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Bipolar Disorder in the Perinatal Period: Understanding Gaps in Care to Improve Access and Patient Outcomes

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**BIPOLAR DISORDER IN THE PERINATAL PERIOD: UNDERSTANDING
GAPS IN CARE TO IMPROVE ACCESS AND PATIENT OUTCOMES**

A Dissertation Presented

By

GRACE ALLISON MASTERS

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MARCH 30, 2021

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It is difficult to truly think of this as “my” dissertation when this work has relied so heavily on others. From all those that encouraged me along the way to my mentors and peers at UMass, this feels to me like the definition of a “team effort.”

To start, I would like to thank my incredible thesis mentor, Nancy Byatt. I have had many mentorship experiences prior to working with you, but none that really compare. When I think about the hours you have spent reading my work, guiding me in my choices, and advocating for my success, I feel so much gratitude. You took a chance in mentoring me as your first MD/PhD student and for that I am forever grateful. I look forward to working with and learning from you for many more years to come.

Additionally, to the whole of the MCPAP for Moms, PRISM, and Lifeline4Moms teams – thank you for being a wonderful and supportive “family” that has taught me so much in the past four years. Your patience and encouragement have been invaluable and your dedication to your work is inspiring.

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Most of all, thank you to my amazing family. To my mom, my dad, Cory, Sam, and Jamie – you are wonderful and keep me going. There have been many times so far (and I'm sure, many more to come) where I have relied on your love and support when I felt like giving up. I could not ask for a better family. Also, all of my love and adoration to my little cats, Bruce and Rosie, who have done more for my mental health than anything else ever has.

Thank you.

ABSTRACT

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Background:

Bipolar disorder (BD) is a significant cause of perinatal morbidity and mortality. Because BD is hard to detect and treat, these individuals often go without care. This dissertation was designed to: (1) identify the prevalence rates of BD and bipolar-spectrum mood episodes in perinatal individuals, (2) understand pertinent barriers to mental healthcare, and (3) elucidate how to bridge healthcare gaps.

Methods:

Data sources included: primary qualitative and quantitative data from obstetric clinicians, encounter data from Massachusetts Child Psychiatry Access Program (MCPAP) for Moms, a program aimed at helping clinicians to provide mental healthcare to perinatal patients. Analyses included: descriptive statistics, systematic review and meta-analysis, qualitative data analyses, longitudinal regression analyses, and group-based trajectory modeling.

Results:

The prevalence of BD in perinatal individuals was 2.6% (95% CI: 1.2 to 4.5%). Twenty to 54.9% were found to have a bipolar-spectrum mood episode. Barriers to mental healthcare for perinatal patients with BD included the paucity of psychiatric resources, difficulties in assessing BD, and stigma towards pharmacotherapy. Obstetric clinicians reported that

ABSTRACT

MCPAP for Moms has helped them feel more comfortable in treating patients with BD. Longitudinal analyses of encounter data corroborated these findings - utilization of the program predicted increased clinician capacity to treat BD.

Conclusion:

Clinicians for perinatal individuals are being called upon and stepping up to care for complex illnesses like BD. Programs like MCPAP for Moms can help them feel more confident in this role, helping to bridge gaps in perinatal mental healthcare and ensuring that individuals with BD are able to receive appropriate care.

TABLE OF CONTENTS

TABLE OF CONTENTS

CONTENTS	PAGE #
TITLE PAGE	i
ACKNOWLEDGEMENTS	iii
ABSTRACT	v
TABLE OF CONTENTS	vii
LIST OF TABLES	viii
LIST OF FIGURES	x
LIST OF ABBREVIATIONS	xi
LIST OF COPYRIGHTED MATERIALS.....	xiii
ACKNOWLEDGEMENT OF FUNDING	xv
PREFACE	xvi
CHAPTER I: INTRODUCTION	18
CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN: A SYSTEMATIC REVIEW AND META-ANALYSIS	27
CHAPTER III: PERSPECTIVES ON ADDRESSING AND TREATING BIPOLAR DISORDER IN THE OBSTETRIC SETTING: A MIXED METHODS STUDY	52
CHAPTER IV: IMPROVING FRONT-LINE CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER AMONG PERINATAL INDIVIDUALS: A LONGITUDINAL ANALYSIS OF MASSACHUSETTS CHILD PSYCHIATRY ACCESS PROGRAM (MCPAP) FOR MOMS	89
CHAPTER V: DISCUSSION AND CONCLUSIONS	123
APPENDICES	139
REFERENCES	173

LIST OF TABLES

LIST OF TABLES

TABLE		PAGE #
	CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN	
2.1a	Prevalence of bipolar disorder and bipolar-spectrum mood episodes in the perinatal period	43
2.1b	Summary of overall prevalence rates of bipolar disorder and bipolar-spectrum mood episode occurrence from included studies, stratified by perinatal stage	46
2.2a	Pooled prevalence of overall bipolar disorder in women without known psychiatric illness preceding the perinatal period, as identified by positive screens and/or diagnostic interviews	47
2.2b	Pooled prevalence of any type of bipolar-spectrum mood episode in the perinatal population	47
Supplemental S2.1	Search string(s)/strategy	141
Supplemental S2.2	Modifications to the Downs & Black Checklist	143
Supplemental S2.3	Summary of studies included in the systematic review	145
	CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER	
3.1	Demographic characteristics of clinician participants	78
3.2	Participant assessment on the role of the obstetric professional in identification and treatment of BD	79
3.3	Systemic factors reported as contributing to barriers and facilitators to address BD in the obstetric setting	83
3.4	Participant-identified recommendations for integrating the treatment of BD into the obstetric setting	85
3.5	Associations with themes by exposure status, based on the number of times the themes were coded	88
Supplemental S3.1	Quantitative questionnaire administered to participants	149
Supplemental S3.2	Guideline for the 5 areas of discussion in the focus groups	151
Supplemental S3.3	Final qualitative codebook, used to code all 3 focus groups	152
Supplemental S3.4	Participant identified themes, sub-themes, and illustrative quotes	154
Supplemental S3.5	Clinician recommendations for solutions and illustrative quotes	162
	CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER	

LIST OF TABLES

4.1	Operationalization of study exposure and outcome variables of MCPAP for Moms utilization	113
4.2	Characteristics of calling clinicians that utilized MCPAP for Moms	114
4.3	Primary outcomes results - association of repeated encounters (by type) on “clinician treats” at encounter conclusion, by diagnosis	116
4.4	Characteristics of exploratory GBTM-based clinician sub-groups, based on MCPAP for Moms utilization data	117
Supplementary S4.1	All variables included in the MCPAP for Moms data set	167
Supplementary S4.2	Model evaluation of exploratory group-based trajectory modeling of clinician subgroups	170
Supplementary S4.3	Primary outcomes sensitivity analysis results - association of repeated encounters (by type) on “clinician treats” at encounter conclusion, by diagnosis, excluding the dates of the COVID-19 pandemic	171

LIST OF FIGURES

LIST OF FIGURES

FIGURE		PAGE #
	CHAPTER I: INTRODUCTION	
1.1	Massachusetts Child Psychiatry Access Program (MCPAP) for Moms Perinatal Psychiatry Access Program model.	23
1.2	Perinatal Mental Health Care Pathway	24
	CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN	
2.1	PRISMA flow diagram	48
2.2	Forest plots demonstrating estimates of the overall prevalence of bipolar disorder in women without known psychiatric illness preceding the perinatal period	49
2.2a	Prevalence estimates of bipolar disorder, using all detection methods	49
2.2b	Prevalence estimates of bipolar disorder, using the Mood Disorder Questionnaire	49
2.2c	Prevalence estimates of bipolar disorder, using diagnostic interviews	50
2.3	Forest plots demonstrating estimates of the occurrence of bipolar-spectrum mood episodes in the perinatal period	51
2.3a	Prevalence estimates of bipolar-spectrum mood episodes in women without known psychiatric illness preceding the perinatal period	51
2.3b	Prevalence estimates of bipolar-spectrum mood episodes in women with bipolar disorder preceding the perinatal period	51
	CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER	
	<i>No figures</i>	
	CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER	
4.1	MCPAP for Moms encounters, by encounter type	119
4.2	MCPAP for Moms encounters, by diagnosis discussed in encounter	120
4.3	For all encounters pertaining to bipolar-spectrum disorders or unipolar depressive disorders, the fraction of those encounters for each diagnosis that the provider will treat	121
4.4	Exploratory group-based trajectory modeling of clinician utilization patterns, based on MCPAP for Moms data	122
Supplementary S4.1	Perinatal Mental Healthcare Pathway	172

LIST OF ABBREVIATIONS

LIST OF ABBREVIATIONS

ACRONYM	MEANING
ACOG	American College of Obstetricians and Gynecologists
AUDADIS-IV	Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV
BD	Bipolar disorder
BDS	Beck Depression Scale
CI	Confidence interval
DSM-IV	Diagnostic and Statistical Manual of Mental Disorders IV
EPDS	Edinburgh Postnatal Depression Scale
GA	Gestational age
GBTM	Group-based trajectory modeling
HAM-D	Hamilton Depression Rating Scale
IRR	Incidence Rate Ratio
MCPAP for Moms	Massachusetts Child Psychiatry Access Program for Moms
MDD	Major depressive disorder
MDQ	Mood Disorder Questionnaire
mHCL-32	Modified hypomania checklist
MINI	Mini-International Neuropsychiatric Interview
MRS	Mania Rating Scale
PMADs	Perinatal mood and anxiety disorders
PP	Postpartum
PPD	Postpartum depression
PPH	Postpartum hypomania
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-analyses
SCID	Structured Clinical Interview for the DSM-IV
SI	Suicidal ideation
SIGH-ADS	Structured Interview Guide for the Hamilton Depression Rating Scale– Atypical Depression Supplement

LIST OF ABBREVIATIONS

SRQR	Standards for Reporting Qualitative Research
VLP	Valproate
YMRS	Young Mania Rating Scale

LIST OF COPYRIGHTED MATERIALS

LIST OF COPYRIGHTED MATERIALS PRODUCED BY THE AUTHOR*

The following dissertation papers are under review in peer-reviewed journals (as of March 2021):

Masters GA, Hugunin J, Xu L, Ulbricht C, Moore Simas TA, Ko JY, Byatt N. Prevalence of bipolar disorder in perinatal women: A systematic review and meta-analysis. *British Journal of Psychiatry*. [**Under Review** – Submitted 2/2021]

*See the following section (PREFACE) for more detailed information on publications and presentations by chapter, including peer-reviewed publications under review in addition to accepted abstracts for presentations.

LIST OF COPYRIGHTED MATERIALS

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The following materials (listed below) in *Chapter I* are adapted based on the following publications:

Figure 1. The Massachusetts Child Psychiatry Access Program (MCPAP) for Moms Perinatal Psychiatry Access Program model. Created based on **Byatt et al. (2018). Ob Gyn.**

Figure 2. The Perinatal Mental Health Care Pathway. Adapted with permission from **Byatt et al. (2019). International Review of Psychiatry.**

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PREFACE

PREFACE

The work presented in this dissertation has been previously presented and/or published (or is currently under review in a peer-reviewed journal). See below publication citations by chapter as of March 2021.

CHAPTER II: PREVALENCE OF BD IN PERINATAL WOMEN

1. Masters GA, Hugunin J, Xu L, Ulbricht C, Moore Simas TA, Ko JY, Byatt N.
Prevalence of bipolar disorder in perinatal women: A systematic review and meta-analysis. Poster presentation at The International Marcé Society for Perinatal Health Biennial Scientific Meeting in October 2020 (virtual due to COVID-19 pandemic).
2. Masters GA, Hugunin J, Xu L, Ulbricht C, Moore Simas TA, Ko JY, Byatt N.
Prevalence of bipolar disorder in perinatal women: A systematic review and meta-analysis. Oral presentation at the Consultation Liaison Psychiatry Annual Meeting in November 2020 (virtual due to COVID-19 pandemic).
3. Masters GA, Hugunin J, Xu L, Ulbricht C, Moore Simas TA, Ko JY, Byatt N.
Prevalence of bipolar disorder in perinatal women: A systematic review and meta-analysis. *British Journal of Psychiatry*. [**Under Review** – Submitted 2/2021]

PREFACE

A note about language used in this dissertation: In an effort to be as inclusive as possible and include those pregnant or postpartum persons that do not identify as women, terms like “perinatal individuals” will be used as often as possible. However, references to prior research almost exclusively refer to “women;” thus, gendered terms may be required when referencing other work.

CHAPTER I: INTRODUCTION

CHAPTER I: INTRODUCTION

Overview of perinatal mental health and substance use disorders

Perinatal mental health and substance use disorders are a major public health problem, affecting 20% of pregnant and postpartum individuals.¹⁻⁴ Rates are estimated to be even higher among persons of color, those in lower socioeconomic brackets, and women in middle- and low-income countries.⁵⁻⁹ Perinatal mental health conditions are associated with negative consequences for the perinatal individual, child, family, and healthcare system.¹⁰⁻¹⁴ These mental health conditions impair social function, interfere with maternal-infant bonding, and increase a child's lifetime risk for behavioral, cognitive, and mental health disorders.¹⁵⁻²¹ Perinatal mental health and substance use disorders are amongst the leading causes of perinatal-related mortality in the US, with 100% of deaths deemed preventable by the Centers for Disease Control and Prevention.²²

Bipolar disorder in the perinatal period and its importance

Bipolar disorder (BD) is a mental health condition of particular importance to pregnant and postpartum individuals. In the general population, the prevalence of BD is estimated to be 1-3% of Americans and costs the healthcare system an average of \$120 billion per year.²³⁻²⁶ However, BD appears to disproportionately affect perinatal individuals. It is during pregnancy and the postpartum periods when women have their highest lifetime risk for new onset or recurrence of bipolar-spectrum mood episodes.²⁷⁻³⁴

CHAPTER I: INTRODUCTION

In the perinatal period, Wisner et al (2013) found that BD occurs in one in five women who screen positive for postpartum depression.³⁵ This has been confirmed in other work as well.^{36,37}

Additionally, though BD affects comparatively fewer individuals than other illnesses like unipolar depression and anxiety, it often requires more complex treatments.^{38,39} Un- or under-treated BD is associated with increased rates of self-injury, substance use, relapsing depressive or manic episodes, psychosis, and suicide.^{29,34,40,41} In fact, BD is the leading risk factor for postpartum psychosis;^{32,34,42,43} a psychiatric emergency that carries a 4% risk of infanticide.^{32,34,42}

The observed prevalence of perinatal BD is likely at least partially due to the fact that the major triggers for bipolar-spectrum mood episodes include major life changes and stressors, medication changes (e.g., regimen switch, discontinuation, or modification), sleep deprivation, and hormonal changes.^{30,32,44-47} These triggers are all inherent to pregnancy, delivery, and the postpartum period. Not insignificantly, a woman's early child-bearing years (18-30) generally overlap with the peak age of onset for BD.²⁷⁻³⁴

It is imperative that BD, along with other perinatal mental health conditions and substance use disorders, be detected, assessed, and adequately treated. This is true at all times in an individual's life, but perhaps even more so in the perinatal period, when risks are highest. Despite this, BD is usually undetected and unaddressed in this high-risk population;⁴⁸⁻⁵⁰ as few as 30% of women with existing BD receive recommended evidence-based pharmacotherapy in the perinatal period.^{32,48}

CHAPTER I: INTRODUCTION

Complexities of treating bipolar disorder in the perinatal period

Bipolar disorder is a serious mental illness that primarily consists of mood episodes that fluctuate between depression and mania. Continuous and lifelong pharmacotherapy with mood-stabilizing and/or antipsychotic medications is generally required for patients with BD in order to adequately manage their illness.^{13,51-53} This is in contrast to many other mental health conditions like unipolar depression, for which first-line, evidence-based treatments include psychotherapy with or without pharmacotherapy.

