Methadone vs. Buprenorphine: A literature review of MOUD in rural populations

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Introduction and Focus Question

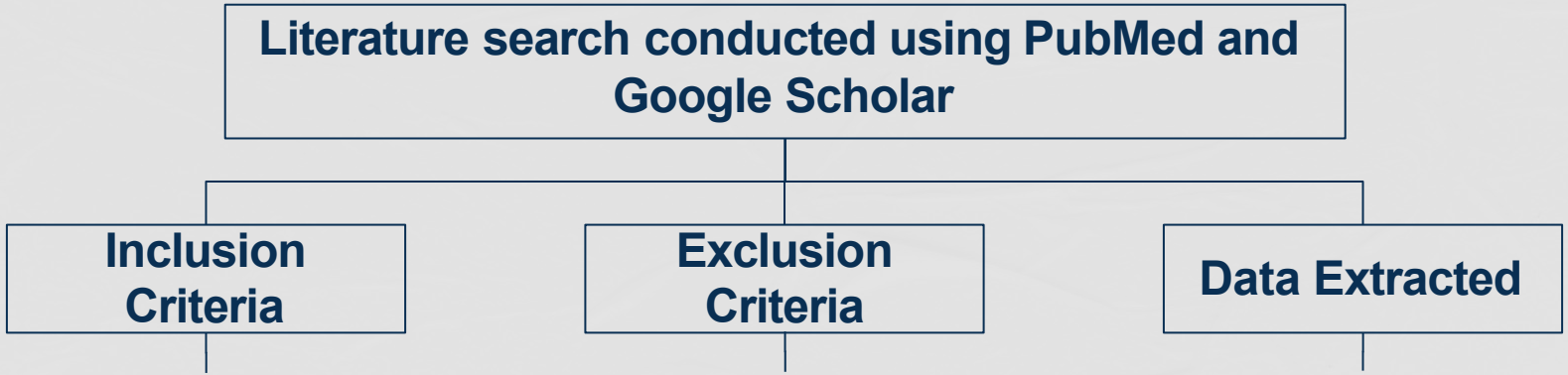
How do buprenorphine and methadone compare in improving adherence and recovery outcomes among patients in rural areas receiving medication-assisted therapy for opioid use disorder?

Barriers to Rural MOUD[1]

- Long distance and limited transportation to clinics
- Provider availability and pharmacy supplies
- Stigmatization around receiving treatment
- Lack of awareness of treatment options
- Confidentiality challenges due to small communities
- High-threshold treatment policies

1. Stopka TJ, Estadt AT, Leichtling G, et al. Barriers to opioid use disorder treatment among people who use drugs in the rural United States: A qualitative, multi-site study. *Soc Sci Med*. 2024;346:116660. doi:10.1016/j.socscimed.2024.116660

Methods


Literature search conducted using PubMed and Google Scholar
Inclusion Criteria
A. Peer-reviewed articles published between 2015-2025
B. Examined buprenorphine vs. methadone
C. Reported on adherence rates, treatment retention, or long-term recovery outcomes
D. Used quantitative or mixed-methods research designs
Exclusion Criteria
A. Focused on urban or non-rural populations exclusively
B. Lacked direct comparison between methadone and buprenorphine
C. Case reports, editorials, or opinion pieces.
Data Extracted
A. Adherence and retention in treatment
B. Access to treatment
C. Recovery outcomes
D. Incidence of adverse event

Overview of Drug Differences[2]

