

ADDRESSING MATERNAL OUTCOMES IN RURAL INDIANA MOTHERS THROUGH IMPROVED PRENATAL CARE UTILIZATION

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Definitions:

Maternal Mortality: Refers to the death of an individual from complications related to pregnancy or childbirth that occur during pregnancy or within 6 weeks after the pregnancy ends (CDC, 2020)

Maternal Desert: County in which access to maternity health care services is limited or absent, either through lack of services or barriers to a woman's ability to access that care (March of Dimes, 2022)

Adequate prenatal care: Care beginning in the 1st Trimester (prior to 14 weeks), completion of 80% or more of the anticipated prenatal visits. (Kotelchuck, 1993)
Care must include: *Risk assessment Health promotion and education, Therapeutic intervention*

Maternal Mortality Rate (MMR):

$$\frac{\text{\# of maternal deaths in calendar year}}{\text{number of live births}} \times 100,000 \text{ (WHO, 2022)}$$

Problem

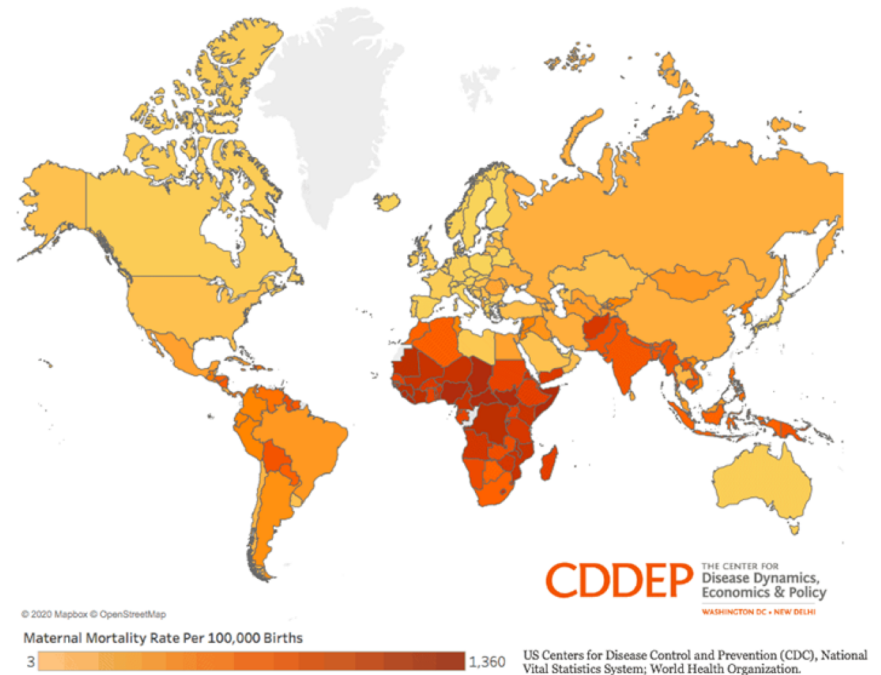


Worldwide Maternal Mortality

Worldwide

- **2021:**
 - MMR 158.8 per 100,000 live births
- Sustainable Development goal (SDG), for 2030 Agenda:
 - <70 per 100,000
 - Current trajectory :
 - 140.9 per 100,000
(Gates foundation, 2022)

Worldwide Maternal Mortality Rates



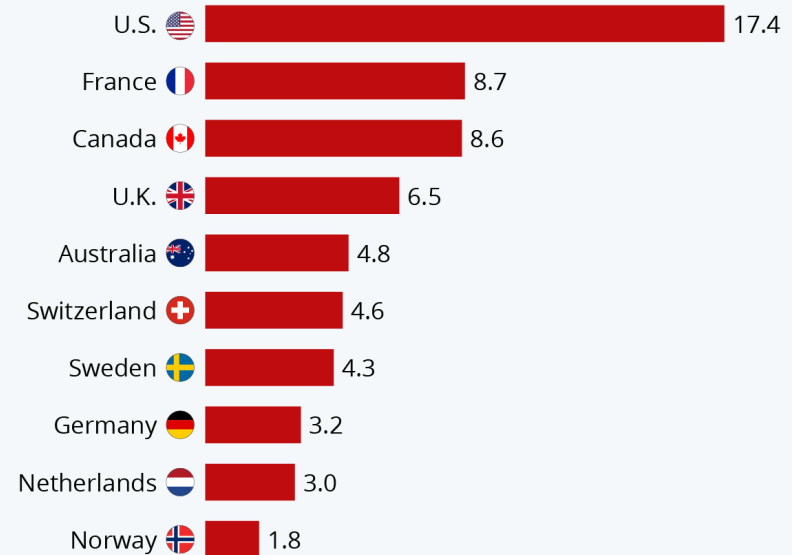
Maternal Mortality in the U.S.