The benefits of pharmacotherapy for BD in the perinatal period outweigh the risks in most cases. Discontinuation of pharmacotherapy significantly increases risk for illness relapse in perinatal women.^{30,32,52} Additionally, exposure to untreated BD is a significant risk to the fetus/child.³² Thus, continued treatment during pregnancy and lactation is almost always recommended for women with bipolar disorder.¹⁻³ Despite this, clinicians across medical specialties are often hesitant to prescribe these medications during pregnancy and lactation.⁴⁸ Even mental health clinicians have historically not recognized the value of pharmacotherapy in their pregnant patients; they often discontinue their treatments or refuse to see patients outright,⁵⁴ leaving patients feeling abandoned. This is largely due to lack of knowledge and self-efficacy among clinicians, particularly with regard to heavily stigmatized drugs like antipsychotics.⁵⁴

An additional barrier to adequate treatment for perinatal BD may also stem from societal stigma. Treatment gaps are exacerbated because patients experience external pressures to forgo all pharmacotherapies during pregnancy for “the benefit of the baby”

CHAPTER I: INTRODUCTION

and may opt out of mental healthcare once they conceive.^{48,54} Stigma attached to psychiatric medications is particularly strong, as these are often societally considered unnecessary and self-indulgent. Patients may also opt-out of pharmacotherapy because they think that clinicians do not have the appropriate training to treat them and/or they may think that pharmacotherapy is not needed in pregnancy for bipolar disorder, despite this being the recommended standard of care.⁴⁸

Barriers to adequate treatment also exist for those individuals not yet diagnosed with BD or with new onset during the perinatal period. While professional societies recommend and support initiatives focused on integrating depression screening into obstetric care,^{1-3,55-60} parallel efforts to assist clinicians with detecting BD are lagging.^{1,35,61} Because 20% of perinatal women who screen positive for depression symptoms are actually more likely to have BD than unipolar depression,^{35,36} it is recommended that perinatal women who screen positive for depression symptoms should be screened for bipolar disorder before pharmacologic treatment is initiated.¹ Because BD may be exacerbated if inappropriately treated with the main pharmacotherapies for unipolar depression (antidepressants),^{38,39,49,62} the primary focus of screening is harm reduction, rather than to identify and treat all individuals with BD. In particular, serotonin reuptake inhibitors, effective for those with unipolar depression, are contraindicated as monotherapy in patients with BD because they may trigger symptoms like mania and psychosis.^{35,38,39,48,54,62} Even with these guidelines in place, clinicians often still initiate contraindicated therapies in perinatal women without screening for BD.⁴⁸

CHAPTER I: INTRODUCTION

In addition, patients with or at risk for BD in the perinatal period experience all of the additional, well-documented barriers to mental healthcare that exist in the general population. These include: (1) the overall shortage of mental health clinicians, (2) the difficulties of interacting with a fragmented mental healthcare system in the US, with limited incentives for mental health clinicians to see patients with public or without insurance, (3) the stigma of mental illness and the historical marginalization of its treatment, and (4) the overlap with other health disparities that occur more frequently in patients with BD.^{63,64}

Strategies to improve the identification of and care for patients with BD during the perinatal period remain elusive. Given the complexities of the disease, it is unlikely that simple screening mandates or reimbursement incentives will result in effective care for perinatal individuals with BD. Thus, innovative treatment models and approaches to care are required to help address this issue.

Introduction to Perinatal Psychiatry Access Programs

In response to the shortage of clinicians in Massachusetts equipped to serve pregnant and postpartum individuals with mental health and substance use disorders, Byatt et al founded the Massachusetts Child Psychiatry Access Program (MCPAP) for Moms in 2014.^{58,65} MCPAP for Moms is first-in-nation, state-wide, population-based program that seeks to increase front-line clinician capacity to provide timely and evidence-based perinatal mental healthcare.^{58,66} MCPAP for Moms functions by

CHAPTER I: INTRODUCTION

providing training and consultative services regarding addressing and treating perinatal mental health conditions to any requesting practice or clinician in the state to improve their knowledge, skills, and self-efficacy in addressing perinatal mental health conditions.⁵⁶ The core services offered by MCPAP for Moms are education, consultation, and resources and referrals (**Figure 1**).

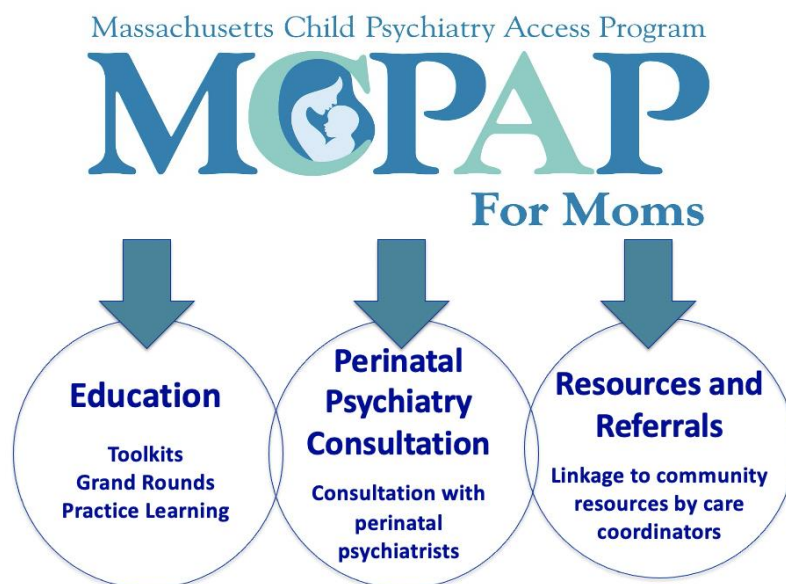


Figure 1.1. The Massachusetts Child Psychiatry Access Program (MCPAP) for Moms Perinatal Psychiatry Access Program model. Adapted with permission from Byatt et al. (2018). *Ob Gyn*.

MCPAP for Moms has changed the definition of comprehensive obstetric care in Massachusetts, such that screening for and addressing depression has become routine in perinatal patients.^{56-58,67,68} Obstetric clinicians, in particular, have learned to identify, assess, and refer patients with depression in pregnancy and the postpartum period at higher rates than before.^{58,69} Additionally, more obstetric clinicians are starting bridge pharmacotherapy for their patients until longer term psychiatric care is available.⁶⁹ Bridge

CHAPTER I: INTRODUCTION

pharmacotherapy means that the clinician will prescribe a medication temporarily, to ensure that the patient receives continuous, adequate treatment, until care can be transferred to a longer-term prescriber. Presently, the 161 practices that perform over 80% of deliveries in Massachusetts⁵⁸ detect, assess, treat, and provide resources and referrals to women with perinatal mental health and substance use disorders through consultation with MCPAP for Moms.^{58,66}

The success of MCPAP for Moms in Massachusetts has inspired the formation of many other Perinatal Psychiatry Access Programs (or “Access Programs”) around the country; sixteen states now have or are developing similar programs.^{58,70-72} Though varied in form and services offered, all of the Access Programs are centered around the idea of moving patients “down” the Perinatal Mental Health Care Pathway (**Figure 2**).⁷³

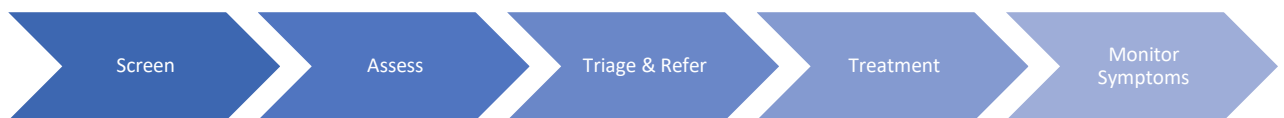


Figure 2. The Perinatal Mental Health Care Pathway

As these programs spread, it is critical to identify their most effective and sustainable components, their mechanisms of action, and how to ensure they deliver equitable care. This should include ensuring that the Perinatal Mental Health Care pathway works to address all perinatal mental health and substance use disorders, including that of BD.

CHAPTER I: INTRODUCTION

The role of Access Programs in helping to connect perinatal patients with bipolar disorder to mental healthcare

The existing infrastructure of these programs, their success in addressing related diagnoses like that of unipolar depression, and the current societal appetite for change in the realm of perinatal mental health all provide an environment that suggest the Access Program model may be a valuable tool used to help address BD in perinatal patients. However, there is currently no existing data on the feasibility of broadening the implementation of these programs, nor whether they will be accepted by patients and clinicians alike. Empirical evidence on how best to integrate screening, assessment, and treatment for BD in the context of the Access Program model is required for this to be a sustainable and effective solution to the current gaps in perinatal psychiatric care for BD.

Specific Aims

This dissertation seeks to help fill these critical evidence gaps around addressing BD in the perinatal period, primarily by exploring the use of Access Programs like MCPAP for Moms. Primary qualitative and quantitative data from front-line clinicians as well as longitudinal encounter data from MCPAP for Moms were leveraged to do this work. A mixed-methods analytic approach was used to contextualize findings. The **specific aims** are to:

CHAPTER I: INTRODUCTION

AIM 1. Identify the prevalence rates of bipolar disorder and bipolar-spectrum mood episodes in perinatal individuals

AIM 2. Elucidate how the Access Program model, via MCPAP for Moms, impacts the management of bipolar disorder in the perinatal period, and specify clinician-level barriers, facilitators, and recommendations to improving management

AIM 3. Characterize the extent to which the Access Program model, via MCPAP for Moms, builds obstetric clinician capacity to address bipolar disorder

The resultant research will be critical in helping to inform design, planning, and implementation of aspiring and nascent Access Programs across the country, as well as assisting existing Access Programs' efforts to incorporate managing BD into their work. The overall objective of this dissertation is to help address issues specific to this vulnerable population, bridge gaps in mental healthcare, and to raise the standard of perinatal mental healthcare for individuals with BD.

CHAPTER II:

**PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN: A
SYSTEMATIC REVIEW AND META-ANALYSIS**

ABSTRACT

Background: Bipolar disorder (BD) is thought to disproportionately affect women in pregnancy and the postpartum period.

Objective: The study objectives were to estimate overall prevalence of BD and the prevalence and timing of bipolar-spectrum mood episodes in perinatal women.

Method: Databases (PubMed, Scopus, PsycINFO, CINAHL, Cochrane, ClinicalTrials.gov) were searched from inception to March 2020. Included studies were original research in English that had: (1) populations of perinatal individuals (pregnant or within 12-months postpartum), aged 18+, and (2) a screening/diagnostic tool for BD. Study design data, rates, and timing of positive screens/diagnoses and mood episodes were extracted by three independent reviewers. Pooled prevalences were estimated using random-effects meta-analysis.

Results: Twenty-two articles were included in qualitative review and 12 in meta-analyses. In women with no known psychiatric illness preceding the perinatal period, pooled prevalence of BD was 2.6% (95% CI: 1.2 to 4.5%) and prevalence of bipolar-spectrum mood episodes (including depressed, hypomanic/manic, mixed) during

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

pregnancy and the postpartum period was 20.1% (95% CI: 16.0 to 24.5%). In women with a prior BD diagnosis, 54.9% (95% CI: 39.2 to 70.2%) were found to have at least one bipolar-spectrum mood episode occurrence in the perinatal period.

Conclusions: The perinatal period is associated with high rates of bipolar-spectrum mood episodes. Though it is well-known that many women experience depressive episodes isolated to the perinatal period, it is striking that women without BD are also experiencing manic/hypomanic and mixed episodes in this time. These data could help to inform clinical care recommendations, thus helping to identify those who may have bipolar disorder to connect them with needed care.

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

INTRODUCTION

Bipolar disorder (BD) is a serious mental illness with significant health ramifications for patients, their families, providers, and the healthcare system.²³⁻²⁶ In the general population, prevalence estimates of bipolar spectrum disorders are 2-3%.⁷⁴ Perinatal women (those pregnant or within 1-year postpartum) may be at increased risk for bipolar-spectrum mood episodes.^{6,27,28,30,33,75} The reasons for increased bipolar-spectrum mood episode occurrence during the perinatal period is multifactorial and include: (1) overlap between peak reproductive years and BD onset; (2) hormonal and other physiological changes accompanying pregnancy; and (3) stress related to childbirth and parenting.^{13,27-30}

BD is a risk factor for perinatal suicide, postpartum psychosis, and infanticide.^{13,29,34,40,41,76-78} Despite the association between untreated perinatal BD and poor neurodevelopmental and psychosocial outcomes in offspring,^{13,29,34,40,41,76,77} detection, diagnosis, and effective treatment remain elusive. Prior systematic reviews demonstrate increased risk of bipolar-spectrum mood episode recurrence in perinatal women with pre-existing BD and poor outcomes with lack of treatment.^{13,30} However, to date, no systematic reviews have estimated the overall prevalence of BD or bipolar-spectrum mood episodes in perinatal women without a known BD diagnosis preceding the perinatal period.

In this review, we systematically evaluated the studies measuring rates of BD during pregnancy and the postpartum period. The goal of this review was to examine: (1) the prevalence of BD in perinatal women and (2) the prevalence and timing of bipolar-

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

spectrum mood episodes in the perinatal time period. The synthesis of these data could help to inform clinical care and screening recommendations specific to BD.

METHOD

Data sources and search strategy

Following the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) guidelines, we conducted a literature review of the following databases: PubMed, Scopus, PsycINFO, CINAHL, Cochrane, and ClinicalTrials.gov. Search terms included keywords describing the population (e.g., perinatal, pregnancy, postpartum), illness of interest (e.g., bipolar disorder), and screening processes (e.g., screen, identify). A complete description of our search strategy may be found in the **Supplemental Table S2.1**. Articles were limited to those published in peer-reviewed journals that were available in English through March 2020. Additional articles were identified via the reference sections of eligible articles. Our study protocol was registered with Prospero (#CRD42020172166). The University of Massachusetts Medical School Institutional Review Board determined this study to not require human subject research review.

Study selection

The initial search, as defined by the criteria above, yielded 4,052 records. After removing duplicates, two independent reviewers (GM, JH) reviewed titles and abstracts to assess first-pass eligibility, excluding 2,786. **Figure 1** illustrates the full PRISMA

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

study identification, screening, eligibility, and inclusion process. Independent reviewers (GM, JH, LX) reviewed the 177 full-text articles for final study eligibility. Any inconsistencies between the reviewers were resolved through discussion and consensus. Eligibility was assessed using the following inclusion criteria: (1) study population of perinatal individuals (pregnant or within 12-months postpartum), aged ≥ 18 ; (2) use of screening/diagnostic tool(s) validated in the perinatal population to detect BD; and (3) accessible article and relevant data. Articles were excluded if: (1) participants were recruited based on an unrelated medical condition that secondarily assessed psychiatric symptoms; (2) screening/diagnostic assessment was conducted outside of the perinatal period; and (3) BD prevalence was not reported. After final review and consensus, 22 articles were included in the qualitative review and 12 in the meta-analyses (see **Figure 2.1** for details).

Data extraction

Data extraction began on June 8, 2020. Eligible articles were extracted by three independent reviewers (GM, JH, LX), with inconsistencies resolved through consensus. Extracted data were entered into REDCap.^{79,80} Articles were examined for key study elements including: (1) study design and population; (2) screening/diagnostic tools; and (3) rates and timing of positive BD screens, diagnoses, mood symptoms, and/or episodes.

Quality assessment

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

Study quality was assessed using a modified version of the Downs and Black checklist,⁸¹ which evaluates study design in five areas: (1) reporting, or design specifics; (2) external validity; (3) bias; (4) confounding; and (5) power. We modified the checklist to exclude items that were not applicable or were not able to be assessed, as has been done previously (**Supplemental Table S2.2**).^{68,82}

Study quality was assessed and recorded during data extraction, with inconsistencies resolved through consensus. For each study, an overall quality percentage score was calculated (total points awarded divided by total points possible). Quality scores were used to examine overall trends in extant study quality and to conduct sub-analyses.

Data reporting

We differentiated the study populations into two categories for analyses: (1) *women with no known psychiatric illness preceding the perinatal period* (henceforth referred to as “no psychiatric history *preceding the perinatal period*”) and (2) *women with BD, based on diagnostic interview, or probable BD, based validated screening tool (e.g., the Mood Disorder Questionnaire [MDQ]), preceding the perinatal period* (henceforth referred to as “women with BD *preceding the perinatal period*”). Some studies also examined women with a history of any mood disorder, including a history of either bipolar or unipolar depression. The heterogeneity of these groups was too high to be included in the meta-analyses and were only included in qualitative review and not in either preceding populations.

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

We examined rates of BD prevalence and timing of bipolar-spectrum mood episodes across study populations. In studies that reported more than one prevalence value (e.g., used more than one scoring methodology), the rates were reported separately. BD was measured as either an overall prevalence or mood episode occurrence/recurrence. *Prevalence of BD* was operationalized as women identified via diagnostic or screening tools that measure bipolar-spectrum mood episodes, past or current (e.g., the MDQ) over all women screened across included studies. *Mood episode occurrence/recurrence* was operationalized as women experiencing a “current” bipolar-spectrum mood episode occurring during the perinatal period, as determined by either: (1) diagnostic interview (e.g., current mood episode on the Structured Clinical Interview for the DSM-IV [SCID]), or (2) symptoms occurring concurrently that correspond with established thresholds on validated instruments (e.g., 10+ score on the Edinburgh Postnatal Depression Scale [EPDS]⁸³ or 8+ score on the Highs scale⁸⁴). Mood episodes were reported both collectively and by subgroup (hypomanic/manic, depressive, mixed).

Meta-analysis

Pooled estimates and 95% confidence intervals (CIs) were calculated for the following: (1) overall BD prevalence and bipolar-spectrum mood episode occurrence in individuals with no psychiatric illness preceding the perinatal period and (2) bipolar-spectrum mood episode occurrence during the perinatal period among women with BD. When more than one rate was available in a study (e.g., by use of different scoring methods), the more conservative value was used in analyses. Pooled prevalence and 95%

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

CIIs were calculated following methodology previously published by Barendregt et al (2013)⁸⁵, where the inverse variance method and double arcsine transformation were used, and resultant values were transformed back to the original proportion format for presentation and interpretation. We used random-effects models to calculate pooled prevalence rates because the studies included varied by design and quality. A fixed-effects model was also run as a sensitivity analysis. Meta-analyses were conducted using MetaXL version 5.3 (EpiGear International).

RESULTS

Description of studies

A total of 22 observational studies met inclusion criteria (**Supplemental Table S2.3**). Most were conducted in obstetric settings (63.6%)^{35,61,86-98} and detected BD using diagnostic instruments (77.3%),^{35,50,86,88,91-103} including the SCID (68.2%),^{35,86,88,92-103} the Mini-International Neuropsychiatric Interview (MINI, 9.1%),^{91,101} and the Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV, 4.5%).⁵⁰ Less than a third used the MDQ screening instrument to identify potential BD (31.8%).^{61,86,87,89,90,95,104} Studies consisted of women who were pregnant (13.6%),^{90,97,102} postpartum (40.9%),^{35,86,87,89,91,96,98,104} or both (54.5%).^{50,61,88,92-94,96,99-101,103} Eleven studies examined the prevalence of BD in women with no psychiatric history preceding the perinatal period.^{35,50,61,86-92,98,104}

Quality assessment

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

The average quality rating was 73.7% (range 45.5-92.9%) (**Supplemental Table S2.3**). The main study design limitations included: (1) insufficient reporting of potential or actual adverse events (e.g., suicidality was reported without description of study plan to address and/or follow-up); (2) limited or no description of participants lost to follow-up and/or the effects on results; and (3) inadequate description of the confounders and/or adjustment for said variables in analyses.