Buprenorphine

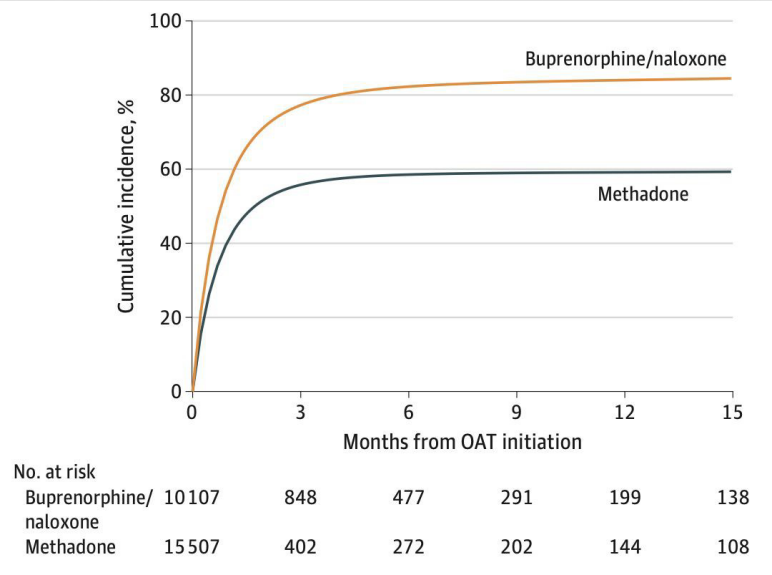
- Long acting, partial opioid agonist
- Sublingual tablets, films, or extended release injection
- Covered by most insurances with prior authorization
- Higher safety profile
- Lower retention rates

Methadone

- Full opioid agonist
- Daily liquid dose at OTP clinic
- Cheaper, typically covered by medicaid
- Lower safety profile
- Higher retention rates

2. Suarez EA, Huybrechts KF, Straub L, Hernández-Díaz S, Jones HE, Connery HS, Davis JM, Gray KJ, Lester B, Terplan M, Mogun H, Bateman BT. Buprenorphine versus Methadone for Opioid Use Disorder in Pregnancy. N Engl J Med. 2022 Dec 1;387(22):2033-2044. doi: 10.1056/NEJMoa2203318. PMID: 36449419; PMCID: PMC9873239.

Treatment discontinuation comparison between buprenorphine and methadone MAT



Retention Rates

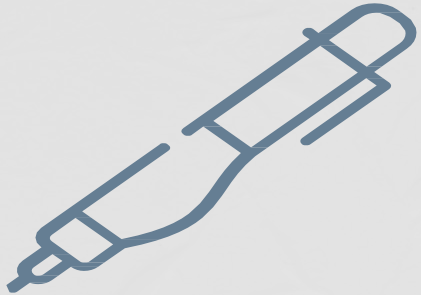
A retrospective observational study in British Columbia, Canada, found that buprenorphine/naloxone had a higher risk of treatment discontinuation when compared to methadone (88.8% vs 81.5% discontinued at 24 months). The study also found that there was no significant difference in mortality between treatments.[3]

3. Nosyk B, Min JE, Homayra F, et al.. Buprenorphine/Naloxone vs Methadone for the Treatment of Opioid Use Disorder. JAMA. 2024 Dec 3;332(21):1822-1831. doi: 10.1001/jama.2024.16954. PMID: 39418046; PMCID: PMC11581542.

Consequences of the X-waiver

The X-Waiver, also known as the Drug Addiction Treatment Act of 2000 (DATA) waiver, was previously necessary for providers to prescribe buprenorphine and required these providers to take an 8 hour training course to qualify.[4]

- Lack of Provider Training
- Drug Stigma
- Limited Supply



4. Davis, Jeffery.The X-Waiver is Gone... But There is a Lot More Work to do to Increase Access to Opioid Use Disorder Treatment. American College of Emergency Medicine. 2023 Mar.

Conclusions

- When treating OUD in a rural setting, there are more challenges to be considered when forming a treatment plan including access, availability, and knowledge of treatment options.
- Buprenorphine may be a superior option for successful treatment of OUD, however adherence and cost effectiveness should be considered.
- Methadone has a higher retention rate and is covered by medicaid, but remains inaccessible in rural settings due to the need of a OTP clinic.

Where can we go from here?