United States

- Ranks last overall among industrialized countries (The Commonwealth Fund, 2020).
- 2019:
 - 20.1 per 100,000
 - 754 deaths yearly in the U.S. related to pregnancy or delivery complications (Hoyert, 2021).

High U.S. Maternal Mortality Rate

Maternal deaths per 100,000 live births in select countries for 2018



Data for Switzerland and U.K. from 2017, data for France from 2012
Sources: OECD, Commonwealth Fund



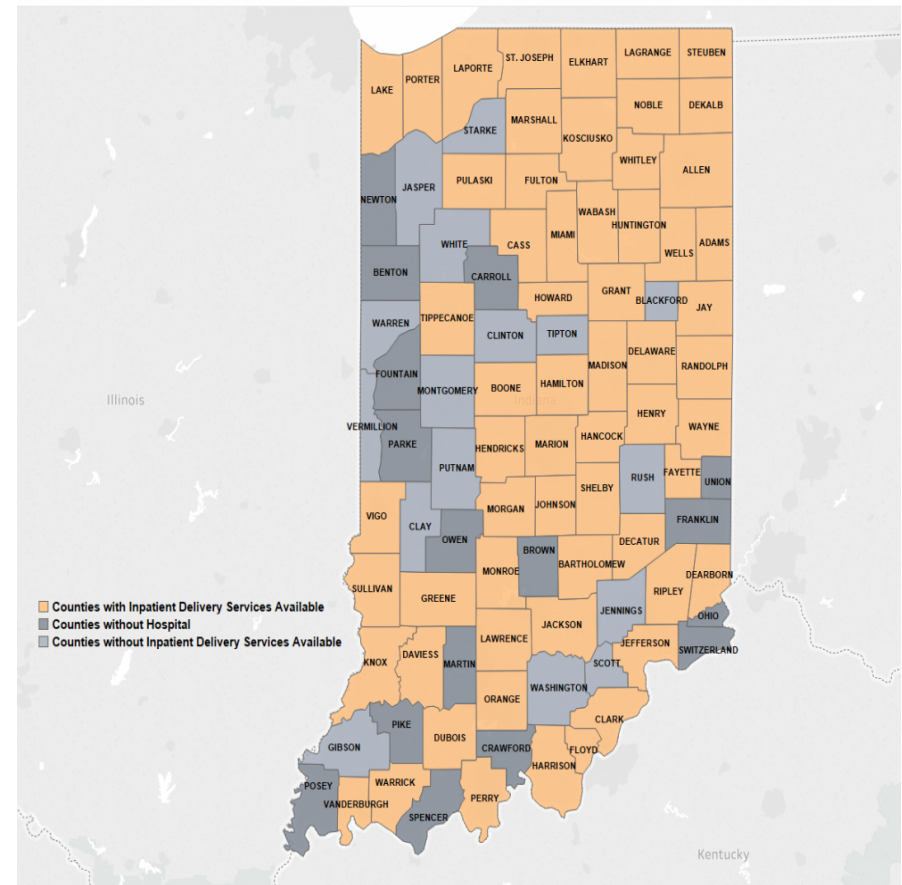
statista

Maternal Mortality in Indiana

Indiana Ranks 3rd highest in the country

- 2019: 60 deaths (80%) were preventable
- 2020: 92 deaths (79%) were preventable
- 40% (34/92) of Indiana counties are Maternal Deserts
- **Rural Disparities:** 9% greater probability of severe maternal morbidity and mortality, compared with urban residence (NCSL, 2022).