Prevalence of BD in women with no psychiatric history preceding perinatal period

In the studies that used the MDQ to screen for probable BD in women with no psychiatric history preceding the perinatal period (n=6), prevalence ranged from 3.3%-25.6%^{61,86,87,89,90,104} (**Table 2.1b**). Studies that used diagnostic tools estimated rates from 0-2.9%.^{50,88,91,92,98} Most studies examined rates in the postpartum period only or across both pregnancy and postpartum; only two studies examined rates in pregnancy alone (**Table 2.1b**).

Among studies that evaluated rates of BD in women with no psychiatric history preceding the perinatal period (n=11),^{50,61,86-92,98,104} no statistically significant differences were observed in the random- or fixed-effects models; therefore, only the random-effects output is reported. Prevalence of BD was 2.6% (95% CI: 1.2-4.5%; **Table 2.2a, Figure 2.2**). When restricted to studies with higher quality scores ($\geq 70\%$), the prevalence was 4.5% (95% CI: 2.9-6.4%). The heterogeneity of prevalence estimates was high ($I^2 = 92\%$, $I^2 = 81\%$ in higher quality). In studies that used the MDQ,^{61,86,87,89,90,104} the pooled prevalence was 4.8% (95% CI: 3.1-6.9%). When restricted to studies using the MDQ

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

with higher quality scores, prevalence was 4.9% (95% CI: 2.9-7.4%). In studies that used diagnostic interviews to diagnose BD,^{50,88,91,92,98} the pooled prevalence was 0.7% (95% CI: 0.0-2.3%). Four of the five studies in this group were of poorer quality; thus, pooled prevalence based on quality could not be calculated.

Bipolar-spectrum mood episode occurrence

Sixteen studies reported on bipolar-spectrum mood episode occurrence among pregnant and postpartum women, including depressive, manic/hypomanic, and/or mixed episodes.^{35,61,86-94,96,99,100,103,104} Measurement tools and methodologies varied greatly; the most common tools used to measure mood episodes were the EPDS and the SCID mood modules. All studies that examined mood episodes looked at depressive episodes and some also looked at hypomanic (n=4), manic (n=3), or mixed episodes (n=2) (**Table 2.1a**). Five studies examined occurrence of depressive episodes among women with BD as compared to individuals with unipolar depression.^{61,86,87,89,100}

Bipolar-spectrum mood episodes in women with no psychiatric history preceding the perinatal period

Among women with no psychiatric history preceding the perinatal period, the rate of bipolar-spectrum mood episodes was higher than the overall rate of BD.^{92,93,104} For example, Pingo et al (2017)⁹² found that 31.6% of individuals exhibited hypomanic symptoms and 17.5% mixed symptoms during the perinatal period, while 0% had a BD diagnosis via SCID. The pooled prevalence rate of mood episodes occurring during the

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

perinatal time period was 20.1% (95% CI: 16.0-24.5%) (Table 2.2b, Figure 2.3). When restricted to studies with higher quality scores, the prevalence was 16.1% (95% CI: 12.4-20.1%). The estimate in pregnant women (n=2) was 22.0%; the prevalence in postpartum women (n=8) was 18.0%.

Bipolar-spectrum mood episodes in women with BD preceding the perinatal period

In women with BD preceding the perinatal period, 54.9% (95% CI: 39.2-70.2%) had at least one bipolar-spectrum mood episode occurrence in the perinatal period. All studies included in this estimate had quality ratings above 70%. The prevalence of episodes was 51.4% in pregnant women (n=1) versus 54.8% in postpartum women (n=6).

Comparing depressive episodes rates in women with and without BD

Eight studies compared rates of depressive episodes in women with and without BD; in 6/8 studies, depressive episodes were higher in women with BD than in those without.^{35,61,86-89,94,100} When prevalence rates were compared, women with probable BD (via positive MDQ) were 6.5-times (95% CI: 2.0-20.8%) as likely to have a depressive episode than those without probable BD (via negative MDQ).^{61,86,89}

DISCUSSION

Bipolar disorder is exacerbated during pregnancy and the postpartum period and is associated with adverse outcomes.^{13,30} Estimating the prevalence of BD and bipolar-spectrum mood episodes occurring in the perinatal period is critical to inform guidelines

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

to adequately detect, assess, and treat BD. We found that, in women both with and without known psychiatric illness preceding the perinatal period, bipolar-spectrum mood episode occurrence in the perinatal period exceeded expected estimates.^{74,105,106} Our review suggests that pregnant and postpartum women are at greater risk for bipolar-spectrum mood episodes during the perinatal period than previously thought.

Though approximately 2.6% of women with no psychiatric history preceding perinatal period were found to have a BD diagnosis, we found that 20.1% were estimated to have had a manic/hypomanic, mixed, or depressive episodes in the perinatal period. It is well-known that as many as one in seven women will experience a depressive episode in the perinatal period,^{107,108} many of whom will not have another psychiatric diagnosis before or after that time. Depressive episodes can be manifestations of multiple psychiatric disorders. However, manic/hypomanic and mixed episodes rarely occur in individuals without a bipolar-spectrum diagnosis; thus, it is striking that women without BD are also experiencing these types of episodes isolated to this time. Few prior studies have found this phenomenon;^{42,109} however, it is considerably less understood than discrete depressive episodes in this period. It important that future work examines how detection and management may need to be tailored for the perinatal population with isolated bipolar-spectrum mood episodes.

We also found that women with a BD diagnosis preceding the perinatal period had a heightened risk of bipolar-spectrum mood episode occurrence/recurrence in the perinatal period. When compared with individuals with unipolar depression, individuals

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

with BD preceding the perinatal period had a substantially higher risk for depressive episode occurrence.

The American College of Obstetricians and Gynecologists' Council on Patient Safety in Women's Health Care and other organizations recommend that obstetric and other front-line providers screen for BD in the perinatal period prior to initiating pharmacotherapy for depression.^{1,110} It is important to detect undiagnosed BD among individuals presenting with depressive symptoms because treatment with antidepressants can precipitate mania and/or suicidality.^{38,111} This clinical scenario is more common than previously thought; Wisner et al (2013)³⁵ found that one-in-five perinatal women with symptoms of depression (via EPDS) were likely to have BD. Given our findings that bipolar-spectrum mood episodes are more common in the perinatal time period and occur in both pregnancy and postpartum, strategies to improve screening and treatment may consider expanding to include *universal* screening for BD as part of their clinical guidance and workflow adaptations, alongside existing recommendations to universally screen for depression.^{2,3,110,112} Recommendations for increases in screening need to be considered in the larger clinical context, including feasibility, resources, and provider capacity to respond to a screen.¹¹³ As processes are put in obstetric practice to conduct universal depression screening, including BD in these protocols may be indicated and become more tenable.

Our review also suggests that future recommendations may consider screening for BD and/or relevant symptoms more than once during pregnancy or postpartum. For example, screening in the first trimester may detect pre-existing BD while screening later

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

in pregnancy and the postpartum period may detect new onset illness. This is supported by our finding of high rates of episodes in both pregnancy and the postpartum period, indicating that mood onset can occur anytime in the perinatal period. Further, studies like that of Sharma et al (2014)¹⁰¹ support this notion of screening more than once. They followed incident BD diagnoses that were diagnostic conversions from major depression. Of women previously diagnosed with unipolar depression, they found that 6.5% converted to BD in the perinatal period.

Further work is needed to establish the ideal time(s) to screen for BD and bipolar-spectrum mood episodes. The vast majority of the studies included in our meta-analyses enumerated episodes across the entire perinatal period or only postpartum. The limited studies in our review examining episode occurrence in pregnancy only indicated that this time period is critical to consider for illness onset/recurrence. More studies need to examine women that are currently pregnant to estimate differences in risk between pregnancy and the postpartum period.

Our work provides a synthesis of the extant research describing aggregate overall and current mood episode prevalence rates of BD in perinatal women. It also indicates that significant gaps in the literature remain and further studies specific to BD in the perinatal period are necessary to make estimates more robust. Of note, we excluded 25 studies from our review because they did not address BD, despite an ability to do so (e.g., used the SCID but reported only data on depression and anxiety). That is, many studies that otherwise met all inclusion criteria and may have yielded useful information to contribute to prevalence estimates were excluded. It appears that examining BD in the

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

perinatal period has not been prioritized in studies in the ways that perinatal depression or anxiety have been.⁶ Additionally, bipolar-spectrum mood episodes other than depression need to be examined more thoroughly to provide more robust estimates with regard to the perinatal time period.

Future work can help to address the specific design limitations seen in many studies in this review, such as including greater efforts to understand the characteristics of women lost to follow-up and exploring and including confounders that may be pertinent risk factors for BD, including substance use and family history. Additionally, prospective efforts should strive to be more inclusive of other perinatal individuals, or those that don't identify as women, to estimate rates in other perinatal populations.

This review has many strengths, including its novel contribution to the field on an understudied area. It encompasses a comprehensive reference search. Data review and extraction were completed using multiple reviewers for scientific rigor. Limitations of this review include its small sample size and heterogeneity across studies, such that the pooled prevalence rates should be interpreted with caution. We were unable to include articles that were not written in English, though articles from many disparate geographic areas were included.

Conclusion

Perinatal mental health conditions, including BD, are now cited as one of the leading obstetric complications in the US and are a preventable cause of maternal mortality.^{1,22} It is imperative that we provide front-line providers with every tool possible

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

to address perinatal mental health. This review establishes the importance of identifying, assessing, and treating BD in the perinatal period due to its prevalence estimates in this population. This review may inform clinical care and screening recommendations, such that all perinatal individuals are screened for BD at least once. This may improve the identification of individuals at risk and connect them to the best clinical care possible.

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

Table 2.1a – Prevalence of bipolar disorder and bipolar-spectrum mood episodes in the perinatal period

Table 1a presents prevalence of BD and bipolar-spectrum mood episodes by study in this review. Perinatal status indicates when the sampling was done - during pregnancy only, postpartum only, or both. Population describes the group of women in the denominator of the reported rates; all indicates that there were no pertinent exclusion criteria and the sample ostensibly represents the “general” perinatal population; MDQ+ is reporting rates for the subset of the sample that had a positive MDQ (thus have probably BD); BD only is reporting rates only in women with BD preceding the perinatal period. Rates or rate ranges are reported for both prevalence of BD and by mood episode type. Finally, notes elaborate more on the specifics of how rate measurements were conducted.

Article identifier	Perinatal status		Population	Overall rates of bipolar disorder	Rates of mood episodes that occur <u>in the perinatal period</u>			Notes
	Pregnant	Postpartum			Manic	Depressive	Mixed	
Celik (2016) ¹⁰⁴		X	All	4.8 – 17.5%	No rates, see notes for scores	22.2 – 42.9%	n/a	<u>To measure overall rates:</u> MDQ original scoring (7+2) method ^d used (4.8%) and alternate MDQ scoring (7+ only) ^e used (17.5%) <u>To measure current symptoms:</u> mHCL-32 used to measure manic symptoms (27.0% had 13+ symptoms <i>but validated criteria is higher; therefore does meet criteria for potential manic/hypomanic episode</i>); EPDS used to measure depressive symptoms (42.9% positive); BDS used to measure depressive symptoms (22.2% positive)
Clark (2015) ⁸⁶		X	All	3.3%	n/a	11.1%	n/a	<u>To measure overall rates:</u> MDQ original scoring (7+2) method ^d used (3.3%) in all participants; of those that screened positive on EPDS and/or MDQ, SCID was done (37.0%) <u>To measure current symptoms:</u> EPDS used to measure depressive symptoms (11.0% positive in all participants, 66.7% in those MDQ+; 91.2% in those with BD per SCID)
			MDQ+	100% ^b	n/a	66.7%	n/a	
Driscoll (2017) ⁹⁹	X	X	BD only	100% ^a	No rates, see notes for scores	No rates, see notes for scores	n/a	<u>To measure overall rates:</u> SCID used (100%) <u>To measure current symptoms:</u> Symptom scales were used to measure differences between women who continued or discontinued psychiatric meds in pregnancy/pp. SIGH-ADS and HAM-D used to measure depression at points in pregnancy – the mean scores were similar across groups and of mild/moderate severity; SIGH-ADS and HAM-D scores tended to be lower pp for all groups. MRS used to measure mania – similar, low scores across all groups in pregnancy and postpartum
Dudek (2014) ⁸⁷		X	All	3.8-25.5%	n/a	16.0%	n/a	<u>To measure overall rates:</u> MDQ original scoring (7+2) method ^d used (3.8%), alternate MDQ scoring (7+ only) ^e used (25.5%), and alternate MDQ scoring (8+ only) ^f used (15.1%) <u>To measure current symptoms:</u> EPDS used to measure depressive symptoms (16.0% positive in all, 65.6% positive in MDQ+ using 7+ only scoring, 72.1% positive in MDQ+ using 8+ only scoring)
			MDQ+	100% ^b	n/a	65.6 – 72.1%	n/a	
Giardinelli (2012) ⁸⁸	X		All	1.5%	n/a	21.9%	n/a	<u>To measure overall rates:</u> SCID used (1.5%)
		X			n/a	13.2%	n/a	

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

								<u>To measure current symptoms:</u> EPDS used to measure depressive symptoms in pregnancy and postpartum, but neither rates, scores, nor associations with bipolar disorder reported; in pregnancy, overall 12% scored 10-12, 10% > 13; postpartum: 7.6% scored 10-12, 5.6% > 13.
Jaeschke (2017) ⁸⁹		X	All	4.6 – 23.7%	n/a	15.2%	n/a	<u>To measure overall rates:</u> MDQ original scoring (7+2) method ^d used (4.6%) and alternate MDQ scoring (7+ only) ^e used (23.7%)
			MDQ+	100% ^b	n/a	24.3%	n/a	<u>To measure current symptoms:</u> EPDS used to measure depressive symptoms (15.2% positive overall; 24.3% positive in those MDQ positive; 12.4% in those MDQ negative)
Kim (2006) ⁹⁰	X		All	3.9%	n/a	22.1%	n/a	<u>To measure overall rates:</u> MDQ original scoring (7+2) method ^d used (3.9%) <u>To measure current symptoms:</u> PRIME-MD PHQ used to measure depressive symptoms (14.3% screened positive for minor depression, 7.8% for major depression)
Kimmel (2015) ¹⁰⁰	X	X	BD/MDD	32.3% ^a	n/a	16.2 – 44.0%	n/a	<u>To measure overall rates:</u> SCID used (32.3%) <u>To measure current symptoms:</u> SCID used to measure current depressive symptoms (30.8% developed postpartum depression in BD; 44.0% developed postpartum depression in MDD, 39.5% overall); Overall: 25% remained well all through perinatal period; 25% depressed in pregnancy but recovered and were well postpartum; 33.9% were depressed all perinatal period; 16.2% were well in pregnancy but developed PPD.
		X	BD	100%	n/a	30.8%	n/a	
Kumar (2016) ⁹¹		X	All	0%	n/a	27.0%	n/a	<u>To measure overall rates:</u> MINI used (0%) <u>To measure current symptoms:</u> MINI used to diagnose depressive symptoms (27.0% with depressive disorder NOS)
Masters (2019) ⁶¹	X	X	All	8.7-18.8%	n/a	22.5%	n/a	<u>To measure overall rates:</u> MDQ original scoring (7+2) method ^d used (8.7%) and alternate MDQ scoring (7+ only) ^e used (18.8%)
			MDQ+	100% ^b	n/a	55.6%	n/a	<u>To measure current symptoms:</u> EPDS used to measure depressive symptoms (22.5% positive overall; 55.6% positive in those MDQ positive)
Pingo (2017) ⁹²		X	All	0%	31.6%	15.8-45.6%	17.5%	<u>To measure overall rates:</u> SCID used (0%) <u>To measure current symptoms:</u> Highs scale used to measure hypomanic symptoms at 3 days pp (31.6%); EPDS used to measure depressive symptoms at 3 days pp (15.8% positive) and 6 weeks pp (45.6%); 17.5% positive on highs and EPDS both at 3 days pp
Pope (2013) ⁹³	X	X	MDD/BDI I	36.1% ^a	No rates, see notes for scores	n/a	n/a	<u>To measure overall rates:</u> SCID used (36.1%) <u>To measure current symptoms:</u> YMRS used to measure hypomanic symptoms (40.8% score > 3, <i>but validated criteria cutoff is higher</i> ;

