science level. Clinical correlations not yet defined.
- Breastfeeding is recommend during maternal or infant COVID19 infection with recommended precautions.

## References – General resources

- Up to date
- CDC website
- La Leche League Canada
- Vaccines.gov
- Drugs and Lactation Database (LactMed)
- <https://www.usamaid.com/index.php/news/2021/01/09/covid-19-what-is-american-homes-factsheet-and-how-to-keep-yourself-safe/>
- <https://coronavirus.llnwd.com/>

## References - Articles

- Antonini SL, Kampmann B, Malring Le-Duc H. Human breast milk: A review on its composition and bioactivity. *Early Hum Dev*. 2015 Nov;91(11):629-35. doi: 10.1016/j.earhdev.2015.08.013. Epub 2015 Sep 12. PMID: 26232626.
- Hansen JA. Breastfeeding provides passive and likely long-lasting active immunity. *Ann Allergy Asthma Immunol*. 1996 Nov;76(5):478. PMID: 8926265.
- Vanhaesebrouck V. Is infant immunization by breastfeeding possible? *Philos Trans R Soc Lond B Biol Sci*. 2015 Jun 19;370(1671):20140133. doi: 10.1098/rstb.2014.0138. PMID: 25964452. PMCID: PMC4257385.
- Patel HF. Immunomodulation by breast-feeding. *Pediatr Infect Dis J*. 1997 Dec;16(10):891-5. doi: 10.1097/00006454-199710000-00017. PMID: 9306476.
- Grant MR, Cassel MR, Smith K, Casey K, Kremen V, Balakrishna E. Immunity, Inflammation and Metabolism in post-partum breast and umbilical fluids. *Acta Paediatr Scand*. 2005 Oct;54(4):223-31. doi: 10.1111/j.1600-0822.2005.01301.x. PMID: 16132613.
- David JD. Breastfeeding and responses to viral vaccines: constitutional and environmental factors. *Am J Perinatol*. 2012 Nov;29(10):789-795. doi: 10.1055/s-0012-1316423. Epub 2012 Jul 6. PMID: 22772636.
- Hausman GJ. Galactin O1: immune cell-mediated protection of the mammary gland and the infant during breastfeeding. *Adv Nutr*. 2015 May;6(3):267-75. doi: 10.3945/adv.nut.144.007371. PMID: 25976462. PMCID: PMC4434776.
- Laker Lopez-Leyva, Nicholas J.B. Swanson, Kristina G. Kosik. Emerging horizons in human milk: microbiome research and suggested proteins for 16S rRNA gene analysis. *Computational and Structural Biotechnology Journal*. Volume 19, 2021. Pages 121-132. ISSN 2003-0170.
- Parra A, Sotelo M, Osakabe G, Chazabangari ME, Panajiotou S, Artakabli P, Laitinen O. Immunizations during pregnancy: How, when and why. *Eur J Child Genet Reprod Biol*. 2019 Sep;24(2):29-35. doi: 10.1007/s10824-019-0216-18. Epub 2019 Jun 14. PMID: 31222574.
- Laidler MC, Kahn HE, Serfaty DB, Kaplan DV, Davidoff FS, Fish RV, Hansen V, Shiff TH. Viral Exposures and Prevention of Influenza and Pertussis Among Pregnant Women and Infants - United States. *MMWR Morbidity and Mortality Rep*. 2019 Oct 11;68(40):885-892. doi: 10.15585/mmwr.mm6840a1. PMID: 31607186. PMCID: PMC6798395.
- Laidler MC, Parra AM, Williams JE, Sotelo M, Osakabe G, Chazabangari ME, Shiff TH, Hansen V, Shiff TH, McQuinn MA, McGuire MA. SARS-CoV-2 and human milk: What is the evidence? *Matern Child Nutr*. 2020 Oct;16(4):e13252. doi: 10.1111/mcn.13252. Epub 2020 May 30. PMID: 32472745. PMCID: PMC7250482.
- Parra A, Morris A, Aranda F, Gonzalez F, Gonzalez-Rodriguez J, Zaldívar-Romero B, Prasad RL. Human and Specific Secretory IgA Against SARS-CoV-2 Detected in Human Milk. *Glycans*. 2020 Nov 25;2(11):1977-85. doi: 10.1016/j.gly.2020.10.1733. Epub 2020 Oct 26. PMID: 33136887. PMCID: PMC7588323.

# Carly Salter, MD

## Projects Completed During Residency:

**Community Health Learning Experience:**  
Wingra Resource Navigator Program

## Scholarly Project:

Is there a Role for Anticoagulation Following ACL Reconstruction to Prevent VTE?:

I completed an FPIN Help Desk Answer with Dr. Erin Hammer and Dr. Jake Starsiak. Knee arthroscopy is becoming a more common procedure with an associated increased risk of VTE which raises the question of the most appropriate prophylaxis that is indicated. Chemoprophylaxis for venous thrombosis prevention is not recommended after knee arthroscopy. There is no strong evidence that thromboprophylaxis is effective in preventing thromboembolic events in adults with unknown risk factors following knee arthroscopy, although there are increased odds of venous thromboembolism after ACL reconstruction in patients with increased risks for venous thrombosis.



Carly Salter is interested in providing continuity care for families, underserved populations, gender affirming care, and women's health. Carly is originally from Fond du Lac, WI and earned her bachelor's degree in chemistry from the University of Wisconsin –

Oshkosh. During college, she participated in a 2-week mission trip to Costa Rica and Nicaragua where she traveled to remote communities with minimal access to healthcare. From this, she gained perspective on poverty's influence on health. Carly earned her medical degree from the Saint Louis University School of Medicine. While in medical school, Carly volunteered at the student-run free health clinic in the underserved urban community of North St. Louis where she gained experience with trauma-informed care and the barriers faced by marginalized populations. As a result of the unrest and dialogue following Michael Brown's killing in Ferguson, which happened one week after starting medical school, Carly engaged the local community in conversations about socioeconomic status and ways to collaborate and make a difference. Carly seeks to understand her patients' stories and experiences so she can provide compassionate care for each individual. When she has some free time, Carly enjoys figure skating, horseback riding, walks in the park, and cheering on the Green Bay Packers.



*To say that I have had amazing support throughout my medical education is an understatement. An extra special thank you to my parents and sister for their constant patience with the endless phone calls with wise counsel (especially urology curbsides courtesy of Dr. E Salter). Over the past three years my amazing co-residents have become family and I never would have survived this without them, not to mention the entire one of a kind Wingra family! I feel fortunate to have had the opportunity to learn how to become an amazing doctor from an amazing group of attendings!*

## **Wingra Resource Navigator Program**

Jonathan Christ, MD & Carly Salter, MD

### **Background**

The Wingra Resource Navigator Program is aimed to identify Wingra patients who are in need of essentials that play a role in their health such as food, housing, transportation, etc. The patient populations we serve at Wingra Clinic are often disadvantaged financially and use our clinic as their main community resource. With the assistance of prior project contributors familiar with the Resource Navigator program at our clinic, undergraduate student navigator volunteers were trained to assist the social work team in connecting our patients with the community resource they needed.