Inpatient Hospital Obstetric Services by Indiana County



(IDOH, 2022)

Current Prenatal Care Recommendations

- The World Health Organization (WHO): minimum of eight visits throughout pregnancy (WHO, 2016)
- American Academy of Gynecology (ACOG, 2017)
 - Weeks 10/12 to 28: 1 prenatal visit a month
 - Weeks 28 to 36: 1 prenatal visit every 2 weeks
 - Weeks 36 to 40: 1 prenatal visit every week

Literature Review

- Rural Health Information Hub:
 - Maternal and Obstetric Care Challenges in Rural America from the National Advisory Committee on Rural Health and Human Services

- State Maternal Mortality Review Committee:
 - Release reports summarizing the state's current statistics
 - Most recent IN: September 2022

- U.S. Government Accountability Office (2021):
 - *Additional Efforts Needed to Assess Program Data for Rural and Underserved Areas*

Literature Review Continued...

- Rural-Urban Differences in severe maternal morbidity and mortality in the US, 2007-15 (Kozhimmanil, et al., 2019)
 - Rural residents 9% greater probability of SMM vs urban residents
 - clinical & social determinants of health

- Working Towards Safe Motherhood: Delays and Barriers to Prenatal Care for Women in Rural and Peri-Urban Areas of Georgia, (Meyer, et al., 2016):
 - Delays: woman's decision to seek PNC, delays in accessing an appropriate healthcare facility, delays in receiving adequate and appropriate care.

Methodology



Study Aim & Goal

Aim:

- The aim of this study was to assess trends in prenatal care adequacy, for expectant mothers living in rural Indiana maternal deserts before and after a newly implemented prenatal resource toolkit, as well as assessing patient barriers to prenatal care and perceived quality of prenatal care.

Long- Term Goal:

- To help increase prenatal care utilization to meet adequate prenatal care for expectant mothers living in rural maternal desert areas in Indiana.

Study Questions:

- 1. What is the impact and patient perception of increasing prenatal resources and educational toolkits, on prenatal care utilizations, among rural Indiana mothers?**

- 2. What barriers/ challenges are mothers facing limiting their ability to complete prenatal visits?**

Study Design

Approval from Purdue University IRB May 4, 2022 (IRB 2021-1753)

Study Design: Two Phase Quasi experimental study

Intervention: Implementation of a new prenatal resource toolkit

Participants:

- Pre-intervention: mothers obtaining care at the two locations between January 2019 and April 2022
- Post-intervention: mothers obtaining care at the two locations between May 2022 and October 2022
- Survey: mothers obtained care from one of two locations between January 2019- October 2022

Setting

- 2 of 4 clinics of a Rural Indiana Federally Qualified Health Center (FQHC)
- Both clinics were located in Indiana Maternal Deserts.
- Use a shared care model- provide care for expecting mothers up until 36 weeks

The Adequacy of Prenatal Care Utilization Index by Kotelchuck

- Measures the adequacy of prenatal care utilization by:
 - evaluating the month in which prenatal care is initiated, and
 - the number of visits from initiation of care until delivery.
- These two components are then categorized into four categories:
 - Inadequate (received less than 50% of expected visits)
 - Intermediate (50%-79%)
 - Adequate (80%-109%)
 - Adequate Plus (110% or more)

Prenatal Care Utilization Recommendations

Baseline: ACOG Recommendations

- Routine pregnancy without complications:
 - Prenatal care between weeks 12-36 was used as the baseline (8 visits)

- To classify as adequate prenatal care, mothers needed to have had:
 - Have entered care prior to 14-week's gestation, and
 - Completed at least 6 visits (80% of the recommended 8 visits)

Quality of Prenatal Care Questionnaire

- Assesses for patient perceptions of quality of care
- Total of 46 questions placed into 6 subscales:
 - information sharing, anticipatory guidance, sufficient time, approachability, availability, support and respect
- For this study survey: 10 of the 46 components were used
 - information sharing (2), anticipatory guidance (3), sufficient time (2), approachability (3), and availability (1)

Procedure

Pre-intervention:

- **Inclusion criteria:** Prenatal patients receiving care at the two northern rural county clinics in Indiana, between January 2019 through April 2022
- **Data Assessed:** age, marital status, insurance, gravida, timing entry to care, number of appointments attended, and number of no shows
- **Exclusion criteria:** Mothers who had an early transfer (prior to 34 weeks)

Intervention :

- Prenatal resource toolkit was provided to all patients who presented to office with a positive pregnancy test May 2022-October 2022

Procedure continued...