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

								<i>therefore does meet criteria for potential manic/hypomanic episode)</i>
Robakis (2015) ⁹⁴	X	X	Combined	8.2% ^{a,c}	n/a	No rates, see notes for scores	n/a	To measure overall rates: SCID used (8.2%) To measure current symptoms: EPDS was used to measure depressive symptoms: mean postnatal EPDS scores were 5.81 for women with no mood disorder history, 6.86 for women with history of unipolar depression, and 12.25 for women with history of bipolar disorder respectively
Sharma (2011) ⁹⁵		X	MDD/BD	45.6 - 48.0% ^a	n/a	n/a	n/a	To measure overall rates: MDQ original scoring (7+2) method ^d used (45.6%) and alternate MDQ scoring (8+ only) ^f used (48.0%); SCID used (45.6%)
Sharma (2013) ⁹⁶	X		BDII	100% ^a	n/a	8.1%	43.2%	n/a
		X						
Sharma (2014) ¹⁰¹	X		MDD/BDI I	37.0%	n/a	n/a	n/a	To measure overall rates: SCID used at start (37.0%) and MINI at end (41.1%) to see conversion rate to BD
		X		41.1%	n/a	n/a	n/a	
Sit (2014) ⁹⁷	X		Combined	26.0% ^{a,c}	n/a	n/a	n/a	To measure overall rates: SCID used (26.0%)
Sole (2019) ¹⁰²	X		Combined	50.0% ^{a,c}	n/a	n/a	n/a	To measure lifetime rates: SCID used (50.0%)
Uguz (2019) ⁹⁸		X	All	0.2%	n/a	n/a	n/a	To measure overall rates: SCID used (0.2%)
Vesga-López (2008) ⁵⁰	X	X	All	2.9%	n/a	n/a	n/a	To measure overall rates: AUDADIS-IV used (2.9%)
Wisner (2004) ¹⁰³	X		BD	100%	n/a	n/a	n/a	To measure overall rates: SCID used (100%) To measure current symptoms: episodes compared between medicated (VLP) and non-medicated groups; hypomanic/manic episode postpartum (6.7% in VLP vs 9.1% in non-med); mixed episode pp (6.7% in VLP vs 18.2% in non-med); depressive episode
		X		100% ^a	7.7%	50.0%	11.5%	

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

								pp (53.3% in VLP vs 45.5% non-med); any episode pp (66.7% in VLP vs 72.7% non-med)
Wisner (2013) ³⁵	X	All	n/a	n/a	14.0%	n/a	To measure overall rates: SCID used (22.6% in those with postpartum depression)	
		PPD	22.6%	n/a	100% See notes for association	n/a	To measure current symptoms: EPDS used (14.0% overall, 100% in those with postpartum depression); higher EPDS cut points more predictive of BD than MDD or others	

MDD = Major depressive disorder; BD = bipolar disorder; GA = gestational age; MDQ = Mood Disorder Questionnaire; EPDS = Edinburgh Postnatal Depression Scale; SCID = Structured Clinical Interview for the DSM-IV; PP = Postpartum; PPD = Postpartum depression; MINI = Mini-International Neuropsychiatric Interview; PPH = Postpartum hypomania; SI = Suicidal ideation; AUDADIS-IV = Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV; mHCL-32 = Modified hypomania Checklist; BDS = Beck Depression Scale; YMRS = Young Mania Rating Scale; VLP = Valproate; SIGH-ADS = Structured Interview Guide for the Hamilton Depression Rating Scale–Atypical Depression Supplement; HAM-D = Hamilton Depression Rating Scale; MRS = Mania Rating Scale

a Studies not included in lifetime prevalence calculation summaries because diagnoses/symptoms were part of inclusion criteria/were confirmatory rather than diagnostic

b Examining symptoms within the participants that were MDQ+ only

c Combined = Includes participants with mood disorders and asymptomatic participants as controls

d Original scoring (7+2) method = Screen is considered positive if individuals report at least 7 of 13 symptoms associated with bipolar disorder, and that these co-occurred and caused a significant impairment to their life

e Alternative scoring (7+ only) method = Screen is considered positive if individuals report at least 7 of 13 symptoms associated with bipolar disorder, without any supplementary questions

f Alternative scoring (8+ only) method = Screen is considered positive if individuals report at least 8 of 13 symptoms associated with bipolar disorder, without any supplementary questions

Table 2.1b – Summary of overall prevalence rates of bipolar disorder and bipolar-spectrum mood episode occurrence from included studies, stratified by perinatal stage

	Prevalence rates		Current episode or symptom occurrence		
	MDQ	Diagnostic	Depressive episodes	Hypomanic/Manic episodes	Mixed episodes
Women without known psychiatric illness preceding the perinatal period					
Pregnant women	3.3 – 25.6%	0.0 – 2.9%	21.9 – 22.1%	-	-
Postpartum women			11.1 – 45.6%	31.6%	17.5%
All perinatal women			11.1 – 45.6%	31.6%	17.5%
Women with bipolar disorder preceding the perinatal period					
Pregnant women	100%	100%	43.2%	8.1%	-
Postpartum women			24.3 – 72.1%	7.7 – 27.0%	11.5%
All perinatal women			24.3 – 72.1%	7.7 – 27.0%	11.5%

MDQ = Mood Disorder Questionnaire

Diagnostic = includes the Structured Clinical Interview for the DSM-IV; MINI = Mini-International Neuropsychiatric Interview; AUDADIS-IV = Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV

CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

Table 2.2a – Pooled prevalence of overall bipolar disorder in women without known psychiatric illness preceding the perinatal period, as identified by positive screens and/or diagnostic interviews

Studies included	Pooled prevalence (%)	95% CI	Heterogeneity index (I ²)
All studies using Mood Disorder Questionnaire (n = 6) ^{61,86,87,89,90,104}	4.8	3.1 – 6.9	78%
All studies using diagnostic interview (n = 5) ^{50,88,91,92,98}	0.7	0.0 – 2.3	90%
All studies that estimate prevalence of bipolar disorder in women without known psychiatric illness preceding the perinatal period (n=11)^{50,61,86-92,98,104}	2.6	1.2 – 4.5	92%

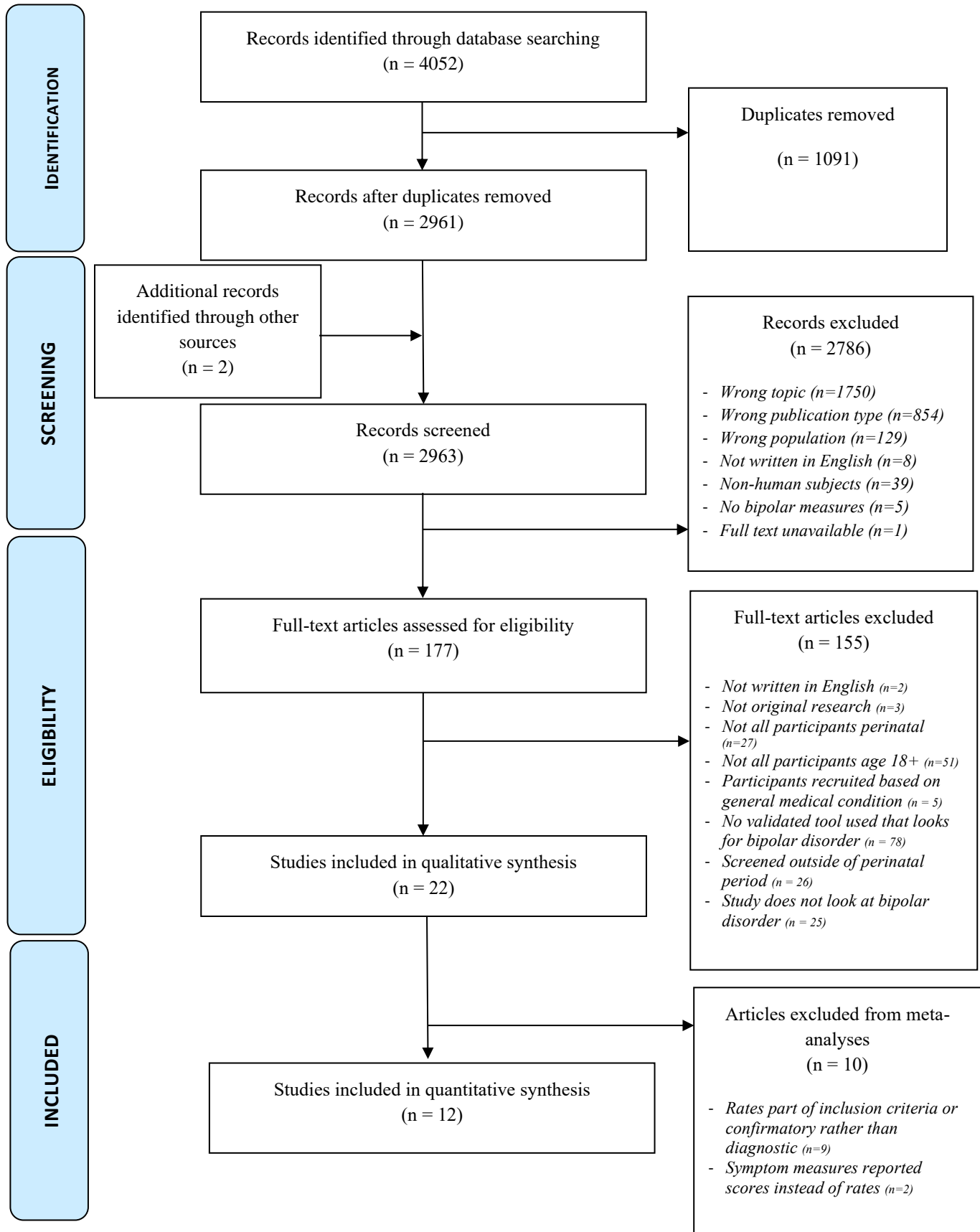
Diagnostic interviews included in the estimate above include the Structured Clinical Interview for the DSM-IV, the Mini-International Neuropsychiatric Interview, and the Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV

Table 2.2b – Pooled prevalence of any type of bipolar-spectrum mood episode in the perinatal population

Population	Studies included	Pooled prevalence (%)	95% CI	Heterogeneity index (I ²)
Women without known psychiatric illness preceding the perinatal period (n = 10)^{35,61,86-92,104}	Episodes in pregnancy (n=2) ^{88,90}	22.0	19.0 – 25.0	-
	Episodes postpartum (n=8) ^{35,86-89,91,92,104}	18.0	14.1 – 22.2	-
	Any episodes in perinatal period	20.1	16.0 – 24.5	91%
Women with bipolar disorder preceding the perinatal period (n = 7)^{61,86,87,89,96,100,103}	Episodes in pregnancy (n=1) ⁹⁶	51.4	-	-
	Episodes postpartum (n=6) ^{86,87,89,96,100,103}	54.8	34.6 – 74.3	-
	Any episodes in perinatal period	54.9	39.2 – 70.2	89%

Bipolar disorder and history of psychiatric diagnoses were established by screening tool (Mood Disorder Questionnaire) and/or diagnostic interview (Structured Clinical Interview for the DSM-IV, the Mini-International Neuropsychiatric Interview, the Alcohol Use Disorder and Associated Disabilities Interview Schedule-DSM-IV)

Figure 2.1 – PRISMA flow diagram



CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

Figure 2.2 – Forest plots demonstrating estimates of the overall prevalence of bipolar disorder in women without known psychiatric illness preceding the perinatal period

Footnote for Figure 2: Data shown in figures show prevalence as proportions rather than percentages (as in the text and tables).

Figure 2.2a - Prevalence estimates of bipolar disorder, using all detection methods

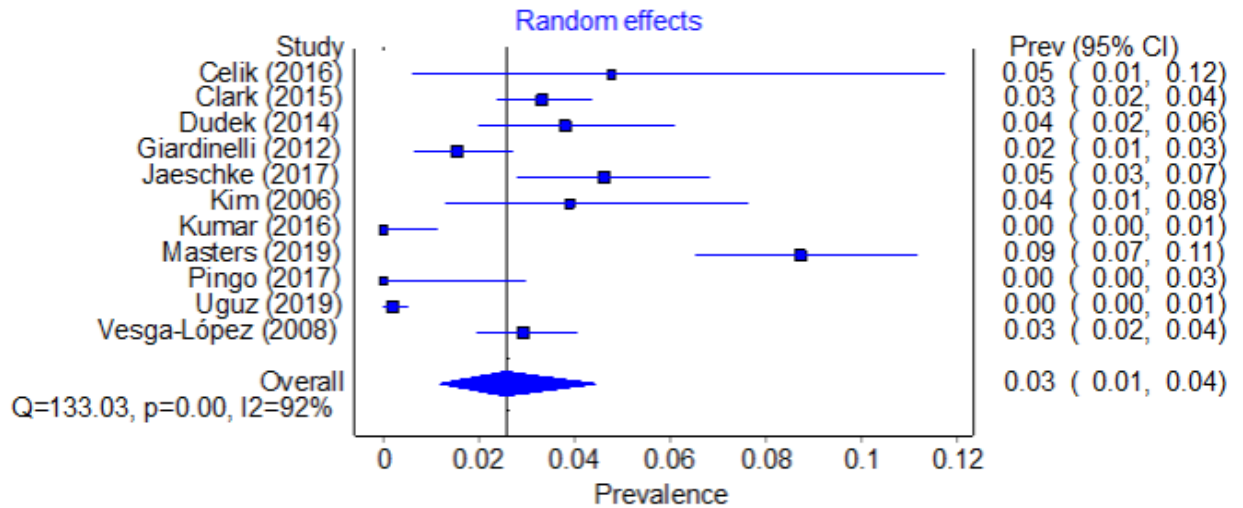
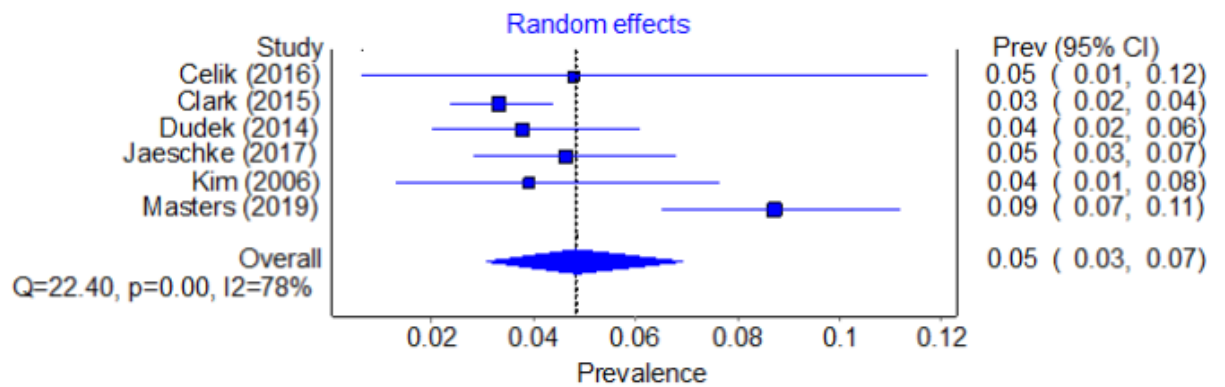
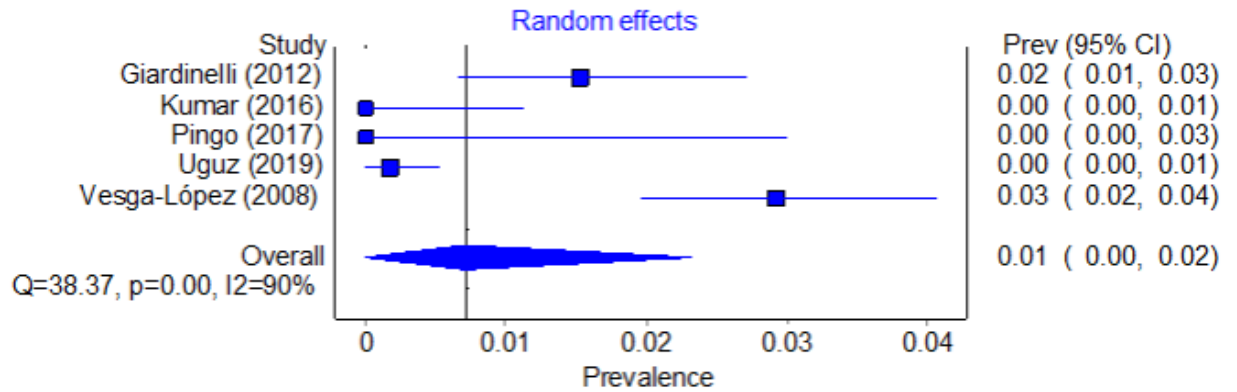


Figure 2.2b - Prevalence estimates of bipolar disorder, using the Mood Disorder Questionnaire



CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

Figure 2.2c - Prevalence estimates of bipolar disorder, using diagnostic interviews



CHAPTER II: PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN

Figure 2.3 – Forest plots demonstrating estimates of the occurrence of bipolar-spectrum mood episodes in the perinatal period

Footnote for Figure 3: Data shown in figures show prevalence as proportions rather than percentages (as in the text and tables).