- **Research with focus in rural settings to create standardization of care**
- **Further work to overcome barriers to care through:**
  - Training more physicians in the the usage of buprenorphine
  - Combatting the pharmacy supply shortages
  - Further transparency of treatment options for both rural physicians and patients
  - Increasing access to care

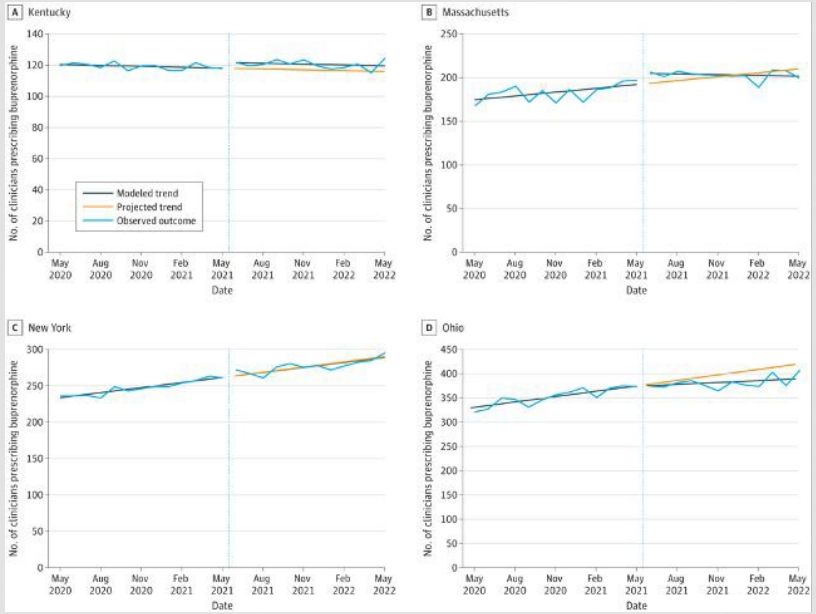
Questions?

Sources

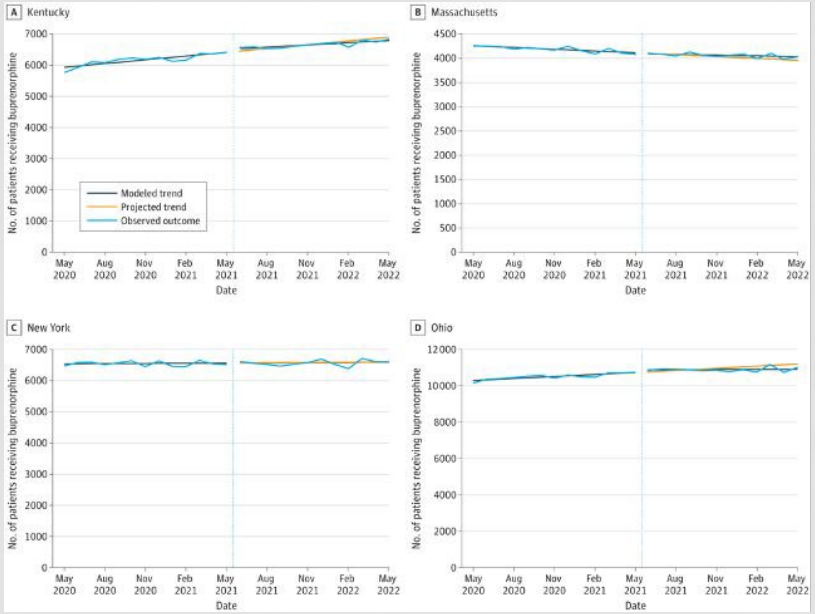
1. 1. Stopka TJ, Estadt AT, Leichtling G, et al. Barriers to opioid use disorder treatment among people who use drugs in the rural United States: A qualitative, multi-site study. *Soc Sci Med*. 2024;346:116660. doi:10.1016/j.socscimed.2024.116660
2. 2. Suarez EA, Huybrechts KF, Straub L, Hernández-Díaz S, Jones HE, Connery HS, Davis JM, Gray KJ, Lester B, Terplan M, Mogun H, Bateman BT. Buprenorphine versus Methadone for Opioid Use Disorder in Pregnancy. N Engl J Med. 2022 Dec 1;387(22):2033-2044. doi: 10.1056/NEJMoa2203318. PMID: 36449419; PMCID: PMC9873239.
3. 3. Nosyk B, Min JE, Homayra F, et al.. Buprenorphine/Naloxone vs Methadone for the Treatment of Opioid Use Disorder. JAMA. 2024 Dec 3;332(21):1822-1831. doi: 10.1001/jama.2024.16954. PMID: 39418046; PMCID: PMC11581542.
4. 4. Davis, Jeffery.The X-Waiver is Gone... But There is a Lot More Work to do to Increase Access to Opioid Use Disorder Treatment. American College of Emergency Medicine. 2023 Mar.
5. 5. Christine PJ, Chahine RA, Kimmel SD, et al. Buprenorphine Prescribing Characteristics Following Relaxation of X-Waiver Training Requirements. *JAMA Netw Open*. 2024;7(8):e2425999. Published 2024 Aug 1. doi:10.1001/jamanetworkopen.2024.25999
6. 6. Franz B, Dhanani LY, Hall OT, Brook DL, Simon JE, Miller WC. Differences in buprenorphine prescribing readiness among primary care professionals with and without X-waiver training in the US. *Harm Reduct J*. 2023;20(1):180. Published 2023 Dec 21. doi:10.1186/s12954-023-00918-3