Post-Intervention

- Recruitment:
 - Survey Flyers: English & Spanish
- Inclusion criteria:
 - Mothers who were pregnant between January 2019 and October 2022 & received prenatal care at 1 of the site locations used for this study

Post-intervention Repeat Data Collection

- May 2022-October 2022
- Estimated Due Date was also assessed for this second data collection

Data Analysis

- Pre-Intervention:
 - 407 total individual entries were received
 - 60 total entries removed: care received elsewhere (33), incomplete charts (27), and miscarriage/ abortions (11)

- Post-Intervention:
 - 41 total individual pregnancies were received

- Survey:
 - 36 Survey Responses
 - 6 removed: not meeting criteria (5), incompleteness (1)

Pre- & Post- Intervention Demographic Data and Prenatal Care Adequacy Compilation

Variables	Pre-intervention (Jan 2019-April 2022) (total: 336)	Postintervention (May-Oct 2022) (total: 41)
Average Age	26.8	26.8
Age Range	13.2-45.4	26.8-39.6
<18	15 (4.5%)	1 (2.4%)
18-24	109 (39.0%)	17 (41.4%)
25-34	151 (44.1%)	19 (46.3)
35+	39 (12.5%)	4 (9.8%)
Married	70 (22.4%)	14 (34.1%)
Single	94 (30.0%)	7 (17.1%)
Partnered but unmarried	142 (45.4%)	19 (46.3%)
Divorced/ Separated	7 (2.2%)	1 (2.4%)
Sliding Scale	135 (43.1%)	29 (70.7%)
Medicaid	141 (44.7%)	5 (12.2%)
Commercial	37 (11.8%)	7 (17.1%)
1 st	68 (21.7%)	7 (17.1%)
2 nd	92 (29.4%)	15 (36.6%)
3 rd	57 (18.2%)	10 (24.4%)
4 th or more	96 (30.7%)	9 (22.0%)
First trimester	204 (65.2%)	30 (73.2%)
Second Trimester	97 (31.0%)	11 (26.8%)
Third Trimester	12 (3.8%)	0
Ave. weeks at 1 st apt.	13.67	12.7
Ave. total appt. attended	4.94	N/A
Ave. no shows per patient	.59	N/A
Achieved Prenatal Care Adequacy	<u>Adequate: 135/336</u> <u>Total: 135 (40.2%)</u>	<u>28/41</u> <u>Total: 28 (68.2%)</u>

Adequacy of prenatal care utilization, according to clinic and year

	2019		2020		2021		Jan -April 2022	
	Clinic 1 (Total: 51)	Clinic 2 (Total: 66)	Clinic 1 (Total: 39)	Clinic 2 (Total: 63)	Clinic 1 (Total: 26)	Clinic 2 (Total: 59)	Clinic 1 (Total: 12)	Clinic 2 (Total: 20)
1st Apt.								
1 st trimester	37 (72.5%)	35 (53%)	33 (84.6%)	39 (61.9%)	19 (73.1%)	37 (62.7%)	10 (83.3%)	15 (75.0%)
2 nd Trimester	13 (25.5%)	26 (39.4)	4 (10.3%)	23 (37.7%)	5 (19.2%)	21 (35.6%)	2 (16.7%)	4 (20.0%)
3 rd Trimester	1 (2%)	5 (7.6)	2 (5.1%)	1 (1.6%)	2 (7.7%)	1 (1.7%)	0	1 (5.0%)
Ave. weeks at first apt.	13.19	14.92	12.39	14.11	13.88	13.08	11.8	14.8
Ave. appointments attended	6.09	4.57	5.2	4.73	4.84	4.98	5.2	5.0
Average no shows	.88	.348	.64	.53	.5	.72	N/A	.5
Range in no shows	0-4	0-2	0-5	0-5	0-2	0-3	0-4	0-3
Prenatal care adequacy	30/51 58.8%	21/66 31.8%	16/39 41.0%	21/63 33.3%	11/26 42.3%	22/59 37.3%	8/12 66.7%	11/20 55.0%

Logistical Regression:

Prenatal care adequacy according to age, gravida, marital status, primary payer

	Estimate	Std Error	Z value	Pr(> z)
(Intercept)	14.37701	2401.44625	0.006	0.99522
Age	0.07102	0.0248	2.913	0.00357**
Commercial Insurance	14.81541	2406.27589	0.006	.99509
Medicaid	-0.09642	0.38557	-0.250	0.80253
Sliding Fee/ Self Pay	-0.37773	0.39737	-0.951	0.34182
Gravida	-0.37008	0.08962	-4.123	0.0000364**
Married	-15.24238	2401.44617	-0.006	0.99494
Partnered/ Unmarried	-15.3093	2401.44616	-0.006	0.99491
Separated	-15.26145	2401.44634	-0.006	0.99493
Single	-15.54396	2401.44616	-0.006	0.99484