Figure 2.3a - Prevalence estimates of bipolar-spectrum mood episodes in women without known psychiatric illness preceding the perinatal period

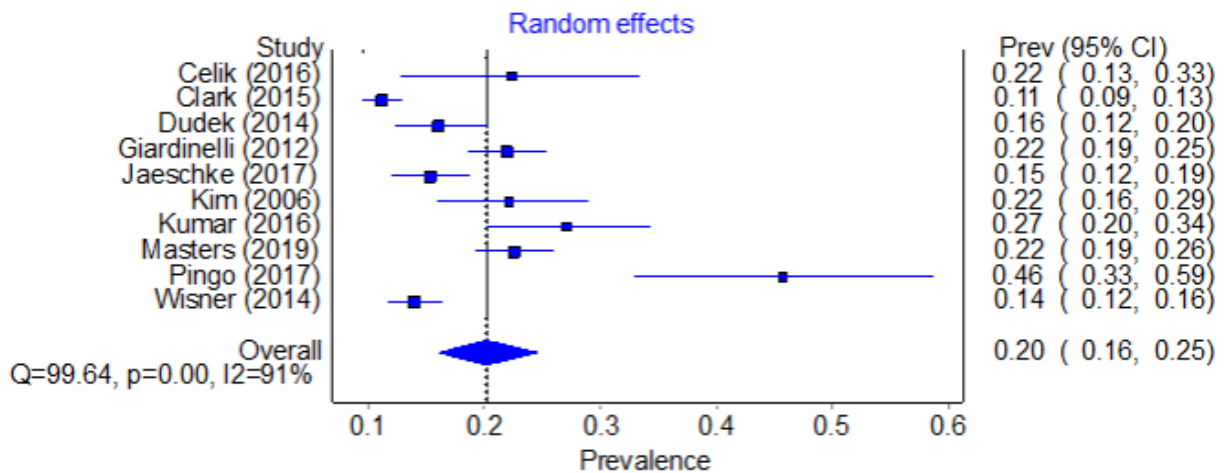
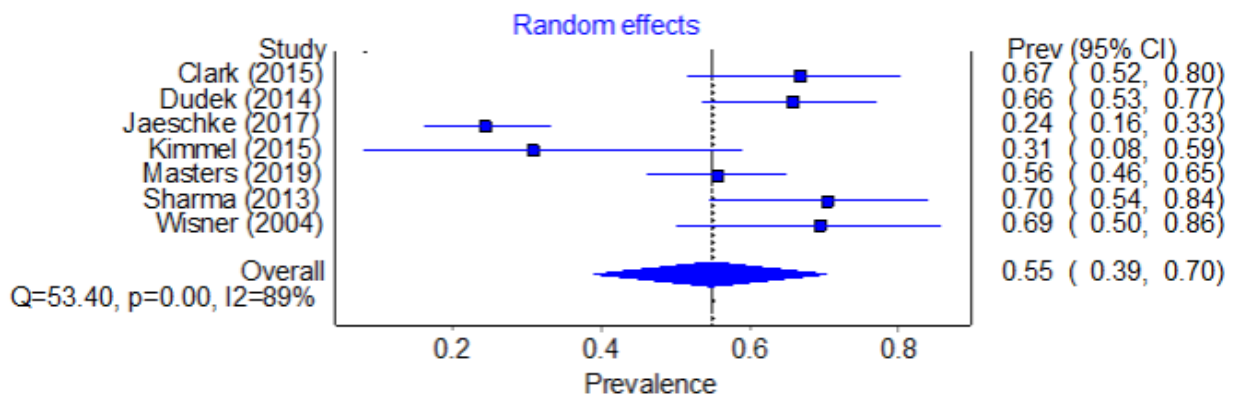


Figure 2.3b - Prevalence estimates of bipolar-spectrum mood episodes in women with bipolar disorder preceding the perinatal period



**CHAPTER III:
PERSPECTIVES ON ADDRESSING AND TREATING BIPOLAR DISORDER IN
THE OBSTETRIC SETTING: A MIXED METHODS STUDY**

ABSTRACT

Background: Bipolar disorder (BD) disproportionately affects pregnant and postpartum individuals and is associated with adverse outcomes, particularly when untreated. Despite this, few perinatal individuals with a BD diagnosis receive evidence-based treatment. Front-line clinicians, like obstetric professionals, may be able to help fill these gaps. Perinatal Psychiatry Access Programs have emerged to build the capacity of obstetric professions to meet the needs of perinatal individuals with BD and other conditions. In this mixed-methods study, we sought to identify obstetric professional perspectives on barriers and facilitators to managing BD in the obstetric setting, and how Perinatal Psychiatry Access Programs (Access Programs) may help or hinder these processes.

Methods: We conducted a total of three focus groups with obstetric professionals with and without exposure to the Massachusetts Child Psychiatry Access Program (MCPAP) for Moms. Participants completed a demographic questionnaire and engaged in a focus group that discussed experiences, barriers, facilitators, and solutions to caring for perinatal individuals with BD. Qualitative data were analyzed using a modified grounded theory by two independent coders; emergent themes were examined across exposure groups for associations.

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Results: Thirty-one obstetric professionals (7 unexposed, 24 exposed to MCPAP for Moms) participated in this study. Identified themes included: (1) gaps in formal education for BD in the perinatal period and potential solutions; (2) challenges in patient assessment for BD; (3) Access Programs as facilitators for clinicians to assess, treat, and refer patients with BD; and (4) importance of continued outreach and destigmatization efforts to increase care collaboration. Participants with exposure to MCPAP for Moms were significantly more likely to report facilitators to caring for perinatal patients with BD ($p < 0.001$); those without exposure were more likely to make recommendations for how to improve their ability to care for these patients ($p = 0.004$).

Conclusions: Structural barriers to receiving adequate mental health care abound for perinatal individuals with BD. Obstetric professionals are increasingly required to care for their mental health. Though many barriers exist, facilitators like Perinatal Psychiatry Access Programs that may make this role more acceptable, effective, and fulfilling to obstetric clinicians are emerging.

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

INTRODUCTION

Perinatal mood and anxiety disorders, including bipolar disorder (BD), affect 20% of U.S. individuals.^{1-3,6} While professional societies across medical specialties are now recommending for perinatal individuals to be screened for depression, substance use disorders, and other perinatal mood and anxiety disorders, professional guidelines do not include universal screening for BD.^{1,35,61} Although 1-3% of the adult population in the U.S. has BD,⁷⁴ it disproportionately affects pregnant and postpartum individuals. Perinatal individuals (including women and people who may not identify as women) are at high risk of new onset, relapse, and/or exacerbation of BD.^{13,27,28,30,31,44,74,114} BD places both the perinatal individual and child at increased risk for adverse outcomes in the perinatal period, particularly when left untreated.¹¹⁵ It has been associated with an increased risk of preterm birth, low birth weight, and delivery complications, as well as increased rates of self-injury, substance use, mood episodes, psychosis, suicide, and, very rarely, infanticide.^{13,29,34,40,41,76,77} BD is often undetected and unaddressed during the perinatal time period.⁴⁸⁻⁵⁰

Despite challenges in identification and treatment of BD, guidelines for universal screening among perinatal individuals lag behind those of other mood and anxiety disorders.^{38,39,49,62} Both obstetric and psychiatric healthcare professionals are often hesitant to consider BD in perinatal individuals to be within their purview.⁵⁴ For example, psychiatric clinicians^{48,54} often feel that they are not trained in how to treat perinatal individuals and may discontinue needed medications due to lack of knowledge of their

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

safety profiles and effectiveness. However, the benefits of pharmacotherapy for the perinatal individual are thought to outweigh risks to the fetus and breastfeeding infant.^{1-3,30,32,52} Thus, continued treatment during pregnancy and lactation is generally recommended.^{38,39,49,62} Despite these recommendations, as few as 30% of perinatal individuals with an existing BD diagnosis receive recommended evidence-based pharmacotherapy in the perinatal period.^{32,48} Gaps in knowledge of healthcare professionals are exacerbated by the stigma perinatal individuals may experience regarding taking psychotropic drugs during pregnancy or while breastfeeding,^{48,116} especially without the psychoeducation from clinicians to support them in doing so. This leaves patients feeling abandoned and denied evidence-based treatment when they may need it most.^{48,116}

Solutions to this complex problem may include education and clinical resources to build the capacity of obstetric professionals to address BD in their patients. In response, Perinatal Psychiatry Access Programs (or “Access Programs”) around the country have emerged to increase front-line clinicians’ capacity to provide evidence-based perinatal mental healthcare.^{58,65,70-72} These Access Programs offer a combination of training/education, consultative services, and patient resources and referrals for clinicians who care for perinatal individuals and their families. Access Programs not only build obstetric clinician capacity, but they also help to fill the shortage of psychiatric clinicians equipped to serve perinatal individuals. In short, Access Programs aim to assist in the implementation and integration of mental health care into the obstetric setting.

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Access Programs have yielded positive clinical results for *depression-related* outcomes⁵⁸ and are a cost-effective mechanism to improve clinician capacity in that realm.¹¹⁷ Given the major gaps that still exist in screening and pharmacotherapy for perinatal individuals with BD, Access Programs may be able to help, as they have with depression. To understand the potential for expansion of these programs to treatment of perinatal individuals with BD, more data on the experiences of obstetric clinicians and their attitudes towards managing BD in the perinatal period are needed to determine how to improve care.

In this mixed-methods study, we sought to identify clinician perspectives on barriers and facilitators to managing BD in the obstetric setting, and if exposure to an Access Program influences clinician perspectives on said barriers and facilitators. Specifically, we: (1) collected quantitative data to characterize obstetric clinician participants; (2) collected qualitative data to explore clinician perspectives on the facilitators and barriers to care; and (3) synthesized and interpreted these findings based on how Access Programs have affected their experiences. These data may help to inform future research, recommendations to bridge existing gaps, suggestions for further professional society guidelines, and policy and funding priorities. Ultimately, these data will help us to better understand barriers to care for perinatal individuals with BD and the clinicians serving them.

METHODS

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Overview

We engaged a convergent mixed method design to investigate an understudied public health problem (i.e., barriers to mental healthcare for perinatal individuals with BD) and approaches to solutions.¹¹⁸ Our convergent design triangulated the qualitative and quantitative data collected to enhance our understanding of the barriers confronted by perinatal individuals with BD and potential solutions.^{119,120} As the method of primary inquiry in this article, qualitative approaches provide a key exploratory step in the research process; it helps to gather new ideas, identify relationships between domains, and illuminate research questions that may never have been considered otherwise.¹²¹ By couching results and implications in the language ascribed by the research participants and incorporating ideas they consider critical, qualitative research can significantly increase the uptake of new ideas, promote messaging, and increase the effectiveness of new policy implementation. In the present study, we engaged qualitative methods to understand potential barriers for perinatal individuals with BD and consider the opportunity for responsive programmatic improvements. Quantitative measures are then used to characterize the samples in the exposed and unexposed groups and to analyze whether between group differences exist for those exposed to an Access Program and those not exposed.

Analytic frameworks used to analyze data include modified grounded theory and content analysis,^{122,123} as described below. Data collection was conducted April 2018 through October 2019. This study was approved by the University of Massachusetts

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Medical School Institutional Review Board. All participants gave informed consent before participation. This study is reported in alignment with the Standards for Reporting Qualitative Research (SRQR) checklist.¹²⁴

Study setting

Access Programs are emerging across the country as an accepted solution to untreated mental health conditions in perinatal individuals. Therefore, study participants were recruited so that participants had varying levels of “exposure” to Access Programs. This was done in effort to understand barriers and facilitators to clinician capacity to address BD across levels of exposure and access to such assistance. This allowed us to contextualize our findings based, in part, on access to these programs as well.

Two groups of people were identified as the target participants: (1) obstetric care professionals with **little to no exposure** to existing maternal mental health resources; and (2) obstetric healthcare professionals **with exposure** to existing maternal mental health resources through Massachusetts Child Psychiatry Access Program (MCPAP) for Moms.⁵⁸ MCPAP for Moms was established in 2014 and has been open to all Massachusetts obstetric clinicians and practices for free and unrestricted access. To date, it has served a total of 10,229 individuals, with 13.6% related to BD. Though the majority of calls come from obstetric clinicians (61.6%), 13.4% come from psychiatrists as well. Level of exposure was determined based on recruitment source and verified by questionnaire responses, outlined in the next section.

Participant recruitment

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

We recruited, surveyed, and held three focus groups with obstetric care professionals from around the United States. We defined *obstetric care professionals* to include independent clinicians (physicians, nurse practitioners, and midwives), nurses, medical assistants (MAs), and practice managers.

Participants were identified as having no exposure if they were: (1) from outside of Massachusetts and thus could not be exposed to MCPAP for Moms, and (2) had no formal training in perinatal mental health conditions. They were contacted to participate in a focus group at the American College of Obstetricians & Gynecologists' (ACOG) Annual Meeting, to optimize individuals' ability to attend. IRB-approved advertisements were sent to the ACOG list-serve, inviting members to participate in a focus group at the upcoming annual meeting. Potential participants were directed to information and a fact sheet about the study, from which they could proceed to the online study questionnaire. Participants expressed informed consent by starting the questionnaire. Upon completion, study investigators reviewed the questionnaire responses and excluded individuals with any self-reported additional experience or formal training in perinatal mental health (e.g., double-boarded in psychiatry, completed a perinatal psychiatry fellowship, etc.). Of the 28 participants that completed the fact sheet and questionnaire, 15 qualified and were invited to participate, and 7 completed the focus group.

Participants with exposure to MCPAP for Moms were recruited from two Massachusetts obstetric practices to participate in two focus groups. The two focus groups were conducted at the practices from which the participants were recruited. These

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

participants were identified as having exposure by caring for patients in the state, as all clinicians in Massachusetts can use MCPAP for Moms. To ensure at least some exposure to MCPAP for Moms, all participants that were recruited had attended at least one training by the program. This training included an overview of how to address maternal mental health and how to use the MCPAP for Moms services. The fact sheet was emailed to the practice leadership prior to the focus group date; all clinicians and staff were invited to participate. At the time of the focus group, interested professionals re-reviewed the fact sheet, provided written informed consent, and completed paper questionnaires like those completed by the unexposed group. The focus groups were then conducted with participants who completed the questionnaires, totaling 24 participants.

Quantitative data collection

Quantitative data collection was completed via paper questionnaire or electronically (via REDCap^{79,80}), depending upon participant preference. The questionnaire ascertained information about demographics, areas of expertise, and years in practice (**Supplemental Table S3.1**). Additionally, participants were also asked to report how often they screened for BD in their practice.

Qualitative data collection

Qualitative data collection was conducted via a series of three focus groups: one for the participants without exposure to Access Programs (n=7) and two for the participants with exposure to MCPAP for Moms (n=24). Engaging a standard of thematic saturation for sampling,¹²⁵ three focus groups were conducted at which time no new

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

themes emerged. Focus groups were the chosen methodology because they provide a setting for participants to interact, explore, and build upon each other's' ideas.

Additionally, they can be particularly useful for understanding multiple perspectives on a shared experience,¹²⁶ such as the positives and negatives of addressing maternal mental health and BD, specifically, in the obstetric setting.

In each focus group, five main probing questions were asked, with subsequent follow-up questions asked for clarification and to encourage conversation as needed **(Supplemental Table S3.2)**. The probes were developed via input from content experts and extant literature. They were framed in the context of the exposure environment and were meant to elicit experiences, challenges, facilitators, and possible solutions pertaining to the following areas: (1) overall experience and reactions to addressing BD in the obstetric setting; (2) screening for BD; (3) assessment; (4) diagnosis and treatment; and (5) referral to outside resources for ongoing treatment. Focus groups ranged in length from 40-60 minutes. They were conducted by trained study investigators (GM, TMS) who each had limited or no prior interaction with the participants. All focus groups were audio-taped, transcribed, de-identified, and stored on a secure server.

Qualitative analyses

Qualitative data were grouped and analyzed using a modified grounded theory known as “Coding Consensus, Co-occurrence, and Comparison.”^{122,123} Two study investigators (GM, LX) independently reviewed focus group transcripts and generated a preliminary codebook with themes. The preliminary codebook, though created

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

inductively using the data itself to identify themes, included *a priori* domains governed by the study aims, prior work, and relevant literature.¹²⁷ Preliminary codebooks were discussed by the investigators and agreed upon as a semi-final version, with operational definitions for each code. Then, the investigators independently coded all three focus groups based on the semi-final codebook, discussing discrepancies and refining the codebook as necessary after each. The second coder (LX) was blind to exposure status for the duration of the analyses. The final codebook that was used for all focus groups is available in **Supplemental Table S3.3**. Dedoose (V.8.0.35, Los Angeles, California: SocioCultural Research Consultants, LLC) was used to assist in qualitative analyses. Identified themes were grouped and reported overall as well as by exposure level.

Quantitative analyses and mixed methods integration

Participant demographic characteristics and screening practices were summarized overall and compared across exposure groups. Associations between identified themes and exposure groups were examined, using Chi-square tests to detect the differences between groups, with alpha level for significance at 0.05. All analyses were conducted using Stata 14.

RESULTS

Participant overview

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Of the 31 study participants, the majority were White (77.4%), Non-Hispanic (96.7%), women (87.1%) across both groups (**Table 3.1**). Almost half of the participants were physicians and 41.4% had 10 or more years of experience in the field of obstetrics. Participants reported significantly different rates of screening for BD based on their exposure to MCPAP for Moms: two participants without exposure reported screening for BD consistently (28.6%) versus 17 in the group with exposure (73.9%, $p=0.03$).

Identified focus group themes

Identified themes from the focus groups are outlined in this section; for a full list of themes, sub-themes, and illustrative quotes, see **Supplemental Table S3.4**. Generally, participants with no exposure discussed their knowledge of the new guidelines around BD but reported little to no experience in implementing any of these recommendations in their practices. Thus, their discussion was largely hypothetical in nature. In contrast, participants with exposure to MCPAP for Moms spoke concretely about their experiences in implementing the new recommendations. First, our analyses revealed obstetric professional understand the identification and treatment of perinatal BD as a critical aspect of their role. Additionally, they perceive a willingness of patients to receive such care from obstetric professionals. Our analyses next identified the barriers reported across the perinatal mental healthcare pathway, including screening, assessment and diagnosis, and treatment. We then review the factors participants identified that contribute to these barriers across the perinatal mental health care pathway and participant-identified

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

recommendations to resolve these barriers. We conclude the results by reporting on which of these observed differences between groups were statistically significant.