### **Objectives**

Our goal was to further integrate the resource navigators into the workflow at Wingra Clinic since there was little communication between providers and the navigators. We sought to integrate the navigators into clinic huddles and provide them with the list of patients being seen in the clinic the following day so that they could be aware of when their patients were being seen in clinic. This would enable them to reach out to providers in order to work together on addressing the patients' needs since they do not have access to our electronic medical record. We also strove to increase awareness about the Resource Navigator program among providers in clinic.

### **Methods**

We held meetings with clinic leadership and resource navigator leaders to identify disconnects between providers and student navigators.

During a resident education afternoon at Wingra in Fall 2019, we presented the background information about the resource navigators to the providers in clinic and encouraged providers to reach out about patients with concerns about resources.

Screening forms were created during the COVID-19 pandemic and handed to patients at check in and were to be returned and collected by Sheray Wallace to identify individuals in need.

### **Results**

The daily patient schedule was printed out by the reception staff on the day prior and given to the resource navigators so that they could identify when their patients would be seen and would reach out to providers prior to the visits. This was implemented and a few weeks later, the COVID-19 shutdown was implemented and navigators were removed from clinic.

The resident education afternoon increased awareness of the Resource Navigator Program and its potential role in the care of our patients.

The screening forms were infrequently filled out because patients were simply handed the forms without an explanation of what they were for and just threw them away or took them home with them.

### **Conclusions**

The impact of our efforts to connect clinic providers and student navigators was complicated by the onset of the COVID-19 pandemic as the student navigators that were an integral component to our improvement plan were no longer present in the clinic as a precaution. Prior to the pandemic, our efforts at resident education afternoons increased clinic utilization of the student navigators as a resource to identify and connect patients to their needed resources. The implemented screening forms created during the pandemic helped Sheray Wallace and the student navigator team stay connected with in need patients despite their absence at Wingra Clinic.

### **Acknowledgements**

Sheray Wallace, Lane Hanson, Kirsten Rindfleisch, Sean Duffy, Mary Vasquez, John Tovar



# Sarah Schaaf, MD

## Projects Completed During Residency:

### Scholarly Project:

Vaccine Hesitancy

### Scholarly Project:

Residency Clinic Efficiency:

We standardized the clinic visit times and adjusted the starting times for each half day. This reduced logistical barriers and opened more visits. We were able to increase the numbers of patients seen each half day for nearly every resident.



Sarah Schaaf does not have one hometown—rather, her experiences living in Marfaqq, Jordan; Cairo, Egypt; Aberdeen and Sioux Falls, SD; Detroit and Belleville, MI; and Atlanta, GA have all shaped her into the doctor she is today. She earned her

bachelor's degree in social work from Wayne State University and a master's degree in public administration from Rutgers University before coming to the University of Wisconsin School of Medicine and Public Health. She comes to medicine with longstanding interests in the reduction of healthcare disparities, the provision of cost-effective healthcare, and the promotion of medical education in 3rd world countries. She has served in the US Peace Corps in Uganda and as a community health volunteer in Lesotho. She has also worked as a direct support professional with developmentally disabled children and as an intern for a community rehabilitation program for female ex-convicts. While in medical school, she served as a leader for the Students for a National Health Plan. As a future family physician, her goals include increasing the importance of longitudinal, inclusive patient care and integrating psychiatric care into general medical care. In her off hours, Sarah enjoys visiting friends and family around the world, gardening and pickling, cooking, hosting friends, running, listening to podcasts, and writing poetry.



*Thank you Jonathan, for being there for me every day and every step of the way. Without your ultrasound modeling skills, I don't know where I would be today. Thank you Grandpa and Dr. Jim for being voices of reason and shining examples. Thank you Angie for making one crazy idea after another work. Thank you Dr. Hannah. You are the most intelligent, patient, flexible, resilient person I know. I will miss your laugh.*

# Vaccine Hesitancy

Sarah Schaaf, MD, MPA, RPCV,  
PGY-3 at the DFMCH-RTT

<https://www.balboa.com/blog/learning-at-21st-century-what-a-miss/>

## One Planet: Ex. Measles

- Globally, one in 7 children is under vaccinated.
- Measles requires 95% of the population to be immunized to achieve herd immunity
- In 2000, measles was declared to be eliminated in the US
- In 2019, we had 1,282 cases in 31 states
- In most cases, a traveler from a poorly vaccinated country spread measles in an inadequately vaccinated US community (9).

## Vaccine Hesitancy


-Delay in acceptance or refusal of vaccines despite availability of vaccine services. Varies across time, place and vaccines. It is influenced by:

- complacency**
- convenience**
- confidence (7)**

- Convenience and complacency are the greatest barriers

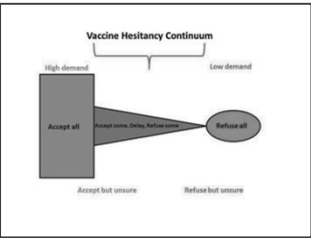
- Ex: ease of religious exemption in the US.

- Humans feel greater moral responsibility for harm done in action than harm done in inaction (9)



Health Workers in China carrying vaccines by hand (WHO 2020)  
<https://www.who.int/news-room/photo-story/photo-story-detail/usa/asia-and-international-topics>

## Vaccine Hesitancy



**Vaccine Hesitancy Continuum**

High demand | Low demand

Accept all | Accept but unsure | Hesitant, Delay, Refuse part | Refuse but unsure | Refuse all

Report of the WHO Working Group on Vaccine Hesitancy, World Health Organization (2014). <https://www.who.int/news-room/feature-stories/who-vaccine-hesitancy-report>

\*Dolly Parton adapts her song 'Jolene' as she receives Covid-19 vaccine she helped fund

In the US/ EU/ Australia and NZ:

- **30-45%** of parents: unquestioning vaccine acceptors
- **25-35%** of parents vaccinate children despite minor concerns
- **20-30%** vaccinate but have significant (safety) concerns
- **up to 27%** accept some vaccines, not others
- **2%** decline all vaccines (9)

## Anti Vaccination themes from 1800's on...

- **Toxicity:** vaccines are *toxic*/ have toxic ingredients and healthy behaviors/ organic foods are just as effective in preventing the spread of disease.
- **Religiosity:** vaccine contains materials objectionable on religious grounds
- **Liberty:** individuals should have health freedom/ medical choice instead of requirements to immunize
- **Distrust of industry:** concern that vaccines are produced by profit- motivated pharmaceutical companies.
- **Safety:** concern for AIDS, autism, seizures from vaccines.
- **Conspiracy:** distrust of government and authority figures such as Bill Gates (9).