Thanks!

Number of X-Waivered Clinicians Prescribing Buprenorphine Before and After Relaxation of the X-Waiver Training Requirements



Number of Patients Receiving Buprenorphine Before and After Relaxation of the X-Waiver Training Requirements



5. Christine PJ, Chahine RA, Kimmel SD, et al. Buprenorphine Prescribing Characteristics Following Relaxation of X-Waiver Training Requirements. *JAMA Netw Open*. 2024;7(8):e2425999. Published 2024 Aug 1. doi:10.1001/jamanetworkopen.2024.25999

RESEARCH Open Access

Differences in buprenorphine prescribing readiness among primary care professionals with and without X-waiver training in the US

Berkeley Franz[1*], Lindsay Y. Dhanani[2], O. Trent Hall[3], Daniel L. Brook[4], Janet E. Simon[5] and William C. Miller[6]

Abstract

Background Medications for opioid use disorder (OUD) are effective at preventing overdose and infectious disease but are vastly under-prescribed in the US. For decades, prescribers faced additional training and regulation to prescribe buprenorphine which stigmatized the medication and lessened support for a harm reduction approach to treating opioid use disorder. The Drug Enforcement Administration removed the X-waiver requirement for prescribing buprenorphine in late 2022, which removed stigma and lessened important barriers to prescribing but also left training at the discretion of individual organizations. Our study aimed to assess differences in knowledge, confidence, and stigma regarding buprenorphine between those who went through the X-waiver training and those who did not, among practicing primary care providers (PCPs).

Methods We assessed buprenorphine prescribing readiness among primary care aligned outpatient providers in Ohio, USA. Using survey data, we conducted bivariate and regression analyses predicting primary prescribing outcomes. Primary outcomes measured knowledge of and confidence in buprenorphine, as well as perceived adequacy of one's training. Secondary outcomes were attitudes toward patients with OUD, including bias toward OUD patients, stress when working with them, and empathy toward them. Participants ($n=403$) included physicians, nurse practitioners, and physician assistants practicing in primary care aligned disciplines.

Results Survey data showed that PCPs who received X-waiver training were more likely to understand and have confidence in the mechanism of buprenorphine, and consider their training on treating OUD to be adequate. PCPs with an X-waiver showed more empathy, less negative bias, and experienced less stress when working with patients with OUD.