Participant assessment on the role of the obstetric professional in identification and treatment of BD

- 1) Participants with adequate support see addressing perinatal BD as an important and valuable part of their role as obstetric professionals.

As aforementioned, participants with no exposure reported low levels of comfort in addressing and treating BD. Understandably, some also voiced an aversion to incorporating the management of BD into their existing workflows, given the scarcity of resources (**Table 3.2**).

Participants with exposure to MCPAP for Moms still expressed some reservations about their role in treating BD, particularly when they were expected to do it without other support. However, these participants also reported that they consider addressing mental health more important than they had previously and have an evolving view and appreciation for this role. Many also agreed that this was now an expected and important part of their role as an obstetric clinician.

- 2) Participants with exposure to MCPAP for Moms perceive their patients as willing to be screened and treated for BD by their obstetric clinicians and are eager to talk about their mental health conditions.

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Participants with no exposure did not comment on patient willingness to discuss and receive treatment from obstetric clinicians for BD, due to lack of experience. However, those participants with exposure to MCPAP for Moms reported little to no difficulties in screening, addressing, and treating BD in their patients, nor pushback from their families. Some even suggested that patients may have less stigma about mental illness than in prior years, which has been a facilitator to the implementation of these processes.

3) Screening is occurring sporadically in places without Access Program exposure.

Without adequate support, participants report seeing no point in screening.

Few participants without exposure to Access Programs reported screening for BD at the time of the focus group (29%), mostly reporting that there seemed little point in doing so when referral was unavailable. Some did not know that validated screeners existed for perinatal settings. In comparison, those with exposure to MCPAP for Moms reported conducting screening for BD in most or all patients, citing that having the support of an Access Program has helped this process.

For those with exposure to MCPAP for Moms, there was a consensus that having the support of medical assistants (MAs) in this process was critical to its success. There were eight MA participants in the group with exposure to MCPAP for Moms that were able to speak about their positive experiences in administering, scoring, and discussing the BD screening with patients.

4) Patient assessment is one of the most challenging parts in addressing BD in perinatal patients for all obstetric clinicians, regardless of exposure level.

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Assessment of patients with potential or diagnosed BD was perceived by participants across exposures to be a daunting task. Participants in both exposure groups noted that they may send patients to emergent care in “worst case scenarios;” however, these scenarios may be when no other assessment assistance or referral is accessible.

Participants without exposure reported no experience with or facilitators to the assessment process; and, in fact, used words like “scary” to describe the idea of assessing these patients. Similarly, participants with exposure to MCPAP for Moms reported feeling uncomfortable with the BD screening tool, calling it “indecisive.” However, participants with exposure reported that the assessment process is helped by knowing that the Access Program could be contacted for further assistance.

5) With appropriate support, clinician participants can be comfortable in treating patients with medications for BD.

Participants in both groups reported that they have seen many patients that had stopped their medications, either of their own volition or due to the advice of another clinician. There was agreement that this has put significant pressure on them, as obstetric professionals, to be the prescribers of medications for BD in their patients. They felt this to be an unfair expectation and that there should be more multidisciplinary care for perinatal patients with BD.

Most clinician participants without exposure said they are uncomfortable in treating patients with medications for BD and are unlikely to prescribe medications. Some participants in both exposure groups said they would only prescribe under certain

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

circumstances (e.g., patient has been stable on medication for a length of time with no other prescriber). The main barriers to prescribing, cited mainly by participants without exposure, included fear of legal action or critical side effects. Clinician participants without exposure reported that specialized professionals, including perinatal psychiatrists and maternal-fetal-medicine specialists with a mental health focus, may act as facilitators to increase comfort in prescribing.

Clinician participants with exposure to MCPAP for Moms reported greater comfort in prescribing medication to their patients and said that they actively do so. Notably, they attributed some of their comfort in doing this to the support received from the Access Program, their educational experiences, and assuredness that they will be able to transition their patients to other care when perinatal care is complete.

Systemic factors reported as contributing to barriers and facilitators to address BD in the obstetric setting

- 6) Formal education about BD in perinatal patients is lacking. Exposure to continuing education can help.

Participants both with and without exposure to MCPAP for Moms agreed that a major barrier to caring for patients with BD is that they received little to no formal education on the matter. Though some clinician participants across groups did remember from medical/graduate school that critical differences exist between BD and other mood disorders, this was the extent of the knowledge for most participants without exposure (Table 3.3).

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Participants with exposure to MCPAP for Moms reported that they have helped compensate for these knowledge deficits in formal education by seeking out continuing education (e.g., grand rounds lectures, educational toolkits and treatment algorithms, etc.). Clinician participants with exposure were able to explicitly discuss the risks of untreated BD, citing their exploration of relevant literature and attendance of lectures as facilitators. Participants with exposure to MCPAP for Moms also noted that this knowledge has helped them to evolve in their views on treatment – some said that they previously were wary of medications for bipolar in perinatal patients but now feel more comfortable with it. Participants without exposure, in contrast, continued to express misconceptions about the dangers of treatment in their perinatal patients.

- 7) Participants noted that there is an extreme paucity of mental health clinicians nationwide, and that barriers to care abound. Access Programs and collaboration with other professionals that have specialized mental health training can help to fill some of these gaps.

One of themes most discussed and present across all groups was the barrier to accessing psychiatric resources. Participants with and without exposure cited contributors to the problem to include: (1) low numbers of mental health clinicians; (2) long wait times to see a prescriber or therapist; and (3) logistical barriers to care for certain populations, such as those with public insurance, that do not speak English, or have transportation issues. Participants noted that these challenges often made the situation

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

feel hopeless. This was especially prominent in the group with no exposure, who reported that they felt that screening was futile without adequate resources for care.

Participants with exposure to MCPAP for Moms noted that the Access Program has helped their patients with BD secure long-term care. Their ability to obtain consultations with perinatal psychiatrists have reportedly made a difference in their ability to care for their patients themselves, too.

8) Coordination of care with outside psychiatric professionals remains a challenge for all participants, regardless of exposure.

Participants in both groups noted that coordination of care with outside psychiatric clinicians and professionals was a major problem. Many participants reported that they have had encounters with other psychiatric clinicians that indicate their unwillingness to care for perinatal patients' psychiatric disorders. One of the most powerful quotes from all of the focus groups was with regard to this matter:

I would tell the residents that pregnancy's the only condition in medicine that you get to freely discriminate against. So all these doctors just drop the ball and run when they see a pregnant patient. I'm talking about from the first pregnancy test...like, including your dentist. [Physician 10, Exposed to MCPAP for Moms]

Barriers reported across groups in coordinating with other psychiatric professionals included: (1) educational gaps; (2) clinician stigma; (3) fear of legal recourse; and (4) the privacy restrictions to access psychiatric medical records.

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Participant-identified recommendations for integrating the treatment of BD into the obstetric setting

Many recommendations to facilitate the integration of managing perinatal BD into the obstetric setting and to improve clinician comfort with doing were proffered from these focus groups. Some of the most discussed suggestions are included below (**Table 3.4**).

- 1) Obstetric professional comfort and competency in managing perinatal BD may be increased with educational efforts and easily accessible resources.

Not unexpectedly, participants almost universally cited education as a key area to address. Suggested educational reformation efforts included targeting medical school, residency, and continuing education efforts. Topics to address included: (1) how to differentiate BD from other illnesses; (2) how to identify important red flags; (3) ability to thoroughly understand the risk/benefit profiles for medications for BD; (4) how to assess for medication side effects and acute toxicity; and (5) more emphasis on the risks of untreated illness. Suggested modalities for training included grand rounds and lecture series, online content on the ACOG website, and decision-tree tools and algorithms for clinicians to use in practice. Additionally, the non-physician participants emphasized that this type of education was necessary in all areas, including nursing, midwifery, and other supportive medical staff training.

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

- 2) Incorporation of the management of BD in the obstetric setting may be further facilitated by recommending efficient ways to integrate practices into existing workflows.

Participants suggested that recommendations should include specific suggestions of how to incorporate screening for BD into a busy practice. One idea was to suggest that screenings should be incorporated into an existing but quieter prenatal appointment, where more time could be dedicated to screening, assessment, and discussion.

Participants without exposure to Access Programs suggested that MAs may be useful in assisting with screening procedures. Additionally, it was recommended that pertinent materials should be integrated into the electronic medical record (e.g., screening tools for BD embedded into the record, pop-up reminders to discuss treatment, etc.). Patient registries were identified by participants with exposure to MCPAP for Moms as a strategy that other practices may employ to keep track of their patients with BD.

- 3) Employment of integrated care models and other innovative care delivery methods for patients and babies

Participants without exposure suggested and expressed enthusiasm for telemedicine and/or consultation options that were similar to those currently offered in Access Programs (e.g., ability to call a psychiatrist for a case consultation). Those with exposure to MCPAP for Moms suggested that their services could reach even more perinatal individuals by using direct patient care over telemedicine, rather than in-person only.

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Mixed methods integration

Participants with and without exposure to MCPAP for Moms discussed many of the themes at statistically similar rates, including the limitations of psychiatric resources in the community (**Table 3.5**). The difficulties with patient assessment were discussed significantly more in the group with exposure to MCPAP for Moms (12.4% vs 3.9% in unexposed, $p=0.026$); however, those with exposure also noted that patients positively perceive efforts to address BD (6.2% exposed vs. 0% unexposed, $p = 0.01$). Clinician participants with exposure to MCPAP for Moms also discussed their experiences with treating BD more frequently than those without, though this was not statistically significant (24.7% exposed vs. 14.4% unexposed).

Both groups discussed barriers to addressing BD in perinatal individuals at length, at statistically similar rates (37.1% exposed, 45.2% unexposed). Facilitators were discussed significantly more commonly in the group with exposure (42.3% exposed vs 15.4% unexposed, $p<0.001$). Solutions and recommendations were given more often by the group without exposure (20.6% exposed vs 39.4% unexposed, $p=0.004$).

DISCUSSION

This study gathered and synthesized data from obstetric professionals about their experiences with and attitudes towards addressing BD in their perinatal patients. Screening, assessment, treatment, and referral processes were discussed in detail by the participants, illuminating existing barriers and facilitators currently experienced by obstetric professionals, as well as potential solutions for the future. These themes were discussed in the context of participant exposure to Perinatal Psychiatric Access Programs.

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Common themes discussed amongst all participants included the limitations of their education on BD and its management as well as the relative scarcity of psychiatric resources, particularly for patients that are considered more vulnerable. Interestingly, while participants with exposure to MCPAP for Moms understandably offered more experience with more advanced topics such as the management and follow-up of BD in their patients, participants without exposure spoke more about the importance of innovative care models, such as collaborating with other clinicians with some expertise in perinatal mental health, leveraging embedded resources, and suggestions for telemedicine.

Overall, participants reported that MCPAP for Moms has helped obstetric professionals make critical strides in their ability to address BD in their perinatal patients and improved their confidence in doing so. Indeed, participants with MCPAP for Moms exposure were significantly more likely to bring up facilitators to care than participants without exposure. In some cases, participants explicitly commented on the specific ways in which MCPAP for Moms has been a facilitator for managing BD in their patients (e.g., the comfort of having the Access Program as a safety net). MCPAP for Moms consultations appear to have made clinicians more empowered and comfortable in treating their patients with medications. In turn, their ability to provide bridge treatment to perinatal patients helps to fill the gaps in psychiatric care that exist everywhere. In other cases, the effects of MCPAP for Moms as an Access Program appeared more nuanced. For example, participants with exposure to MCPAP for Moms tended to talk about medication treatments in a less stigmatizing way. This may be, in part, due to their

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

experiences with the program and its educational efforts to make medication treatments less foreboding and to emphasize the risks of untreated illness itself. Since data were collected for this study, 15 statewide Access Programs have started specifically to improve obstetric clinicians' capacity to detect, assess, treat, and refer their patients for mental health services. As Access Programs become more plentiful in number around the country,^{71,128} these findings suggest that the MCPAP for Moms model may be an efficient and efficacious way to help improve obstetric clinician capacity to address BD in perinatal patients, who may otherwise go without treatment. These burgeoning programs are varied in size and services offered, so there is a need to further determine the specific mechanisms by which MCPAP for Moms (and others) are most effective in increasing clinician capacity.

Barriers to addressing BD in perinatal patients were plentiful, even amongst participants that were exposed to MCPAP for Moms, though were more commonly discussed amongst participants without exposure. Participants without exposure hit upon a key issue when expressing their concerns for screening for any mental health condition without available follow-up; indeed, there is evidence that this can be detrimental to overall patient care.⁶⁸ Participants agreed that they have seen numerous patients with BD taken off their medications solely because they were pregnant or postpartum, had trouble working with other clinicians due to stigma and misinformation, and struggle with the lack of available psychiatric resources for their patients. More focus may be needed on disseminating information about the risks of untreated illness in the perinatal period, as well as promoting the resources already available. This extends, perhaps even more so, to

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

psychiatric clinicians, as is consistent with other studies.^{48,49,54} MCPAP for Moms services, including trainings and clinical decision-making tools, are freely available for use by *all* clinicians that care for perinatal individuals in the state – including psychiatric clinicians.

Participants across groups noted that they are still relying on urgent and emergent care in some patients, even when this does not appear to be clinically necessary. When done indiscriminately, this may deter patients from trusting their providers with their mental health symptoms and is an inefficient use of the healthcare system. While MCPAP for Moms does appear to be helping and has reduced this phenomenon, any occurrence of this is too frequent. Calls from participants for more education, including specifics around the complex issue of patient assessment, is a particular area that needs more emphasis going forward.

Participants were eager to provide useful and concrete recommendations for how to improve the uptake of the integration of the management of BD in obstetric settings. Solutions tended to be proffered much more frequently by the group without exposure, perhaps indicating their eagerness for innovation and change. Interestingly, some of the solutions given by the group without exposure have already been already implemented in some Access Programs, including MCPAP for Moms. This further suggests that Access Programs are helping to meet the specific needs requested by obstetric clinicians and assisting them in this work. For example, participants without exposure to Access Programs suggested that MAs would be useful in assisting with screening procedures.

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Indeed, medical assistant participants with exposure to MCPAP for Moms enumerated their own successes in doing this.

Recommendations provided from the group with exposure to MCPAP for Moms built on the structure of the existing Access Program resources. For example, one suggestion they gave to mitigate patient-level barriers to care was to use more telemedicine. The COVID-19 pandemic has forced most clinical systems to pivot to at least some degree of telemedicine, including MCPAP for Moms. This has reportedly improved access to care for many patients with logistical barriers, such as transportation or child care coverage.¹²⁹ Other suggestions, such as improved educational curricula for trainees around perinatal mental health and decision-tree algorithms and toolkits to assist in treatment, have been developed in recent years.^{130,131} However, these do need more widespread dissemination, uptake, integration, and evaluation of effectiveness.

This study's strengths included its mixed methods design and investigation of a largely unexplored topic. This exploratory work also provides many future avenues of inquiry, such as understanding the specific mechanisms of Access Programs' effectiveness and how to distribute more information to assist clinicians in patient assessment of BD. However, this study and findings should be interpreted with some limitations in mind. The sample size and professional type breakdown across the two comparison groups were unequal; in particular, the unexposed group contained only physician participants. There was a high degree of homogeneity of participants within each group. However, our primary interest was to build theoretical understandings in this

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

qualitative work and efforts to generalize these findings to other context and participants require an expanded sample and likely use of quantitative methods.¹¹⁸ Therefore, our goal was not to generalize to large populations not included in the present sample. Future work would benefit from larger and more racially, ethnically, and professionally diverse samples and practice settings, as experiences and suggestions will range based on these characteristics. Additionally, our conceptualization of “exposure” to Access Programs was limited to one program and state, and thus, also requires further inquiry and more formal conceptualization. Perhaps now that Access Programs are more widespread, further examination can proceed. This would additionally allow us to evaluate the effects of more than just one specific Access Program, whose results may not be generalizable.

CONCLUSIONS

Structural barriers to receiving adequate mental health care abound for perinatal individuals with BD, resulting in many being under- or inappropriately treated. Given this, obstetric clinicians are increasingly being asked to take a leading role in caring for these patients. Though many barriers exist in obstetric clinician ability, comfort, and effectiveness in caring for their patients with BD, facilitators like Perinatal Psychiatry Access Programs, such as MCPAP for Moms, that have the ability to make this role acceptable, effective, and fulfilling to clinicians are emerging.