## History of the modern Western Anti- Vaccine Movement

- Whole cell pertussis vaccine caused febrile seizures in the 1970's- 1990's.
- Gordon Steward made unsubstantiated claims that 1 in 50,000 pertussis vaccines caused brain damage.
- In England and Wales, rates of pertussis vaccination dropped from 77% to 30% from 1974 to 1978.
- 5,000 British children were hospitalized, 20% of whom suffered pneumonia, and some suffered permanent cognitive deficits from meningitis.
- In 1982, there was a televised expose of the dangers of the Pertussis vaccine in the US, accompanied by lawsuits by parents of disabled children.
- Liability concerns caused vaccine manufacturers in the US to leave the market
- Worried about low vaccine supplies, Congress created a no fault administrative court in 1986 to consider vaccine harm allegations and provide monetary compensation, protecting manufacturers from liability.
- This was followed by Andrew Wakefield in the 1990's who claimed that the MMR vaccine caused autism.
- In Feb 2020, a study of 2,500 US adults found that 20% were misinformed about vaccines (9)

## WHO: TAILORING IMMUNIZATION PROGRAM

- Identified target population
- Used surveys to determine the major factors underlying hesitancy
- Tailored intervention strategy to address these factors
- Evaluated outcome.
- It is about trust: people believe messages from other consumers more from companies.
- There was no "magic bullet" (7)



Robert Heringage, a nurse assistant, gives baby Lashon the first dose of the world's first rotavirus vaccine. Photo: WHO/UNICEF  
<http://www.who.int/news-room/photo-gallery/2012/04/04/12040401>

## Physician Recommendation

- What does not work? Communicating GRAVITY of DISEASE or EFFICACY of VACCINE.
- The decision to immunize is shaped by a patient's perception of social norms.
- Physician recommendations can influence social norms
- Recommendation by provider with **longitudinal relationship** with the family raises vaccination rates.
- **Direct physician recommendation** was the #1 factor cited in increasing the uptake of HPV vaccines.
- **Strength of physician recommendation** significantly affected vaccine uptake (5).
- **Presumptive language** is more effective: ex "Now that Harry is 12, he is due for 3 vaccines, including vaccines against meningitis, HPV cancers, and whooping cough." (9)

## Tools To Use During Your Discussions



## Vaccine Approval Process

1. **Research and Discovery Stage:** laboratory based ideas of how a vaccine may work
2. **Pre-clinical:** phase: animal based testing to see if human trials would be safe and effective
3. **Clinical Development:** Researchers submit an Investigational New Drug Application (IND) to the FDA. The FDA ensures that pre clinic studies were done according to good laboratory practices and whether it would be safe to move on to human trials.
  - a. Phase 1: 20-100 volunteers not yet exposed to the disease. Tested for adverse reactions and whether immune response is developed
  - b. If no safety concerns from Phase 1, move to Phase 2. Placebo controlled testing done on 100's of people with varying medical problems to see if it is safe.
  - c. If no safety concerns from above, move to Phase 3: Placebo controlled vaccine administration to thousands of people, generating effectiveness and safety data. Less common side-effects are found.
4. During clinical development, the FDA works with the manufacturer to develop a **lot release** protocol. Each produced lot of vaccines has to pass testing for purity, potency, identity, and sterility to be released by the FDA for distribution (3)

## Vaccine Monitoring

VAERS: Vaccine Adverse Event Reporting System: Database on **unverified** report of adverse events following immunization with US licensed vaccines. Anyone can submit a report or download data to search at [www.vaers.hhs.gov](http://www.vaers.hhs.gov). There is a search tool, WONDER that you can use to search: wonder. <https://wonder.cdc.gov/vaers.html> (10)

**CDC Vaccine Safety Datalink:** partners with health care corporations around the country and uses their EMR records to track vaccines administered and illnesses or events sustained. This allows rapid reporting of adverse effects linked to vaccines. The incidences of illnesses among vaccinated persons are compared to incidences of the same illnesses among unvaccinated persons and used to inform vaccine safety. This is a primary method for tracking vaccine safety in pregnant women (11).

## Example, RotaShield

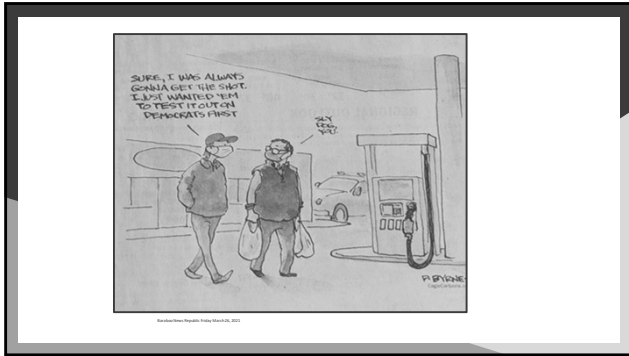
**Rotashield** was a vaccine introduced in 1998, recommended to children at 2, 4, 6 months of age.

-A few months after it was introduced, there were 15 cases of intussusception reported to VERS

-At baseline, before introduction of the vaccine, this occurred in about 1 in 2,000 children. A question arose: does Rotashield cause more intussusception than at baseline?

The Vaccine Safety Datalink was used to investigate medical records of children with and without the vaccine. The vaccine caused an extra 1, in 10,000 children to get intussusception.

Rotashield was taken off of the market (6)



### How could the COVID-19 vaccine develop so fast?

1. We can now rapidly sequence the genes of both humans and pathogens. The COVID-19 genetic sequence was available in January 2020.
2. Global scientists used existing data from the MERS vaccine to do the pre-clinical work targeting COVID-19.
3. Vaccines were under development at the same time that most of us entered quarantine in 2020. Moderna's Phase 1 clinical trials to begin on March 16, 2020. Other companies began in April.
4. COVID-19 is very infectious, allowing companies to compare the rates of illness in vaccinated vs. unvaccinated persons in a shorter time frame than other diseases would allow. (4)

### What is Emergency Use Authorization?

**Emergency Use Authorization:** allows availability and use of medical treatments and vaccines during public health emergencies.

- Vaccines had to complete testing on tens of thousands of study participants. Before submitting an application for emergency use, vaccine manufacturers had to finish clinical phase 1&2 and be in the process of completing phase 3 trials.
- They had to follow up for adverse effects for at least 2 months.
- The FDA also evaluated the chemistry, manufacturing and quality control for vaccine production. (2)

### Vaccine Education Center: CHOP

- <https://www.chop.edu/centers-programs/vaccine-education-center>
- Paul Offit, MD Pediatric Infectious Disease
- Vaccine information for pregnancy
- Vaccine information for parents of infants
- Disease specific and concern specific information
- Parents PACK newsletter and parent group

### Common Q&A: Are Vaccines Safe?

Safety: benefit outweighs risk. Vaccines are not harmless but they also prevent real disease.

Ex: Hepatitis B: the disease kills about 1,700 persons a year in the US. It causes many more to have liver disease. 1-2 million people have it without knowing it. Infants can get it by being exposed to other adults. You can get it through exposure to microscopic amounts of another person's blood.

The vaccine: 1 in 1 million doses is complicated by anaphylaxis. There are 4 million babies born in the US per year. If each received 3 doses of the vaccine, we could have up to 12 cases of anaphylaxis per year.

The benefit is avoiding 1,700 deaths. The risk is 12 cases of anaphylaxis (6)

### Vaccine Schedule and Number

2. Why do we have to give the vaccines at such a young age?
  - Most of the vaccines we have were developed to combat diseases that killed and permanently disabled infants.
  - The infantile immune system is more robust than the adult immune system. For example, the older a person is, the less likely the Hepatitis B vaccine is to produce an effective immune response.
3. Aren't these too many vaccines?
  - A child has the capacity to respond to approximately 10,000 vaccines at one time. The immune system can make about 2 billion white blood cells a day to respond to pathogens. Modern vaccines also use fewer proteins than older vaccines did. For example, smallpox, a common vaccine in the early 1900's contained about 200 proteins. The whole cell pertussis vaccine in the 1980's contained 3,000 proteins. Now all of our childhood vaccines combined contain about 160 proteins.