Conclusion Removing restrictive policies for prescribing buprenorphine is an important step to expanding access and reducing the stigma associated with opioid use disorder treatment. Yet, our findings suggest that the training received alongside regulation may be important for improving prescribing confidence and reducing stigma. Strategies to increase buprenorphine prescribing are unlikely to be effective without also expanding access to prescribing support for primary care providers across the career course.

Keywords Opioid-related disorders, Primary care, Misinformation, Buprenorphine, Addiction medicine, Medications for opioid use disorder

MOUD and Pregnancy

- Buprenorphine is favored for use during pregnancy when compared to methadone with an increased birth weight, reduced need for newborn treatment, and a shorter newborn length of stay in term infants.
- Incidence of neonatal abstinence syndrome was similar among both treatment but still slightly higher born to mothers being treated with methadone.
- Maternal methadone use significantly increased likelihood of a newborn hospitalstay longer than 7 days.

7. Staszewski CL, Garretto D, Garry ET, Ly V, Davis JA, Herrera KM. Comparison of buprenorphine and methadone in the management of maternal opioid use disorder in full term pregnancies. *J Perinat Med*. 2020;48(7):677-680. doi:10.1515/jpm-2020-0106

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Improving Diabetic Eye Screening in Rural Care: The Role of Staff Engagement and Teleretinal Imaging

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Presenter : Albertas Klugas, B.Sc., MS1

28th Annual Michigan Rural Health Conference

April 24, 2025

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[2] Central Michigan University College of Medicine

Understanding Diabetic Retinopathy

- Diabetic retinopathy: complication of diabetes
  - Retinal blood vessels
- Damage caused by high blood sugar levels
  - Leakage, swelling, abnormal growth
- Vision impairment or blindness if untreated
  - No symptoms in early stages
- Leading cause of blindness in the US [1]
  - Diabetic eye exams are critical for early detection and improved outcomes

Why Rural Communities Face Higher Risk and Lower Screening Rates

- Prevalence of diabetes is higher in rural areas compared to urban [2]
  - 14.3% in rural vs 11.2% in urban populations
- Diabetic eye exam screening rates are lower in rural communities compared to urban [3]
  - 69.1% in rural vs 72.4% in urban populations
- Higher proportion of rural individuals with diabetes experience retinopathy compared to urban counterparts [4]
  - 56.2% in rural vs 35.6% in urban populations
- Rural populations at increased risk

RetinaVue

- Digital camera that is specifically designed to take high-resolution images of the patient's eye and retina
  - Fast - takes 5 minutes from start to finish
  - No eye dilation necessary
- Images are taken and sent to an ophthalmologist to determine if a patient with diabetes has normal vision, diabetic retinopathy, or another retinal disorder.

Can Staff Engagement and Teleretinal Equipment Improve Screening Rates?

- We hypothesized that layered staff interventions and teleretinal imaging would increase diabetic eye exam rates

Existing knowledge

- Limited data on combined interventions
- Lack of real-world implementation data
    - Integration into primary care workflow

How We Implemented Interventions in a Rural Clinic Setting

- Study period: October 2023 – December 2024
- Population: Patients aged 18+ with type 1 or type 2 diabetes mellitus
- Data source: Electronic medical records (EMR) from MyMichigan Family Practice Center (Alma, MI)