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Table 3.1: Demographic characteristics of clinician participants

Characteristic	All participants (n = 31) ^a	No exposure (n = 7) ^a	MCPAP for Moms exposure (n = 24) ^a
	(n,%) ^a		
Female gender	27 (87.1)	6 (85.7)	21 (87.5)
Race			
<i>Asian/Pacific Islander</i>	3 (9.7)	2 (28.6)	1 (4.2)
<i>Black/African American</i>	1 (3.2)	0	1 (4.2)
<i>White</i>	24 (77.4)	5 (71.4)	19 (79.2)
<i>Other</i>	1 (3.2)	0	1 (4.2)
Hispanic/Latino/Latina ethnicity	1 (3.3)	0	1 (4.4)
Professional Role			
<i>Physician</i>	14 (45.2)	7 (100)	7 (29.2)
<i>Nurse</i>	6 (19.4)	0	6 (25.0)
<i>Certified Nurse Midwife</i>	2 (6.5)	0	2 (8.3)
<i>Medical Assistant</i>	8 (25.8)	0	8 (33.3)
<i>Practice Manager</i>	1 (3.2)	0	1 (4.2)
Years of experience (#, SD)	11.6 (10.5)	17.4 (15.6)	9.7 (7.9)
Professional setting			
<i>Academic Medical Center</i>	4 (12.9)	4 (57.1)	0
<i>Health system with academic affiliation</i>	14 (45.2)	1 (14.3)	13 (54.2)
<i>Health system without academic affiliation</i>	12 (38.7)	1 (14.3)	11 (45.8)
<i>Federally Qualified Health Center</i>	1 (3.2)	1 (14.3)	0
Screen for bipolar disorder*	19 (63.3)	2 (28.6)	17 (73.9)

*p<0.05

^aNumbers may not add to 100%, due to rounding

Missing data: Race (2 participants prefer not to answer); Ethnicity (1 participant prefer not to answer); Years experience (2 missing); Screening (1 missing)

Table 3.2. Participant assessment on the role of the obstetric professional in identification and treatment of BD

		No Exposure to MCPAP for Moms		Exposure to MCPAP for Moms	
Identified barriers/facilitators		Theme?	Illustrative Example	Theme?	Illustrative Example
<i>Theme 1: Participants with adequate support see addressing perinatal BD as an important and valuable part of their role as obstetric professionals.</i>					
<i>Barriers</i>	Aversion to incorporating BD into their care	X	<i>[Screening for BD] an unfunded mandate. You didn't get any more time in the day, you did your 25 hours, 24, and... - Physician 13, No exposure</i>		
<i>Facilitators</i>	Appreciated and understood the importance of incorporating BD into their role			X	<i>I do [think managing BD is part of our role], you know. I mean, in conjunction with psychiatry and other support services. It's hard for just us to do it all alone, you know? I think it's a multidisciplinary treatment, right, you know? You need therapists, social workers, psychiatrists, OBs. I mean, we could all work together - Physician 1, Exposure to MCPAP for Moms</i>
<i>Theme 2: Participants with exposure to MCPAP for Moms perceive their patients as willing to be screened and treated for BD by their obstetric clinicians and are eager to talk about their mental health conditions.</i>					
<i>Facilitators</i>	Patients are accepting of BD treatment from OB			X	<i>It's [screening for BD] overall positive because people [patients] are happy for the information – Physician 11, Exposure to MCPAP for Moms</i>
	Patients exhibit less stigma about mental illness and want to talk about it			X	<i>Yeah, there's not this stigma in psych, the psych diagnosis, that feels like it's less than it was years ago, that people are more open about talking about it, though people also say, I want to go through pregnancy on no medication, so they're weighing the risks of not being on meds and having the disease versus now the people I think are open to talking - Physician 4, Exposed to MCPAP for Moms</i>
<i>Theme 3: Screening is occurring sporadically in places without Access Program exposure. Without adequate support, participants report seeing no point in screening</i>					
<i>Barriers</i>	Screening feels futile because of paucity of resources	X	<i>Why screen for something that we can't do anything about? - Physician 5, No exposure</i>		
	Unaware that validated screens exist for BD in the perinatal setting	X	<i>And there's probably not the simple two questions that you can ask about depression. You'd have to ask more than that to even figure it out - Physician 7, No exposure</i>		

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

	Screening is occurring infrequently in places lacking support	X	<i>[We are not screening for BD] ...just thinking about putting it into the workflow - Physician 8, No exposure</i>		
Facilitators	Screening is occurring in most or all patients for BD in places with more support			X	<i>We do it [with every patient] at the suppressed menses visit - Medical Assistant 1, Exposed to MCPAP for Moms</i>
	Access Programs may be a facilitator for implementing screening processes			X	<i>Before [MCPAP for Moms] this there was always kind of a futility to it where you're like, well, let's talk about depression. You should go see a psychiatrist. There's none available... You know, now there's something we can talk to them about it and then say, and we have this option for you to just actually get care instead of both laying it all on the patient - Physician 9, Exposed to MCPAP for Moms</i>
Theme 4: Patient assessment is one of the most challenging parts in addressing BD in perinatal patients for all obstetric clinicians, regardless of exposure level.					
Barriers	Assessment of patients with suspected or diagnosed BD is very difficult	X	<i>I think [bipolar disorder is] a little bit more, at least for me, it's a more scary diagnosis or it had more impact or more difficult thing to treat. Like I feel more comfortable and feel like most of the antidepressant meds would actually help depression and anxiety, but those are not necessarily better for bipolar, well, actually contraindicated, so I feel like I actually have not been screening for it, so I will try and change that - Physician 7, No exposure</i>	X	<i>Well, ideally is they already have the [bipolar] diagnosis and they're already on the medication, but because again, I'm just an obstetrician...Honestly I couldn't tell you if somebody's bipolar one, two, or three and all the other subtleties that go with this... - Physician 10, Exposed to MCPAP for Moms</i>
	Difficulties in assessment can be exacerbated by existing assumptions, misconceptions, or stigma	X	<i>And there's probably, I'd think there'd be a little bit of a stigma behind [a BD diagnosis] so maybe people don't tell you the truth or they downplay it as just depression - Physician 7, No exposure</i>		
	Will send patients with suspected or diagnosed BD to higher level of care if unable to adequately assess	X	<i>Okay, so worst case scenario, I have a psych ER. And so, the psych ER will determine if she can be admitted to the main hospital or there's a psychiatric hospital that's five minutes away... [worst case scenario] is like if I feel like there is a danger and she's somebody who I cannot like call a friend and see if they can see her. I mean, they can't see her today. So next week. So if I feel like it can't wait, I'll do the psych ER - Physician 3, No exposure</i>	X	<i>So I mean, in a jam I probably would send the patient to the emergency room - Physician 10, Exposed to MCPAP for Moms</i>

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

	Discomfort with assessment properties of BD screening tool			X	<i>You know, so we have the screening tool [for BD] now, which it's an interesting tool. I feel like a lot of it has to be positive for it to be a positive screen, but in some patients we're, like, there's these things that does not technically rule in that concerns me for bipolar or something else, I don't know, so I guess I'm not super comfortable with it, even though I'm glad we have it – Physician 11, Exposure to MCPAP for Moms</i>
Facilitators	Access Programs have cut down on use of ED for assessment and provided reassurance in assessment strategies			X	<i>Having the support of MCPAP to guide you through [assessment], that's not our specialty, and to be able to talk on the phone with the specific symptoms of the patient is very helpful – Physician 12, Exposure to MCPAP for Moms</i>
Theme 5: With appropriate support, clinician participants can be comfortable in treating patients with medications for BD.					
Barriers	See patients with diagnosed BD that have stopped their medications	X	<i>I think it is variable. I've worked in three different cities and so kind of environments of different mental health and like plus or minus people that are interested in pregnant and postpartum women and that certainly makes a difference. And absolutely there's providers out there that, like, "Oh, you're pregnant, you can't be on anything." That's it. See you later. - Physician 6, No exposure</i>	X	<i>Most of the people are told to stop or at least they say they were told to stop, and then you're scrambling to catch up. - Midwife 1, Exposure to MCPAP for Moms</i>
	Feel pressure to treat their BD patients with medications and that this is unfair	X	<i>So there are a lot the prescribers that take care of patients while they're not pregnant, and as soon as they become pregnant, they don't talk to them, but they're fired and then they send them to an MFM, and we're like, we don't know how to do it, but we'll figure it out because nobody else will - Physician 6, No exposure</i>	X	<i>I think [we're being expected to make diagnoses and we expect it of ourselves], but I definitely think, I think it's expected by the patients that we're able to manage the, you know, especially when they call their psychiatrist and the psychiatrists say, now it's up to your OB to treat you. Which really gets me. It's unfair...When you have another physician telling a patient that is, you know, your obstetrical provider should deal with this, that's just frustrating. And it happens a lot in this community - Physician 1, Exposure to MCPAP for Moms</i>
	Unlikely to prescribe medications for BD	X	<i>And I would never write a prescription for bipolar disorder - Physician 3, No exposure</i>		
Facilitators	May prescribe medications for BD under specific circumstances, such as refilling a prior prescription	X	<i>[I may prescribe meds for BD] if they're already on it. I feel like it's, that hopefully its working for them and they didn't already have an adverse outcome to it, so then I feel like it's less side effects to worry about or less that they're going to call me about potential side</i>	X	<i>They need some help with their [BD management]. I'll redo [the prescription], reinitiate or renew it and all that, but I won't start - Physician 10, Exposed to MCPAP for Moms</i>

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

			<i>effects. That's my thought process - Physician 8, No exposure</i>		
	Comfortable treating patients with BD with meds, with support of an Access Program, perinatal psychiatrist, or other specialist	X	<i>And I feel like there's at least, in our, in [state], there are MFMs who are specializing more in mental health. They are taking it upon themselves to do more - Physician 3, No exposure</i>	X	<i>I'm a lot less scared to prescribe medications than I was probably four years ago because I see the benef-, I think the benefit outweighs the risks obviously, so, but I won't start somebody on a bipolar medication if I think they're bipolar. But if they've been on it and I call and I talk to Dr. XX or Dr. YY and we go do the case and they think it's appropriate, then I will happily prescribe it - Physician 1, Exposure to MCPAP for Moms</i>

NB: Some excerpts are slightly modified [brackets] to facilitate ease of interpretation. Overall meaning has not been changed.

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Table 3.3. Systemic factors reported as contributing to barriers and facilitators to address BD in the obstetric setting

		No Exposure to MCPAP for Moms		Exposure to MCPAP for Moms	
Identified barriers/facilitators		Theme?	Illustrative Example	Theme?	Illustrative Example
<i>Theme 6: Formal education about BD in perinatal patients is lacking. Exposure to continuing education can help</i>					
<i>Barriers</i>	Lack of formal education on BD	X	<i>I was at a big facility [for residency] that would typically have some champion in psychiatry or perinatal psychiatrist, someone of interest who would probably give a grand rounds or something a year, but I don't know if there was any formal education. It was just kind of, you would learn in clinic that these are medicines that are typically prescribed. Again, they're typically SSRIs that are the ones you feel comfortable with - Physician 2, No exposure</i>	X	<i>I did have, I did have a psych rotation, you know, 15, 20 years ago. You know, like, it was an inpatient psych unit that was completely different than really what I'm dealing with on a daily basis, you know? So you know, hopefully we have more training within our residency education and things like that, but you know, I think there's a lot of system changes that have to occur - Physician 1, Exposure to MCPAP for Moms</i>
	Awareness of the new standards of care for BD	X	<i>We need to do it [screen for BD]. I mean, the Council of Patient Safety has a lot of algorithms and recommendations and they're all based on science, and we've instituted all of them - Physician 3, No exposure</i>	X	<i>And I've certainly been to enough lectures now where the topic is untreated depression, untreated anxiety causes, here's all the bad things that could happen, so it used to be no medications is best and we're going to take people off of their antidepressants. And it's certainly not, we have, I feel like we have a different mentality about that - Physician 4, Exposed to MCPAP for Moms</i>
<i>Facilitators</i>	Continuing education have helped to mitigate prior education deficits about the risks of untreated illness and to evolve views on the benefits of pharmacotherapy for BD			X	
<i>Theme 7: Participants noted that there is an extreme paucity of mental health clinicians nationwide, and that barriers to care abound. Access Programs and collaboration with other professionals that have specialized mental health training can help to fill some of these gaps.</i>					
<i>Barriers</i>	Paucity of psychiatric resources	X	<i>Psychiatry is what's really bad about the system in terms of my access. Well, I have a numbers problem. There's not enough psychiatrists in the community - Physician 3, No exposure</i>	X	<i>And for many, there's many barriers. Patients not able to call. The therapists not having availability. I mean, it's just there's a paucity of services in this area, so I think a lot of these women just kind of struggle or kind of, you know, they're just sub-optimally controlled, you know? And we try our best, but what can, you know, it's hard when we feel like we don't have a ton of resources - Physician 1, Exposure to MCPAP for Moms</i>

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

	Psychosocial barriers to care	X	<i>Yeah, so it's access and also [finding] people that are willing to take Medicaid insurance...to try to find a psychiatrist that's willing to see my non-insurance person is going be weeks. Like what are we supposed to do? - Physician 6, No exposure</i>	X	<i>It's just so many psychosocial factors that go into [barriers to care]. And I find there's a lot of trauma in these women and a lot of adverse childhood experiences that they've had that shape their psyche and their mental health and their physical health - Physician 1, Exposure to MCPAP for Moms</i>
Facilitators	Access Programs are a facilitator and mitigate access to care issues			X	<i>And it's also good to know that in our cases of the patients that are very unstable, is that [MCPAP for Moms] will take them for a face-to-face. So for those, again, that can get there, at least we have that, because without that we don't have anything. So we can get them to Worcester or Boston hopefully and they can get a face-to-face and at least have some ongoing management - Physician 12, Exposure to MCPAP for Moms</i>
Theme 8: Coordination of care with outside psychiatric professionals remains a challenge for all participants, regardless of exposure					
Barriers	Encountered or tried to work with or refer to other clinicians that do not want to treat perinatal patients with BD	X	<i>It's the same reason why we can't get some psychiatrists to keep seeing the patients. It's this fear of liability and fear of pregnancy. And potential exposures and litigations. So they just stop and we don't want to do it and we're not, it's conscientious objection to taking care of a pregnant woman that's going to be on medications.- Physician 6, No exposure</i>	X	<i>Yeah, I mean, I think we've tried to outreach [to providers] about a couple patients that I can think of, and you know, it really, they don't call back or I think they're, like, oh, they're pregnant, it's off my plate... - Physician 1, Exposure to MCPAP for Moms</i>
	There are communication difficulties that specific to dealing with patient mental health information	X	<i>I think that goes to when you request records from somebody. It's in the document and there's special boxes that you have to check that, like HIV, and [mental health] and substance abuse are kind of a specialized category of things, so that does impair...I think also if I got more of the [information from the records] of what is happening, I probably would learn over time, this is how they got managed and so I would boost my confidence to maybe step it up a little bit and maybe I would be more comfortable in sort of a little more complex patients - Physician 6, No exposure</i>		

NB: Some excerpts are slightly modified [brackets] to facilitate ease of interpretation. Overall meaning has not been changed.

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Table 3.4. Participant-identified recommendations for integrating the treatment of BD into the obstetric setting

	No Exposure to MCPAP for Moms		Exposure to MCPAP for Moms	
Recommendation	Theme?	Illustrative Example	Theme?	Illustrative Example
<i>Recommendation 1: Obstetric professional comfort and competency in managing perinatal BD may be increased with educational efforts and easily accessible resources</i>				
Emphasis on educating trainees	X	<i>She had the psychiatric nurse practitioner, so having someone of relevance educating the residents - Physician 3, No exposure</i>		
Education specific to the steps along the mental health care pathway	X	<i>Tell us how. Tell us how and how much time it takes - Physician 8, No exposure</i>	X	<i>I think it'd be helpful to have, like, the recommendation of how frequently [to follow-up with patients with BD] because sometimes it does feel like we're prescribing that medication and then they disappear into the void... - Physician 9, Exposed to MCPAP for Moms</i>
Help on distinguishing BD from other mental health conditions	X	<i>Another thing that I feel like with depression, I'm a little bit more comfortable making that call, but with something above and beyond that, like a psychotic disorder or a bipolar, I kind of feel like my distinguishing abilities as an MFM is less - Physician 6, No exposure</i>	X	<i>I guess I also worry sometimes that, is there certain things that can be misdiagnosed as bipolar? In thinking of other medical scenarios, it's not only enough to know how something presents, but what are the things that can fool you and make you think it's this, but it's really something else - Physician 14, Exposed to MCPAP for Moms</i>
More information to understand the risk/benefit profile of BD meds and to recognize their side effects	X	<i>If I had a list of specific side effects that I needed to know about and I put that in their problem list and I read it every time they came in, I would probably be okay with that - Physician 5, No exposure</i>	X	<i>Because we are more comfortable with the SSRIs, it'd be nice to have the review on the [BD] meds, on the current meds... So sure, and then for some of the counseling and, you know, maternal fetal medicine has their little blurb that they do for lithium and for different meds then whether or not to do an echo or whatever, but it'd be nice to sort of have a review - Physician 4, Exposed to MCPAP for Moms</i>
Emphasis on destigmatizing mental health conditions for clinicians and patients	X	<i>And is there a way to like soften the term bipolar. Like what if the patient says, my doctor just called me crazy and I'm not going to go back and see her, then we've lost them. So how to talk to the patient about it? - Physician 7, No exposure</i>		
Use of Grand Rounds and other lecture series as a venue for education	X	<i>I mean, get some more speakers out there. I mean, I would have speakers when I'm on grand rounds - Physician 3, No exposure</i>	X	<i>Yeah, just [a series of] rotating topics, because I'd probably need to relearn these things every year, so every, you know, few months a little quick update or... - Physician 11, Exposure to MCPAP for Moms</i>
Creation of more online content and education	X	<i>Some video content I think would be helpful that people just watch in their spare time - Physician 2, No exposure</i>		