## Alternative schedules, links to chronic disease

### 3. What about an alternative vaccine schedule?

- It increases the time during which children are susceptible to vaccine preventable diseases.
- Children produce the same amount of stress hormone (cortisol) whether they get one shot or multiple. Spacing out vaccines therefore causes more stress.

### 4. Do vaccines cause chronic diseases?

- We know that MS is worse during influenza season because influenza proteins can mimic myelin basic protein. Persons with MS can inadvertently have heightened autoimmunity to the myelin on their nerves when combatting influenza. The influenza vaccine contains myelin protein. Studies, however, have found that the influenza vaccine cannot cause the same worsening of MS symptoms that the influenza illness does.

## Vaccines and Autism

5. Do vaccines cause autism? On Feb 28, 1998, Andrew Wakefield, et, al published an article in the Lancet, a British newspaper, regarding 12 children with Autism, 8 of whom had had the MMR vaccine, and one of whom had Measles.

The paper stated that viral encephalitis does cause autism. It states "We did not prove an association between measles, mumps, and rubella vaccine and the syndrome described (Wakefield, 1998)." 12 further studies, involving thousands of children, failed to find an association between the MMR vaccine and autism.

In 1999 the American Academy of Pediatrics asked that thimerosal be removed from children's vaccines, even though research did not find any sign of mercury poisoning or autism from this preservative.

There was no change in rate of autism between children given all their vaccines on time and those with delayed vaccines.

## Concern about Harmful Additives



## Thimerosal

- Removed from childhood vaccines in 2001
- Previously, caused a dose of about 200 mcg of methylmercury throughout the entire childhood
- Breastfed babies ingest 400 mcg of methylmercury through breast milk in the first 6 months of life.
- When children who received thimerosal were compared to those who had not, there was no difference found in risk of autism or mercury poisoning.

## Aluminum

- The adjuvant to enhance the immune response.
- It is the third most abundant element on earth and in all of our foods.
- A breastfed baby will eat 10 mg by 6 months of age
- A formula fed baby will eat 30 mg by 6 months
- A soy formula fed baby will eat 120 mg by 6 months of age.
- Vaccines: 4 mg of aluminum in 6 months.

## Formaldehyde

- Used to inactivate the polio and Hep A virus and bacterial toxins (diphtheria, tetanus).
- Formaldehyde can damage DNA and causes cancerous changes in lab cells.
- Formaldehyde has not been found to cause cancer in human beings.
- Formaldehyde is part of the metabolism of thymidine, purines, amino acids. Every human makes formaldehyde and has it in their blood.
- The average 11 lb infant would have 1 milligram of formaldehyde in it's blood due to natural metabolic processes. This is ten times the amount of formaldehyde found in a vaccine.



<http://www.artsandculture.com/photos/boonville-glass-entraining-both-house>

## Aborted Human Fetal Cells

- Two elective abortions in the early 1960's
- Sweden: human fetal cells went to the Wistar Institute: cells WI-38-> rubella and rabies vaccines
- England: cells went to the Medical Research Council: cells MRC-05 -> rubella, rabies, chicken pox, hepatitis A vaccines
- Pope Benedict XVI reasoned that giving vaccines from human fetal cells "does not indicate any negative moral value when compared to the greater good of preventing life threatening infections"

Questions?

## CITATIONS

1. Ball, P. (2020). The lightning-fast quest for COVID Vaccines — and what it means for other diseases. *Nature*, 589(7840), 16–18. doi:10.1038/041586-020-03826-1
2. Center for Biologics Evaluation and Research. (n.d.). Emergency use authorization for vaccines explained. Retrieved March 28, 2021, from <https://www.fda.gov/vaccines-blood-biologics/vaccines/emergency-use-authorization-vaccines-explained>
3. Center for Biologics Evaluation and Research. (n.d.). Vaccine development — 101. Retrieved March 28, 2021, from <https://www.fda.gov/vaccines-blood-biologics/development-approval-process-how-vaccine-development-101>
4. Lurie, N., Saville, M., Hanhinep, R., & Hutson, J. (2020). Developing covid-19 vaccines at pandemic speed. *New England Journal of Medicine*, 382(12), 1969–1973. doi:10.1056/nejmp-2005630
5. Nyhan B, Reifler J, Richey S, Freed GL. Effective messages in vaccine promotion: a randomized trial. *Pediatrics* 2014;133(4):e835–e842.
6. Gilpin P.A., & Mosser C.A. (2013). *Vaccines & your child: Separating fact from fiction*. New York: Columbia University Press
7. Report of the SAGE Working Group on Vaccine Hesitancy. World Health Organization (2014). doi:<https://www.google.com/search?client=firefox-b-1-d&q=SAGE+VACCINE+HESTANCY+WORKING+GROUP>
8. The Editors of The Lancet. (2018). Restriction—*hag* lymphoid nodular hyperplasia, non-specific colitis, and pervasive developmental disorder in children. *The Lancet*, 375(9713), 445. doi:10.1016/S0140-6736(16)0175-4
9. The Sabin-Apigen Vaccine Science and Policy Group. Meeting the challenge of vaccination hesitancy. May 2020 ([https://www.sabin.org/sites/sabin.org/files/sabin\\_apigen\\_report\\_2020\\_meeting\\_the\\_challenge\\_of\\_vaccine\\_hesitancy.pdf](https://www.sabin.org/sites/sabin.org/files/sabin_apigen_report_2020_meeting_the_challenge_of_vaccine_hesitancy.pdf), opens in new tab)
10. The Vaccine Adverse Event Reporting SYSTEM (VAERS) REQUEST. (n.d.). Retrieved March 28, 2021, from <https://wonder.cdc.gov/vaers.html>
11. Vaccine Safety Datalink (VSD). (2020, August 24). Retrieved March 18, 2021, from <https://www.cdc.gov/vaccinesafety/ensuring-safety/monitoring/vsd/index.html>

# Stacey Schley, MD

## Projects Completed During Residency:

### Scholarly Project:

Increases in Training Load Are Negatively Associated with Sleep Duration and Quality in Male Collegiate Athletes

### Community Health Learning Experience:

Verona's 2020 Fitness and Lifestyle Challenge:

The 2020 program provides adult patients with obesity, prediabetes, or diabetes at the Verona Family Medicine Clinic the opportunity to participate in shared medical appointments, with the goal of teaching lifelong health habits in a supportive, group environment. The multifaceted program occurs once monthly and incorporates a nutrition, exercise, educational and goal-setting component within each session. My specific roles included active participation in movement/exercise sessions, assisting in group discussions and educational sessions, leading goal-setting sessions, and offering additional support for the program participants. I also helped facilitate a virtual format in lieu of the in-person classes during the COVID pandemic.



*I'd like to say thank you to my family and friends who have provided endless support over the years. To my parents, who were always understanding, willing to lend a hand or a listening ear, I couldn't have done it without you. Special thank you to my sister for her mentorship in medicine and for always raising the bar high. Thank you to my mentors, near and far, for your guidance, compassion, and support. And last but certainly not least, to the ladies who brunch, I would not have survived the past 3 years without you; you're simply the best!*



Stacey Schley comes to Madison with a strong interest in sports medicine and preventive and lifestyle medicine. Originally from Kalamazoo, MI, Stacey earned her undergraduate degree in sports science from Lasell College. She earned her medical degree from the Michigan State

University College of Human Medicine, where she founded the school's Sports Medicine Student Interest Group and provided medical coverage for sporting events. While in medical school, she implemented and instructed an ultrasound elective for 1st and 2nd year medical students. During her 3rd and 4th years of medical school, Stacey provided medical coverage for the NHL Prospect Tournament / Detroit Red Wings Training Camp. Throughout medical school, Stacey was a mentor and exercise instructor for FitKids360, a multidisciplinary childhood obesity program. Stacey has a background in personal training and she is excited to work with her patients to manage acute and chronic conditions as well as partner with individual patients and whole communities on the preventive aspects of health and well-being. She wishes to establish long-lasting relationships with each of her patients to encourage them to achieve their health goals. Stacey enjoys weightlifting, baking, hiking, and boating on Lake Michigan with her family and friends.