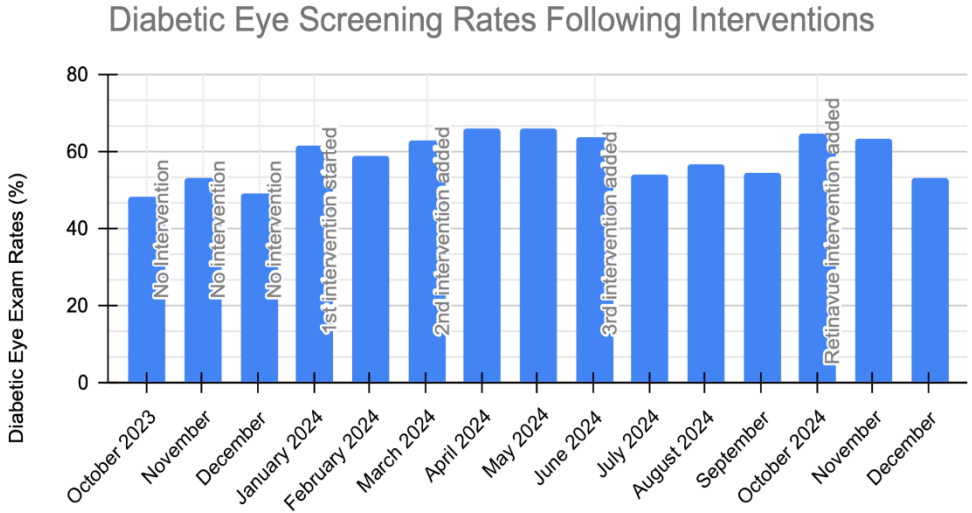
Staff Interventions

- January 2024: Staff offered referrals for patients without eyecare providers
- March 2024: Staff asked patients to sign release forms for outside eye exam records
- June 2024: Staff asked patients about the date of their last eye exam

- Teleretinal imaging (RetinaVue) used October 7-18, 2024
  - Handheld retinal camera
  - Captures and transmits retinal images to ophthalmologist

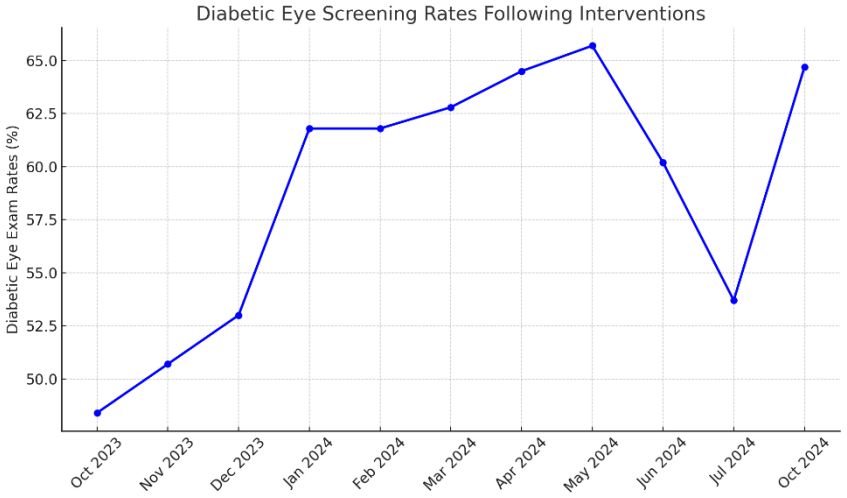
Screening Rates Increased After Layered Interventions

- Descriptive statistics
  - Monthly eye exam completion rates
  - Changes over time in response to intervention
- Baseline (Oct-Dec 2023): 48.4%-53.0%
- Post-January intervention: 61.8%
- Post-March intervention: 62.8% (peak 65.7%)
- Drop in July: 53.7%
- After Retinavue intervention (Oct 2024): 64.7%
  - 17 scans completed



What the Data Tells Us: Staff Engagement Drives Results

- Direct staff interventions showed an increase in screening rates
- Largest improvement seen following first intervention
  - Referral-based approach in January
- Progressive rise in screening rates through May (65.7%)
  - Consistent follow up interventions
- Drop in screening rates seen in July
  - Clinic stability and timing
- Potential of teleretinal technology access in rural clinics
  - Rebound rates (64.7%)