Survey Results: Demographic Characteristics

Variable	Characteristics	Response (30)
Age	Average Respondent Age	25.4
Entry to care	1 st Trimester	23 (76.7%)
	2 nd Trimester	5 (16.7%)
	3 rd Trimester	2 (6.7%)
Gravida	1 st	7 (23.3%)
	2 nd	10 (33.3%)
	3 rd	9 (30%)
	4 th or more	4 (13.3%)
Income	<\$10,000	7 (23.3%)
	\$10,000-19,999	8 (26.7%)
	\$20,000-39,999	13 (43.3%)
	40,000-59,999	
	60,000-79,999	2 (6.7%)
	80,000+	
Marital Status	Married	13 (43.3%)
	Living with partner (unmarried)	11 (36.7%)
	Single never married	5 (16.7%)
	Separated/ divorced	
Employment	I am not employed	16 (53.3%)
	Full time employee	6 (20%)
	Part time employee	5 (16.7%)
	Full time student	3 (10%)
Education	Less than high school	11 (36.7%)
	Completed high school	11 (36.7%)
	Some community college	4 (13.3%)
	Some university	2 (6.7%)
	Bachelor's degree	1 (3.3%)
	Graduate degree	1 (3.3%)
Race/Ethnicity	Hispanic or Latino	13 (43.3%)
	White	5 (16.7%)
	Asian	1 (3.3%)
	Black/ African American	1 (3.3%)
	Native Hawaiian/ pacific islander American Indian/ Alaskan native	
Distance from clinic	0-10 miles	10 (33.3%)
	11-20 miles	10 (33.3%)
	21-30 miles	7 (23.3%)
	31+ miles	3 (10%)
Insurance	Sliding scale	20 (66.7%)
	Medicaid	7 (23.3%)
	Private/ Commercial Insurance	3 (10.0%)

Patient perceptions: Quality of prenatal care & Prenatal toolkit

Prenatal care perceptions (30)	Extremely important	Very Important	Moderately important	A little important	Not at all important
How important is prenatal care to you?	17 (56.7%)	12 (40%)	-	1 (3.3%)	-
How necessary is prenatal care for you?	12 (40%)	10 (33.3%)	3 (10%)	-	-
Difficulty accessing care (30)	Extreme difficulty	Very difficult	Moderately difficult	A little difficult	Not at all difficult
How much difficulty did you experience attending appointments?	-	1 (3.3%)	5 (16.7%)	9 (30%)	16 (53.3%)

Opinions on Prenatal Toolkit

Did you receive a prenatal packet at the beginning of your pregnancy?

No- 11 (36.7%)

Yes- 19 (63.3%)

Did you find it beneficial?

No- 0

Yes (100%)

What did you find most beneficial?
(Select all that apply)

Scheduling Sheet	14 (73.7)
Medication Sheet	12 (63.2)
What to anticipate at each visit	11 (57.9)
Community Resources	9 (47.4)

What resources would you like to get more of? (Select all that apply)	Insurance Navigation	9 (30.0)
	Financial Options	8 (26.7)
	Childcare	7 (23.3)
	Transportation	5 (16.7)
	Birth control	4 (13.3)
	Breastfeeding	2 (6.7)
	I am not needing any additional resources	8 (26.7)

Quality of Prenatal Care Assessment patient responses

Quality of Prenatal Care (30)	Highly Agree (5)	Moderately Agree (4)	Neither agree nor disagree (3)	Moderately Disagree (2)	Highly Disagree (1)	Average
My prenatal provider gave me enough information to make decisions for myself	12	15	3	-	-	4.33
I fully understand the reasons for blood work and other tests my prenatal care provider ordered for me	13	14	3	-	-	4.33
I was given enough information to meet my needs about breastfeeding.	11	11	3	5	-	3.93
I was linked to programs in the community that were helpful to me	9	14	4	3	-	3.97
I was given adequate information about depression in pregnancy	10	12	3	5	-	3.90
My prenatal care providers always had time to answer my questions	13	15	2	-	-	4.37
My prenatal care provider took time to listen	13	12	4		1	4.20
*I was afraid to ask my prenatal care provider questions	3	6	-	2	17	3.80
*I was rushed during my prenatal visits	2	-	5	3	18	4.10
*My prenatal care provider made me feel like I was wasting their time	3	-	4	4	18	4.10
I knew how to get in touch with my prenatal care provider	9	16	4	-	1	4.07
Average OPCQ:						4.10