## Increases in Training Load Are Negatively Associated with Sleep Duration and Quality in Male Collegiate Athletes

**STACEY SCHLEY, MD**

JENNIFER SANFILIPPO, MS, ANDREW WATSON, MD, MS  
UNIVERSITY OF WISCONSIN SCHOOL OF MEDICINE AND PUBLIC HEALTH,  
MADISON, WISCONSIN

## Why do we care?

**Aim to keep athletes well, at optimal performance & “in the game”**

**Goal:** aim for therapeutic levels of TL

- TL  $\leftrightarrow$  stress/adaption  $\leftrightarrow$  maladaptation/OR/OTS
- Benefits of sleep:
  - Athletic performance, recovery, quality of life

**Previous studies:** Adolescent F athletes, International Rugby players  
• Collegiate population novel

## Purpose

To determine if increases in daily (TL-D), weekly (TL-W), monthly (TL-M), or acute-on-chronic training load (TL-A:C) are negatively associated with subsequent sleep quality or duration in NCAA Division I (D-I) male basketball players.

## Methods/Design

- **Design:** This was a prospective cohort study of 11 D-1 Male Basketball players @ UW Madison over 2 consecutive, 6-month seasons.
- **Measures**
  - **Training load:** sRPE: Duration (min) x Intensity (1 to 10)
  - **Sleep:** reported duration (hrs) & quality on Likert scale 1 (worst) to 5 (best) every morning prior to activity
  - **Prior day training load (TL-D):**
  - **Weekly training load (TL-W):** Rolling average of prior 7 days
  - **Monthly training load (TL-M):** Rolling average of prior 4 weeks
  - **Acute on chronic training load (TL-A:C):** Prior week divided by prior 4 weeks

## Methods/Design

- TL values reported individually (rather than group average)
- **Analysis:** Separate mixed effects linear regression models were used to evaluate:
  1. the association between TL-D, TL-W, TL-M and TL-A:C and sleep the following day
  2. the associations between TL-W, TL-M and TL-A:C and sleep the following week

## Results: Average TL and Sleep

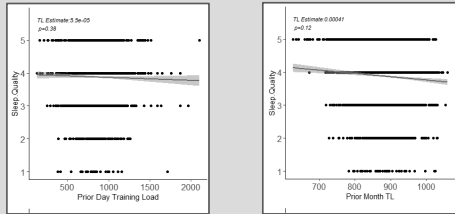
Mean individual TL-D: 856+/-228 arbitrary units (AU)

Year	Sleep Duration (hours)	SD	% Averaging < 8 hours
2015-16	7.47	1.00	81.8
2016-17	7.38	1.00	100.0

Players averaging < 8 hours of sleep per night:  
81.8% and 100% for the 2 seasons.

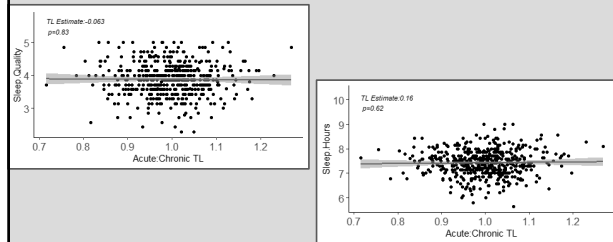


TL-D: No significant association with sleep quality or duration the following night.

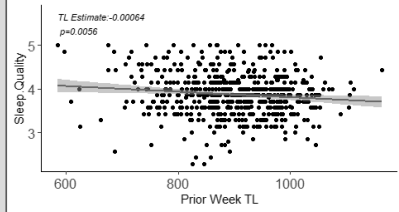


Also no association between TL-W, TL-M, TL-A:C with sleep the following night.

No association was identified between TL-A:C and sleep duration or quality the following week.

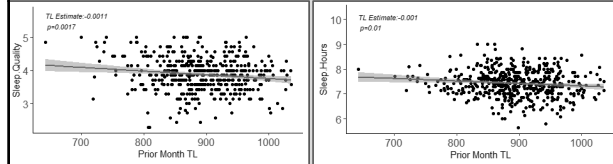


#### Effect of TL-W on Subsequent Week's Sleep Quality



TL-W demonstrated a significant, negative association with sleep quality the following week ( $b=-0.001$ ,  $p=0.006$ ).

#### Effect of TL-M on Subsequent Week's Sleep Quality & Duration



TL-M: Significant, negative association with sleep quality and duration the following week ( $b=-0.001$ ,  $p=0.002$ ,  $b=-0.001$ ,  $p=0.01$ ).

## Conclusion/Significance

1. Among NCAA D-I male basketball players, high TL-W and TL-M is negatively associated sleep quality and duration the following week.
2. Moderate increases in TL-W (500 AU) are associated with a 0.32 decrease in average sleep quality the following week (1-5 scale)
3. Moderate increases in TL-M (500 AU) are associated with a 0.55 decrease in average sleep quality and a 30 minute decrease in average nightly sleep duration the following week.

#### Monitoring may allow coaches/trainers/athletes:

- Identify periods at risk for poor sleep & establish countermeasures
- Assist with program design/periodization to prevent overtraining/burnout
- Avoid performance/game loss

## Limitations/Future Research

#### Limitations:

- Small population, limited to M athletes, Single sport
- Subjective rather than objective measures utilized
- Did not account for practice/game schedules (early vs. late practices, travel for competition)

#### Future Direction

- Larger sample size
- Comparing perceived vs. actual sleep (polysomnography or actigraphy)
- Assess to what degree the negative association between TL and sleep affects injury/illness/performance

## References

- Gabbett T. Infographic: The training–injury prevention paradox: should athletes be training smarter and harder? *British Journal of Sports Medicine*. 2017;52(3):203-203. doi:10.1136/bjsports-2016-097249.
- Lastella M, Vincent GE, Duffield R, et al. Can Sleep Be Used as an Indicator of Overreaching and Overtraining in Athletes? *Frontiers in Physiology*. 2018;9. doi:10.3389/fphys.2018.00436.
- Leduc, C., Jones, B., Robineau, J., Piscione, J., & Lacombe, M. (2019). Sleep Quality and Quantity of International Rugby Sevens Players During Pre-season. *Journal of Strength and Conditioning Research*, 33(7), 1878–1886. doi: 10.1519/jsc.0000000000002839
- Schwellnus M, Soligard T, Alonso J-M, et al. How much is too much? (Part 2) International Olympic Committee consensus statement on load in sport and risk of illness. *British Journal of Sports Medicine*. 2016;50(17):1043-1052. doi:10.1136/bjsports-2016-096572.
- Watson A, Brickson S. Impaired Sleep Mediates the Negative Effects of Training Load on Subjective Well-Being in Female Youth Athletes. *Sports Health: A Multidisciplinary Approach*. 2018;10(3):244-249. doi:10.1177/1941738118757422.