Challenges We Faced

- Clinic staff turnover
  - Staff transition (incoming resident physicians) and scheduling changes
  - Potential inconsistency in staff intervention
- Seasonal factors
  - Potential patient travel and lack of follow up one eye exams
- Limited access to RetinaVue
  - Teleretinal retinal imaging equipment only available for short period (Oct 7-18), limiting its potential impact
- Descriptive data only
  - Results based on gross percentages
  - More data needed to conduct inferential statistical analysis
    - Patient demographics such as age, gender, race, insurance type

Simple, Scalable Strategies Improve Rural Diabetic Eye Screening

- **Low resource interventions can meaningfully improve diabetic eye exam rates in a rural primary care clinic**
- Highest screening rates seen with layered and consistent interventions
  - Referrals, record releases, verbal reminders
  - May 2024 (65.7%)
- Emphasis on the impact of sustainable workflow
  - Temporary decline seen in July 2024
- **Value of integration of telehealth tools in resource-limited settings**
- Simple, scalable strategies can help to close care gaps in rural and underserved populations

What's Next: Year-round Access and Targeted Improvements

- Expansion teleretinal imaging access year-round to improve consistency of screenings
- Collection and analysis of demographic data to better understand the impact of disparities
  - Tailor interventions
- Incorporation of statistical analysis to validate findings and strengthen evidence
- Training of clinic staff and process standardization
  - Maintain improvements in screening rates during transition periods

Acknowledgements

- Statistician: Guoli Zhou, PhD – Consultant (Michigan State University)

- MSU/MyMichigan Medical Center Alma Family Medicine Residency

- Selected References:

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Time from Positive Mammogram Screening to Referral to Breast Cancer Specialist Based on Patient Distance to Hospital in the Upper Peninsula

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Disclosures

- None

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Introduction

- Breast cancer has the highest incidence rate of all cancers in the United States
  - Second most common cause of cancer deaths for women in the US[1]
- Despite declining total cancer mortality in the United States, rural communities have not benefited equally
  - Death rates have decreased at a slower rate in rural counties compared to urban and suburban counties
  - Rural-urban mortality gap continues to expand[2]
- Rural breast cancer patients have longer times between treatment stages and worse survival outcomes when compared to urban populations[3]

[1] Siegel RL, Miller KD, Jemal A. Cancer statistics, 2020. *CA Cancer J Clin*. 2020;70(1):7-30. doi:10.3322/caac.21590

[2] Weaver KE, Nightingale CL, Lawrence JA, Talton J, Hauser S, Geiger AM. Preferences for breast cancer survivorship care by rural/urban residence and age at diagnosis. *Support Care Cancer*. 2020;28(8):3839-3846. doi:10.1007/s00520-019-05134-z

[3] Davis KJ, Campbell C, Costelloe R, et al. Causes of Unwarranted Variation and Disparity in Breast Cancer Management in Regional and Rural Area. *Breast J*. 2024;2024:9354395. doi:10.1155/2024/9354395

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Objective

- Investigate differences in time between positive mammogram screening and referral to a specialist based on **distance from the patient's residence to the treatment hospital**
- Patients who live further away will likely have a longer time from initial positive screening to referral to a specialist than patients who live closer to the treatment hospital

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Methods

- Retrospective chart review
- Data from 107 Upper Peninsula Health System patients who had a positive mammogram and diagnosis of de novo breast cancer between January 1st, 2018 and January 1st, 2022
- Investigated differences in time from initial positive mammogram screening to referral to an oncologist or surgeon, whichever they saw first, based on the patient's distance from the hospital
- Of the 107 patients, 52 lived 1-10 miles from the hospital, 25 lived 10-20 miles, 13 lived 20-40 miles, and 17 lived 40+ miles

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Results

- Positive correlation between time from positive mammogram to specialist referral and distance from patient residence to treatment hospital
- Patients residing >40 miles from the hospital experienced longest average time from mammogram to referral (30.0 days)
- Patients residing less than 10 miles from the hospital experienced shortest average time from mammogram to referral (21.0)