Discussion



Discussion

- Pre-intervention (336): 40.2% prenatal care adequacy
 - Rural mothers are less likely to have access to prenatal care
- Post-intervention (41): 68.2% prenatal care adequacy
 - Early education can help promote adequacy
 - Benefit: medication sheet, scheduling sheet, what to anticipate and community resources
- Logistical Regression:
 - Positive Significance: age and prenatal care adequacy
 - Negative Significance: gravida and prenatal care adequacy

Discussion

- Average age: 25.4
 - Assess other means of education
- $\frac{3}{4}$ of mothers entering care in first trimester
 - Gap with the number of visits attended
- Overall QPCQ score: 4.10/ 5
- $\frac{2}{3}$ of respondents noted desire for resources:
 - Finances, insurance navigation, childcare, transportation, birth control and breastfeeding
 - *despite COVID no significant change in appointment attendance was noted

Conclusion



Conclusion

- Despite perceived importance to care (96.7%) & perceived necessity to care (73.3%)
- 40.2% achieve prenatal care adequacy
 - Causes for missed appointments: Transportation, Childcare, Forgot appointment, Finances, Did not find it important
 - Early and consistent resources and education can help increase prenatal care adequacy (40.2% → 68.2%)
- Focus for at risk mothers:
 - Younger & multigravida

Conclusion continued....

- Desire for more resources:
 - insurance navigation, financial options, childcare, transportation, breastfeeding and birth control
 - Mirrors findings from 2022 IN MMRC Report
- Despite location similarities, differences in patient needs were found
 - Reiterating importance to complete similar studies at local levels to identify community barriers and resource needs to effectively address prenatal care utilization
- Repeat similar studies are recommended with a longer postintervention timeframe

Implications



System

We need system level

• **Complexity** of factors: patient factors, community & neighborhood factors, provider factors and system factors

▪ Recommendations:

- publicly funded childcare (beginning in infancy)
- comprehensive evidence-based sexual education
- universal access for long- acting reversible contraception
- Medicaid and insurance coverage for medical procedures
- Access to public transportation

▪ Continued studies at local levels to identify unique

social determinants of health

Economy

700-900 yearly deaths/ 60,000 near fatal

- **complications**
- \$32.3 billion from conception to child's 5th birthday
- \$8,624 in additional costs to society per maternal/ child pair
- Top 4 maternal costs: productivity loss (\$6.6 billion), c-section deliveries (\$895 million), increased peripartum stays (\$350 million), increased need for social services (\$239 million)
- Recommendations:
 - Paid family leave
 - Health insurance coverage
 - Respectful and culturally appropriate care
 - Investment in communities

Needs assessments can help identify needs for appropriate lobbying

- Advocacy for rural health & expansion of NP and midwifery scope
 - 2020: shortage of 6,000-8,000 OBGYNs
 - Current study, almost half (43.1%) of mothers are uninsured/ sliding scale
 - Expansion: Medicaid coverage for up to 1 year postpartum
 - Advocacy for continued healthcare coverage & expansion:
 - Long acting reversible contraception



Practice

Family providers often provide prenatal care in rural settings

- Up to date on: current issues & causes of Maternal Morbidity & Mortality
- Education for mothers:
 - Birth control, chronic disease management, prenatal vitamins, importance of early/ consistent prenatal care (IDOH, 2022)
- Early pregnancy recognition (Selchau, et al., 2017)
- Training: Social determinants of health & implicit bias
- Screening: Post traumatic stress disorder, depression, suicidal ideation, domestic violence (IDOH, 2022)
- Tools: ACOG monthly subscriptions, participation in ACOG IN Virtual Section Scientific Meetings

2018: 60% of maternal deaths were preventable

- High preventability -> gaps in care
- Leading causes:
 - patient/ families not knowing early warning signs, patients/ families not knowing when to seek care, provider misdiagnosis, ineffective treatments, and lack of coordination between providers
- National research: help identify and address social determinants of health
- Regional/ local research: Identify regional needs

Journal Submission

MCN: The American Journal of Maternal Child Nursing

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THANK YOU

For your time and attendance for this presentation

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