# Nicholas Squires, MD

## Projects Completed During Residency:

**Community Health Learning Experience:**  
Obstetrical Care Training for Belleville EMS

### Scholarly Project:

Expanding Rural Training Options in Family Medicine: The Rural Health Equity Track (RHET) and Rural Pathway and UW-Madison:

The Rural Health Equity Track (RHET) was a new addition to the UW-Madison curriculum that was started in the 2017-2018 academic year. The goal was to prepare residents to be leaders in improving rural healthcare. This was accomplished through a leadership curriculum, networking opportunities with rural health advocates, rural free clinic, and rotations within critical access hospitals across the state. This has continued to evolve over time. In the words of Lou Sanner, “we’re building the plane as we fly.” There were numerous hurdles and challenges but ultimately it has been an extremely beneficial presence within our residency. We presented a poster with these findings at the World Organization of Family Doctors conference in Albuquerque, NM in 2019.



*Residency was by far the biggest hurdle in my life, but also the biggest opportunity for growth. My biggest thanks has to go to my wife, Stephanie. Without her, residency would have been significantly more challenging. I would also like to thank my co-residents who made the journey enjoyable and filled with laughter. Our faculty have been amazing and nothing but supportive. It's been great, but I'd never want to have to do it again.*



Nicholas (Nick) Squires is drawn to the broad scope of family medicine, both in caring for babies to adults to seniors, and having direct positive impacts on lives through outpatient and inpatient care. Nick is a native Wisconsinite, hailing from Altoona (near Eau Claire). He earned his

bachelor's degree at the University of Wisconsin – River Falls before moving to Minneapolis for 2 years. He then earned his medical degree from the Tulane University School of Medicine. Nick's family medicine clerkship in Opelousas, LA showed him what kind of doctor he wanted to be – one that fosters strong relationships with patients, sees a wide variety of conditions, and does many procedures. This experience also showed him the benefits of practicing rural medicine and living in a small town. He looks forward to knowing each of his patients personally and adapting his care for their unique situations. In his patient care, Nick focuses on prevention and follow-up as he works with patients to manage acute and chronic illnesses. Outside of medicine, Nick enjoys playing video games and chess, reading fantasy novels, and exploring nature through hiking and fishing.

# **Obstetrical Care Training for Belleville EMS**

Nicholas Squires, MD

## **Background**

Obstetrical care is something that frequently strikes fear into the hearts of emergency medical service (EMS) personnel. It tends to be a rare patient encounter for rural EMS providers so many felt it was outside of their comfort zone. It also carries the potential for devastating outcomes. Physiology in pregnancy changes dramatically and many medications are contraindicated. Fortunately, we have an ongoing relationship with Belleville EMS through our clinic thanks to our clinic director, Jen Lochner. She has been working with them longitudinally for years on various projects. Belleville EMS identified obstetrical care as a weakness and felt dedicated education would be highly beneficial. They felt that many other surrounding communities also viewed obstetrical care as a weakness. We settled on a “train the trainer” model to allow us to disperse information to 1-2 representatives from each surrounding community EMS group to aid in education to their employees.

## **Objective**

Our goal was to identify and carry out an effective training regimen for EMS employees of surrounding rural communities. We brainstormed numerous different ways to carry out the training ranging from personally devised PowerPoint presentations on dedicated topics to formalized curriculum that were already in place. With the help of Ann Evensen, we settled on the Basic Life Saving in Obstetrics (BLSO) program. This is a program through the American Academy of Family Physicians to improve the management of normal deliveries as well as obstetric emergencies by standardizing the skills of first responders. It is specifically for pre-hospital care providers.

## **Methods**

Patrick McDonnell from Belleville EMS was able to advertise the BLSO event through the UW Emergency Education Center to disseminate the opportunity to surrounding communities. This allowed us to pull together personnel from several other townships. We were able to acquire the Epic campus as our training location. Funding for the course came from the EMS training budget. Adult mannequins were available from the Department of Family Medicine and neonatal masks were available through the Belleville EMS. The instructors for the course were Ann Evensen and Lee Dresang, who also helped create the BLSO program. We also had several resident/fellow instructors including Danielle Hartwig, Lashika Yogendran, Neal Smith, Nicole Altman, Anne Drolet, and myself.

## **Results**

We carried out the course on 5/15/21. The training allowed them to get hands on experience which is critical for their role out in the field. The course participants were able to obtain an official certificate of completion and disseminate the information to their home EMS groups. They are not able to formally certify others in BLSO but are able to teach employees about what they learned. We held a survey at the end of the course to identify further training needs within our EMS community which will allow our partnership to continue.

## **Conclusion**

It is critical for our emergency medical personnel to feel comfortable and adequately prepared for the challenges that lie in the field. We were able to directly provide training in an area that they felt was a weakness. We will be able to use the results of the survey to continue aiding our EMS colleagues with education they desire, whether that be another BLSO course or other case-based training. Incoming residents can continue this project by reaching out to surrounding EMS communities or Belleville based on survey results.

## **Acknowledgements**

A special thank you to Neal Smith for helping me with this project. It was his discussion with Ann Evensen that spurred our pivot to BLSO which ultimately was the best move for this experience. This would not have been possible without Ann Evensen or Lee Dresang who are Family Medicine faculty at our program. Jillian Landeck also provided guidance and assistance throughout the process. Thank you to all our BLSO instructors: Danielle Hartwig, Lashika Yogendran, Nicole Altman, and Anne Drolet.

# Andrea Suarez, MD

## Projects Completed During Residency:

### Community Health Learning Experience:

Partnership with the School Age Parent Program (SAPAR)

### Scholarly Project:

What Type of Infant Formula is Best to Prevent Atopic Diseases?:

Andrea co-wrote an FPIN HelpDesk Answer with Dr. Jonas Lee that has been submitted to Evidence-Based Practice for publication. They performed a literature review to answer whether there is a specific type of formula that is best to prevent atopic diseases. Multiple systematic reviews and RCTs were reviewed and there is no consistent evidence that the use of either partially or exclusively hydrolyzed formula with or without prebiotics can prevent atopic disease in infants and children at high-risk for allergic disease.



Andrea grew up in Lima, Peru. She earned her undergraduate degree in biology from Hamline University before attending the University of Wisconsin School of Medicine and Public Health. Andrea has participated in multiple global health electives in China, Brazil

and Peru throughout medical school and residency. She was also involved with the Latino Medical Student Association and volunteered at student-run free clinics while in medical school. Andrea has led events to raise awareness of health issues that disproportionately affect underrepresented communities as well as worked to recruit more diverse clinicians to the health professions. She wants to partner with patients and communities to decrease health disparities. When she is not caring for patients, Andrea enjoys live music, outdoor activities and, most importantly, seeing her 2 year-old explore the world.