Distance from Patient Residence to Hospital (miles)	Average time from Mammogram to Referral (days)
0 to 10	21.0
10 to 20	22.8
20 to 40	23.5
40 +	30.0

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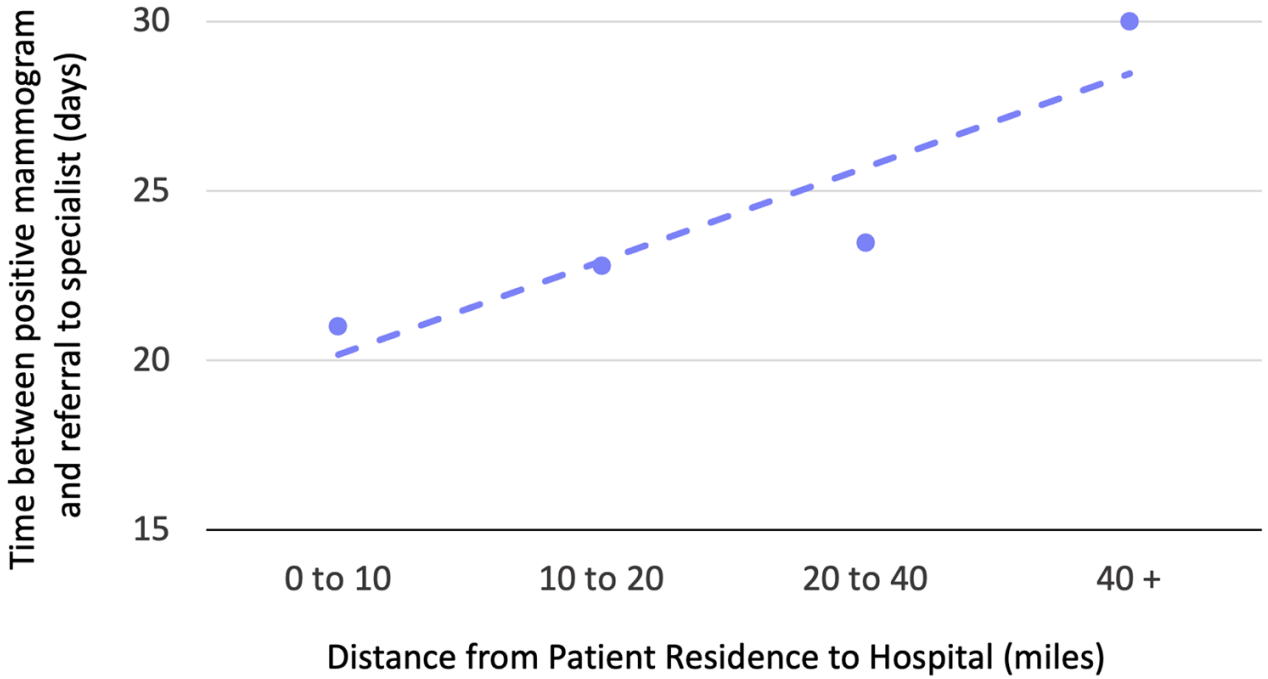
Results



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Conclusions

- On average, patients who resided further from the treatment hospital experienced prolonged duration between positive mammogram screening and referral to a specialist
- Future studies should investigate possible explanations for this difference, including the needed time off from work to travel to appointments, access to reliable transportation, adverse road conditions, etc.

Barriers

- Lack of radiology services
- Limited access to breast cancer patient navigators

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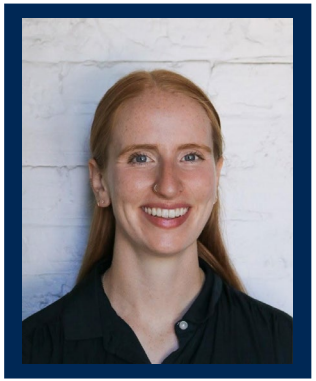

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