*Thank you to my residency family: your encouragement, teachings, and support has been paramount and I could not have done it without all of you. Thank you to my co-residents and friends for your flexibility, support and all the good times! To Dr. Tellez-Giron, my mentor since day 1 in medical school through residency and beyond, I am truly blessed and I can't imagine being here without your guidance, support and trust. To Dr. Beth Potter, I will always remember your kindness, good spirit and smile. To my Wingra family, what a great place to learn and grow as a doctor! To my husband Thadeu and daughter Sophia, your love, support and all the happiness you bring to my life, what a precious treasure and I can't thank you enough. Para mis papas y mi familia, siempre juntos a pesar de la distancia, gracias por tanto amor.*

# Partnership with the School Age Parent Program (SAPAR)

Andrea Suarez, MD

## Background

For the last two years, I have conducted interactive educational sessions at the School Age Parent Program (SAPAR) for pregnant and parenting students in the Madison Metropolitan School District. SAPAR provides prenatal care, childbirth and parenting skills to middle and high school students.

## Objectives

1. Develop interactive educational sessions on pregnancy and parenting topics
2. Create a safe space to share experiences and ask questions openly
3. Continue a long-standing partnership with SAPAR

## Methods

During my first year with SAPAR, I was able to teach in-person sessions about once monthly during the school year. I strived to have interactive sessions with open-ended questions that encouraged students to voice their thoughts and concerns. Before each session, I contacted the program coordinator who provided me with the topics that students were interested in discussing. Lessons included multiple topics such as common complaints of pregnancy, expectations and decision-making related to delivery, contraception, STDs, child abuse, postpartum depression, mental health, care of newborns, vaccinations, early childhood growth and development, and preparing for a well child appointment among others.

At the beginning of the pandemic with virtual classes, I along with other two residents, were able to join the staff and students online and continued to address diverse topics. I also recorded multiple presentations on mental health, prenatal care and childcare and information on COVID-19. The staff at SAPAR chose when to show these videos based on their educational curriculum.

## Results

Students at the SAPAR were very welcoming and participated actively in our sessions. Students were comfortable asking questions and discussing openly their concerns and doubts. In-person sessions had a better attendance rate with about 3-6 students per class. Video sessions had less attendance, but we coordinated with the SAPAR staff with handouts and resources after each session so that it can be available for the students who were not in attendance.

## Conclusions

My partnership with SAPAR was a great way to connect with students. I was able to teach about pregnancy, parenting, women's health and child health by developing interactive sessions. I strived to create a safe non-judgmental environment where everyone could voice their concerns and doubts.

## **Acknowledgments**

Thank you to the students in SAPAR for their welcoming environment. Thank you to Jessie Loeb and all the SAPAR staff for their partnership. Thank you to Dr. Lee Dresang for all the mentorship and support. Thank you to Dr. Paula Goldman, who initially connected me with the program. Thank you to my husband Thadeu and daughter Sophia for their unconditional support and kindness.



# Alexandra Wolf, DO

## Projects Completed During Residency:

### Scholarly Project & Community Health Learning Experience:

Diversity, Equity, and Inclusion Microlearnings  
Pilot: A Feasibility Study:

Early in residency, Allie voiced an interest in participating in Diversity, Equity and Inclusion efforts and took on a UW Health initiative involving a modular toolkit called “Microlearning.” She completed her Community Health experience as a facilitator at the Belleville residency clinic and overall project evaluator. The Microlearnings were deployed at 4 clinical sites within the Department of Family Medicine and Community Health. The usability of the Microlearnings was evaluated and presented as a “Scholarly Discussion Presentation” at the 2021 Annual Spring Conference for the Society of Teachers of Family Medicine.



Alexandra (Allie) Wolf is a native Wisconsinite from Green Bay. For Allie, medicine is about taking care of more than just the patient in front of her; it is about the person’s family and communities, which is why she focuses on multigenerational patient-centered care. Allie earned

her bachelor’s degree in biomedical sciences from Marquette University. Before starting medical school, Allie worked at a medical scribe company where she joined the Board of Directors and helped set up new scribe programs across the nation. Allie attended the A.T. Still University Kirksville College of Osteopathic Medicine. She served as president of the school’s chapter of the Student Osteopathic Medical Association, where she expanded leadership opportunities on the board and helped raise nearly \$10,000 for St. Baldrick’s to benefit child cancer research. Allie was also involved in the Diversity Club and coordinated the first annual Cultural Diffusion Show. Allie is interested in providing full-spectrum family medicine including clinic, hospitalist and obstetrics with OMT, in rural, underserved communities. Allie can often be found singing, canoeing, hiking, cheering on the Green Bay Packers, playing with Taco, her Chihuahua mix, or enjoying her newborn Nya with husband Alex.



*My deepest thanks goes to my husband, Alex, who has supported me through the highs and lows of medical training. I would not have survived without his unwavering encouragement, humor, and incomparable cooking; and I truly mean “survived” because I doubt I would have eaten, at least well. And we made a beautiful baby in the midst of a pandemic and busy resident life! I also have to thank my dog, Taco, as silly as it sounds, yet I could not imagine fulfillment without his comforting cuddles and sassy personality. Of course I would not be here without my parents, Sue and Todd, and brother, Joey, who have held me up from day one with constant love. Finally, I thank my co-residents, faculty, and DFMCH staff who are a part of my forever family!*

# Diversity, Equity and Inclusion Microlearnings Pilot: A Feasibility Study

Alexandra (Allie) Wolf, DO  
Jillian Landeck, MD  
Naomi Takahashi, MSW, LCSW  
Maddie Batzli, BA

*"In a racist society it is not enough to be non-racist. We must be anti-racist."  
-- Angela Davis*

## Disclosures

No disclosures or conflicts

## Objectives

- Describe the UW Health Diversity, Equity and Inclusion (DEI) Microlearning modules and its objectives
- Explain the role of a DEI Microlearning Facilitator
- Describe how a Microlearning model could be used in a workplace to promote DEI

## Background

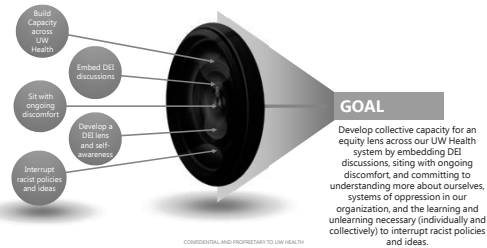
## UW Health DEI Vision, Path and Goals

Our Vision | **UW Health is a leader in dismantling racism in ourselves, in our system and in our community**



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## UW Health DEI Microlearning Goal



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## Frequently Asked Questions

**Do I have to facilitate these since I'm the manager/leader?**

Absolutely not! You can open it up to employees who would like to grow facilitation skills. We will also be offering a facilitator training that you or employees in your department may

**How should I handle pushback from staff around engaging in these?**

Normalize discomfort. This is expected when engaging in DEI. The goal is not for people to be on the same page, but to create space to have conversations around DEI in order to move this work

**How will this impact my work?**

To improve our work around DEI and this requires intentional and embedded learning. By infusing microlearnings into your daily practice, you are supporting yourself and colleagues to embed equity and

**We have so much to do already. Why spend time on this?**

This tool encourages the expected and necessary learning and unlearning we must all do in order to move towards our vision of dismantling racism in ourselves, in our system, and in our community.

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## Microlearnings: Key Takeaways

- 01 Microlearnings are meant to be embedded into pre-existing meetings, 15-30 minutes
- 02 Microlearning modules are meant to be used in sequential order
- 03 Use additional resources as "homework" or further engagement on a topic
- 04 There is no need to rush!
- 05 The tool is to assist facilitators in feeling empowered to prep ahead of time to lead micro-discussions

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## Methods

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## Methods

- Microlearnings introduced to DFMCH DEI May 2019
- 4 DFMCH DEI Committee member volunteer facilitators
- Timeline of pilot: July 2019 – February 2020
- Surveys sent to Facilitators and Participants after each Microlearning
- Interviews with main Facilitator from all 4 pilot sites conducted September 2020
- Interviews coded and reconciled by 2 team members

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## Pilot Site Descriptions

Group	Clinic schedulers at Urban FQHC Clinic (Wingra)	Patient and Family Advisory Council at FQHC Clinic (Northeast)	Climate Committee for administrative staff in department	Voluntary participation from clinic employees at rural clinic (Belleville)
Professional roles of group members	Clinic staff	Clinic patients	Admin Staff	Staff, faculty, residents, APPs, etc.
Meeting context	Standing meeting	Standing meeting	Standing meeting	Microlearning-only meeting
Number of group members	7 in two meetings (14-15 total)	12 or fewer	7 to 9	10 to 24 (staggered lunches)
Frequency of meetings	Monthly 7am	monthly	monthly	monthly
Frequency of microlearnings	Sporadic	Sporadic	Sporadic	monthly
Number of microlearnings per meeting		1	1	1
Final microlearning completed by Feb. 2020		1	4	4
				2
				12

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## Results

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## Quantitative Data: Facilitator Survey

How much time did it take you to prepare to facilitate this module?	
6-10 minutes	1 (16%)
21-30 minutes	2 (33%)
31-45 minutes	1 (16%)
46-60 minutes	1 (16%)
>60 minutes	1 (16%)
How much time did the microlearning module take?	
26-30 minutes	3 (50%)
31-45 minutes	3 (50%)

## Quantitative Data: Facilitator Survey

How challenging was it for you to <u>prepare</u> to facilitate this module?	
Very easy	2 (33%)
Somewhat easy	2 (33%)
Neither challenging nor easy	2 (33%)
How challenging was it for you to <u>facilitate</u> this module?	
Very easy	3 (50%)
Somewhat easy	1 (16%)
Neither challenging nor easy	2 (33%)

## Qualitative Data

- Interviews with 4 facilitators, one from each pilot site
- 8 Major themes that emerged from facilitator interviews:
  - Content
  - Facilitation experience and guidance
  - Interpersonal relationships: Group Dynamic
  - Commitment
  - Time constraints
  - Method of delivery: web interface
  - Customization
  - COVID-19 Impact

## Content

*"The content is really good. And it's really important to be having more everyday conversations with folks and to be able to **watch a video and not have a big article to read** I think was a really great format."*

## Facilitation Experience & Support

### Difficult conversations

*"I can see how it might be more challenging for a facilitator who did not have that background, since some of the **conversations are difficult to navigate**."*

*"This is back to why maybe **more training** or something is important. Because when a meeting like that goes poorly, you're **causing harm**."*

## Group Dynamic & Interpersonal Relationships

- Participants all knew each other prior to Microlearnings
- Microlearnings strengthened group dynamic at sites with diverse groups and sites with non-diverse groups

*"It has made the group stronger, and has built trust. And kind of making the group **more willing to be vulnerable** in all kinds of things, not just in that space."*

## Commitment: Personal and Institutional

- Facilitators mentioned the importance of facilitator and institutional commitment

*"What would it look like if we heard from [our department chair] that going to [a] Microlearning meeting is **part of your job**? ... It needs **institutional backing**."*

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## Time Constraints

- *It **takes more time**. It is billed at 15 minutes, and it's not 15 minute conversations. I think people in the [group] always seem to be looking forward to them, although sometimes we haven't done them because we **don't have time on the agenda**."*

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## Customization

- Each pilot site tailored Microlearnings to their own setting
- Examples of how facilitators customized:
  - Adding relevant data
  - Altering for relevant context (non-clinical setting)
  - Leading Microlearnings as stand-alone meeting
  - Including two Microlearning modules in one sitting
  - Selecting modules out of order

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## COVID-19 Impact

Two groups struggled to continue with Microlearnings because of COVID and two groups continued Microlearnings

*"Prior to the pandemic, it would be an hour and a half meeting. Now we're trying the hour. We're going to have to **try and see what we can do**."*

*"It **worked really well**. We did a hybrid where we were half in person, half virtual."*

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## Belleville Clinic

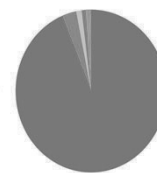
Background, Methods, and Results

## Demographics:

- Rural residency clinic
- Town of 2300
- Green Co:
  - White 94.1%
  - Latinx 3.1%
  - African American 0.8%
  - Asian 0.7%
  - Native American 0.4%
  - 2+ races 1.2%
- 35 staff, predominantly white
- Farming, manufacturing, cheese

Green County 2019

- White
- Hispanic
- Two or more Races
- Black
- Asian
- American Indian/Alaska Native
- Native Hawaiian/Pacific Islander



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## Methods and Evolution

- Lunch and Learn Series, food provided
- Sept 2019- April 2020
- Facilitators: 2 residents, 1 faculty
  
- Hosted 2 Additional Anti-Racism Community Forums
  - June and August 2020
  - Included public health, county sheriff, teachers, school principal

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## Themes

- White Privilege
- Implicit Bias
- Structural Racism
- Anti-racism
- Allyship
- Education system changes
- Policing
- Accountability

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## Conclusions

## Quantitative Data Themes

- Not enough data for quantitative statistical analysis
  - Variable time to prepare
  - Variable challenge, but not highly challenging
  
- Unable to conclude statistically if feasible

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## Qualitative Data Themes

- Need for Facilitator training (difficult conversations)
- Customization occurs
- Strengthened group dynamic
- Time constraints

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## Conclusions

- Unique modular toolkit
- Goal of creating a DEI lens

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## Conclusions: Outcomes and Next Steps

- Evolution to Anti-Racism discussions
- Deployment to other departments
- Increased racism and microaggression reporting
- Institutional support

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## Resources

- DFMCH Office of Community Health Anti-Racism:  
<https://fammed.wisc.edu/diversity/anti-racism-resources/>
- UW-Madison Ebling Library DEI:  
<https://researchguides.library.wisc.edu/c.php?g=1082834&p=7892609>
- 21-Day Racial Equity Challenge:  
<https://www.eddiemoorejr.com/21daychallenge>

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## Acknowledgements

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- UW Health DEI Department

## References

- Anderson L, Scrimshaw S, Fullilove M, Fielding J, Normand J. Culturally competent healthcare systems: A systematic review. *American Journal of Preventive Medicine*. 2003 Apr; 24(3):68-79.
- Celik H, Tineke A, Klinge I, Widdershoven G. Process evaluation of a diversity training program: The value of a mixed method strategy. *Evaluation and Program Planning*. 2012 Feb; 35(1):54-65.
- Celik H, Tineke A, Widdershoven G, van Wijmen F, Klinge I. Implementation of diversity in healthcare practices: Barriers and opportunities. *Patient Education and Counseling*. 2008 Apr; 71(1):65-71.
- Hawthorne K, Prout H, Kinnersley P, Houston H. Evaluation of different delivery modes of an interactive e-learning programme for teaching cultural diversity. *Patient Education and Counseling*. 2009 Jan; 74(1):5-11.

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