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Circulation of more treatment algorithms and clinical decision-making tools	X	<i>I like one-pagers. A front and a back. Something that I can have on my desk or have in my frequently referenced pieces of paper that I just say, all right, hey, did I ask this question or this is my next move, something like that. So a one-pager - Physician 7, No exposure</i>	X	<i>If we had a protocol we could follow or something where you can say, like, OK, if we're gonna start someone on Risperdal like, we're gonna follow up in three months and then we're gonna do the A1c...something like that - Physician 9, Exposed to MCPAP for Moms</i>
Outreach to other clinicians around preventative care			X	<i>I know we're talking from the OB side, but I think also on the psychiatry side, kind of like spreading the word [about not stopping meds]. Like at least, you know, think twice before you [stop them] - Physician 14, Exposed to MCPAP for Moms</i>
<i>Recommendation 2: Incorporation of the management of BD in the obstetric setting may be further facilitated by recommending efficient ways to integrate practices into existing workflows</i>				
Include discussion of BD into appointments with fewer required tasks	X	<i>We just kind of like talk about [perinatal depression] at a certain appointment I think, like maybe an appointment where you don't have a lot going on - Physician 7, No exposure</i>		
Leverage other professionals in the OB practice to assist	X	<i>I work in a particularly resource-poor setting and lots of people are doing lots of things, but what I really learned over the years is leveraging my health care assistants to do a lot for me, and because they are all bilingual also...to give patients the info and just explain that Dr. ___ wants you to do X and she will be with you afterwards, and that's at least a couple of minutes that I don't need to do that piece of it, so I think that's where I think I would be interested in some assistance - Physician 8, No exposure</i>		
Integration of BD screeners and reminders into the Electronic Medical Record (EMR/HER)	X	<i>But I think your comment about EHR is really important because I think sometimes, particularly when we share about the record with internists and family that we don't remember to put our OB diagnoses in there so everyone can see and vice versa, so I think it's really important for us to put postpartum depression on that shared list, even though the postpartum period may be over, that's still a flag for the internist who sees them. Maybe I should really talk to that lady about what she's doing now. I think we don't do a good job with our problem list - Physician 8, No exposure</i>		
Use of patient registries in the practice to help with follow-up			X	<i>Following up with patients, I think [having a patient registry] where we keep track of patients so closely, I think other practices could</i>

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

				<i>benefit from doing the same. I think that's really helpful – Medical Assistant 2, Exposure to MCPAP for Moms</i>
<i>Recommendation 3: Employment of integrated care models and other innovative care delivery methods for patients and babies</i>				
Embedded psychiatric professionals into OB practices	X	<i>I will say that what has totally changed my practice in the last 12 months is our health center organization has undergone a pilot projection, which we are continuing with sort of embedding psychiatric social workers in every one of our sites. So I now have the ability to talk to woman who is distraught and has other social stressors and clearly probably a diagnosis, who I can literally say, "Would you like to talk to [social worker] today?" And [social worker] can come over and talk to her - Physician 8, No exposure</i>		
Use of Perinatal Psychiatry Access Programs or other consultative professionals with mental health expertise	X	<i>We have OB Med so that's a different specialty that has perhaps a little comfort in the behavioral stages, so I mean, they're not psychiatrists, but it's a specialty of internists who have done some intake for pregnancy woman with medical issues including behavioral health - Physician 8, No exposure</i>	X	<i>And [having access to MCPAP for Moms has] been huge to have that as a resource and referral options, so sometimes she'll take time to set someone up with therapy, other times she just works with our social worker or gets them set up with another therapist or other needs. And that's amazing. Every practice should have that – Physician 11, Exposure to MCPAP for Moms</i>
Leveraging telemedicine and direct patient care over telemedicine	X	<i>One thing that might be nice for you and for anybody else would be like, I don't know how comfortable I feel, like psych is doing more with tele medicine, but that would be essentially your visit, but you don't have to travel - Physician 7, No exposure</i>	X	<i>Maybe telemedicine, like, you know, I think that could really work in a psych setting, you know for a psychiatric issue, you know, with technology today and things. You could do that in the hospital. We could do that here - Physician 1, Exposure to MCPAP for Moms</i>
Inclusion of more comprehensive assessment strategies			X	<i>I think more trauma-informed approaches would be helpful other places – Physician 11, Exposure to MCPAP for Moms</i>

NB: Some excerpts are slightly modified [brackets] to facilitate ease of interpretation. Overall meaning has not been changed.

CHAPTER III: PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER

Table 3.5: Associations with themes by exposure status, based on the number of times the themes were coded

Theme	All participants	No exposure	MCPAP for Moms exposure
	% ^a		
Formal education about bipolar disorder in perinatal patients is lacking. Exposure to continuing education can help	9.0	8.7	9.3
Screening is occurring sporadically in places without Access Program exposure. Without adequate support, participants report seeing no point in screening	9.0	10.6	7.2
Patient assessment is one of the most challenging parts in addressing bipolar disorder in perinatal patients for all obstetric clinicians, regardless of exposure level*	8.0	3.9	12.4
Clinician participants can be comfortable in treating patients with medications for bipolar disorder with the appropriate support	19.4	14.4	24.7
All participants noted that there is an extreme paucity of mental health clinicians nationwide, and that barriers to care abound. Access Programs and collaboration with other professionals that have specialized mental health training can help to fill some of these gaps	13.4	15.4	11.3
Participants with adequate support see addressing perinatal BD as an important and valuable part of their role as obstetric professionals.	2.0	1.9	2.1
Participants with exposure to Access Programs perceive their patients as willing to be screened and treated for BD by their obstetric clinicians and are eager to talk about their mental health conditions*	3.0	0	6.2
Coordination of care with outside psychiatric professionals remains a challenge for all participants, regardless of exposure	6.0	5.8	6.2
Facilitators***	28.4	15.4	42.3
Barriers	41.3	45.2	37.1
Recommendations**	30.4	39.4	20.6
Clinician comfort and competency in managing perinatal BD may be increased with educational efforts and easily accessible resources	16.9	20.2	13.4
Incorporation of the management of BD in the obstetric setting may be further facilitated by recommending efficient ways to integrate practices into existing workflows	6.5	8.7	4.1
Employment of integrated care models and other innovative care delivery methods for patients and babies*	6.0	9.6	2.1

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

^aNumbers correspond to the percentage of times a theme was mentioned, based on qualitative analysis.

**CHAPTER IV:
IMPROVING FRONT-LINE CLINICIAN CAPACITY TO ADDRESS BIPOLAR
DISORDER AMONG PERINATAL INDIVIDUALS: A LONGITUDINAL
ANALYSIS OF MASSACHUSETTS CHILD PSYCHIATRY ACCESS PROGRAM
(MCPAP) FOR MOMS**

ABSTRACT

Background

Perinatal mood and anxiety disorders (PMADs) are common in the perinatal period, yet many patients do not receive the mental healthcare needed. This can be especially true of complex illnesses like bipolar disorder (BD). Massachusetts Child Psychiatry Access Program (MCPAP) for Moms has emerged as a solution to these gaps in care, to increase front-line clinician capacity to provide mental healthcare. The objectives of this study were to examine if utilization of MCPAP for Moms increased front-line clinician ability to treat PMADs more frequently and of increasing complexity.

Methods

Clinical encounter data from the MCPAP for Moms program was examined from the first utilization (7/2014) through 6/2020. We examined if utilization of MCPAP for Moms (number of annual encounters with the program in total and by encounter type) was associated with increased frequency with which front-line clinicians provided direct mental health treatment to their patients (count of encounters that ended with calling

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

clinician treating) and increased complexity of illnesses treated (count of encounters for BD that ended with the calling clinician treating versus those for unipolar depression). Outcomes were estimated using longitudinal negative binomial models. Exploratory group-based trajectory modeling (GBTM) was used to determine if sub-groups of clinician utilization patterns existed.

Results

Since July 2014, 1,006 individual clinicians have utilized MCPAP for Moms. The percentage of encounters for BD that ended with the clinician providing direct mental health treatment to their patient was found to have an increasing trend over time, whereas trends for unipolar depression were decreasing. Utilization of MCPAP for Moms was modestly predictive of increased rates of the calling clinician providing direct mental health treatment (IRR = 1.07, 95% CI: 1.06 to 1.07), after accounting for elapsed time and rural community. Utilization of encounters that included one-on-one education for the calling clinician tailored to their clinical case (phone consultations with a calling clinician, face-to-face consultations with patients) were more predictive of calling clinician treatment rates than any encounter or resource and referrals. Repeated utilization of face-to-face consultations with patients was most predictive of increased rates of encounters related to BD ending with the calling clinician providing direct mental health treatment (IRR = 2.12, 95%CI: 1.82 to 2.41). Based on sub-groups that emerged from GBTM, clinicians in a utilization group that exhibited high utilization rates that were increasing over time exhibited the strongest predictive association of encounters ending

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

with the calling clinician providing treatment all diagnoses, including BD (IRR = 13.5, 95%CI: 4.2 to 43.2).

Conclusions

This study provides compelling evidence to support the hypothesis that clinician utilization of the Perinatal Psychiatry Access Program, MCPAP for Moms, teaches and empowers front-line clinicians to provide direct mental health treatment to their patients, including those with complex illnesses like BD. Further work is necessary to elucidate the more nuanced trends in clinician utilization and generalizability to other programs around the country, as well as to determine individual-level barriers and facilitators to capacity building. Overall, this study contributes to the growing body of evidence in support for the Access Program model.

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

INTRODUCTION

Perinatal mental health and substance use disorders (mood, anxiety, anxiety related, psychotic and substance use disorders occurring in pregnancy and the year postpartum) affect more than one in five individuals worldwide.^{4,10-13,35,132,133} They can have long-term, deleterious effects for the childbearing individual, child, and family.^{4,10-13,35,132,133} Perinatal mental health and substance use disorders are associated with preeclampsia, low birth weight, developmental delays, and impaired mother-infant bonding,¹⁰⁻¹³ as well as increased risk for psychiatric and medical morbidities and mortality in the childbearing parent.^{10-13,14} Rates are as high as 25% among Black and Latino/a individuals and those in lower socioeconomic situations.^{5,7-9} Perinatal mental health and substance use disorders are a leading cause of maternal mortality.^{13,29,34,40,41,76,77} In 2020, the Centers for Disease Control and Prevention deemed that 100% of the deaths caused by perinatal mental health and substance use disorders are preventable.²²

In this paper, we will focus on perinatal mood and anxiety disorders (PMADs), a common complication of pregnancy.⁶ Less than 25% of perinatal women with PMADs in need of treatment receive adequate mental health care in this time period.⁶ There are ample opportunities for intervention that are missed. For example, individuals interact with the healthcare system an average of 20-25 times during the perinatal period.⁶⁹ Additionally, individuals with perinatal mental health conditions are forced to rely on urgent or emergent services at higher rates over office-based primary care,³⁷ due to barriers to access to mental health treatment.

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

It is imperative that we address this inequity in access to evidence-based perinatal mental healthcare. Many of these gaps are thought to stem from the fragmented mental healthcare system, the relative shortage of mental healthcare clinicians, and stigma and misinformation regarding treatment of perinatal mental health conditions.^{63,68,134-136} One potential approach to addressing this is helping front-line clinicians to provide this care themselves. Front-line clinicians for perinatal individuals include those that deliver primary care (obstetrician/gynecologic, primary care, and pediatric clinicians). These professionals may be ideally poised to address perinatal mental health conditions, given the frequency with which they interact with this population and strong, longitudinal relationships, and can be adequately supported in doing so.¹¹⁶ Historically, these front-line clinicians have felt that they were not supported in tackling PMADs, lacked the training and skills, and had inadequate resources to do so.^{54,56,60,67,137-139} Universal screening mandates for perinatal depression have been in place for years,^{38,39,49,62} however, many clinicians (rightly) felt screening without adequate systems in place for follow-up is incomplete clinical care.

To fill this need, the Massachusetts Child Psychiatry Access Program (MCPAP) for Moms was created to increase front-line clinician capacity to provide mental healthcare to this population. MCPAP for Moms supports these clinicians in helping them to move patients down the entirety of the “perinatal mental healthcare pathway⁷³” (**Supplementary Figure S4.1**). This pathway describes the steps that are needed to be taken to improve perinatal mental health outcomes - screening, assessment, triage and referral, treatment, and monitoring until illness remission.

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

The success of MCPAP for Moms has inspired federal legislation, funding, and subsequent spread of other Perinatal Psychiatry Access Programs (or “Access Programs”) to 16 other states, with even more in development.^{58,70-72,128} However, this national dissemination of Access Programs, with its tailoring to fit each state, creates a critical evidence gap. There has been no research to date on how MCPAP for Moms or other Access Programs affect front-line clinician practices regarding mental health over time. It is posited that, with increased utilization of MCPAP for Moms over time, clinicians will feel more comfortable managing increasingly complicated PMADs. They may also do so more frequently and will thus help to alleviate gaps in perinatal mental healthcare.^{57,58,66} Establishing and understanding the mechanism(s) by which Access Programs work will help to inform the implementation of the other programs as they spread across the country.

In this study, we examined the longitudinal trends of clinician utilization of the MCPAP for Moms Access Program. We hypothesized that, as individual clinicians utilized MCPAP for Moms more, they would treat PMADs more frequently and of increasing complexity. The objectives of this study were to examine: (1) descriptive trends in clinician utilization of MCPAP for Moms since program inception; and (2) longitudinal changes in clinician treatment patterns of PMADs, based on the extent to which they used MCPAP for Moms.

METHODS

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

We examined the clinical encounter data from the MCPAP for Moms program from its first encounter (July 2014) through June 2020. Notably, we recognized that this study period does overlap with the onset of the 2020 COVID-19 pandemic in the U.S.; adjustments made for this in analyses are discussed below. We believed it to be important to include these trends and examine how the known changes in healthcare utilization during this time affected MCPAP for Moms. This study was approved by the University of Massachusetts Medical School Institutional Review Board.

Study setting and MCPAP for Moms overview

MCPAP for Moms provides training and consultative services regarding addressing and treating perinatal mental health conditions to any requesting practice or clinician in the state to improve their knowledge, skills, and self-efficacy in addressing perinatal mental health conditions.⁵⁶ To date, MCPAP for Moms has trained and enrolled 77% (n=163 practices) of the obstetric practices in the state (total 1,669 healthcare professionals), covering >80% of MA deliveries.⁶⁶ The bulk of the program's work involves individual encounters with clinicians in Massachusetts (heretofore "calling clinicians"), who contact the program for support in providing direct or indirect care to their perinatal patients.

The MCPAP for Moms encounter-based services examined in this study included: (1) provision of resources and referrals, (2) phone consultations between a calling clinician and a consulting program psychiatrist, and (3) one-time, face-to-face patient

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

consultations in which a consulting program psychiatrist assesses a patient and provides recommendations based on that assessment to the calling clinician.

Resources and referrals. MCPAP for Moms employs resource and referral specialists, whose roles are to connect calling clinician with pertinent services (e.g., a list of psychotherapists in their geographic area that accept Medicaid/MassHealth and are taking new patients). Resource and referral-related encounters are the most common type in the MCPAP for Moms program. These encounters aim to help the calling clinician connect their patients to external sources of mental healthcare.

Phone consultations between a calling clinician and a consulting program psychiatrist (or “phone consultations with calling clinician”). MCPAP for Moms employs a number of consulting perinatal psychiatrists who use their expertise to help calling clinicians provide direct care to their patients. For example, the calling clinician may contact the program for a phone consultation, where they will explain a clinical scenario for which they require assistance (e.g., a patient presents with a certain set of symptoms – which treatment course(s) is indicated and may be considered most likely to be effective?). In response, the consulting psychiatrist provides education and discusses options for management. These encounters aim to enable and empower the calling clinician to deliver needed and timely mental health care for their patient.^{58,66}

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

One-time, face-to-face consultations with patients, in which a consulting program psychiatrist assesses a patient and provides recommendations based on that assessment to the calling clinician (or “face-to-face consultations with patients”).

In a minority of cases, after the phone consultation with a calling clinician, the consulting psychiatrist will see a patient for a one-time assessment in-person.

After this encounter, the consulting psychiatrist will provide recommendations to the calling clinician, who will subsequently provide direct mental health treatment. The consulting psychiatrist will only see a patient for a face-to-face consultation if the calling clinician previously agreed to treat said patient. These encounters aim to educate and empower the calling clinician to deliver direct care to patients. Common scenarios that would result in a face-to-face consultation include: (1) a calling clinician that requires assistance in managing treatment for the longer term, typically done in patients with more common mental health conditions like unipolar depression; and (2) a calling clinician that requires assistance in providing bridge treatment to patients with more complex mental health conditions, until care can be transferred to another psychiatric prescriber. An example of the latter case might include a patient with a bipolar-spectrum disorder (BD). While it is not expected that front-line clinicians would ever be able to manage BD on their own, face-to-face consultations with patients and the resulting recommendations from the consulting psychiatrist can help calling clinicians to initiate and/or continue much-needed pharmacotherapy for these patients, until psychiatric treatment can be secured.

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

In both phone consultations with the calling clinician and face-to-face consultations with patients, the consulting psychiatrist **does not provide direct clinical care** to the patient. Rather, the consulting psychiatrist makes recommendations to the calling clinician to help them treat the patient themselves. The outcome of both encounters is that the initiating clinician will resume all care for the patient, including psychiatric management.

The hypothesized mechanism by which the MCPAP for Moms program works is at the clinician level. It is expected that the calling clinicians learn from and are empowered by each encounter and continue to apply this knowledge to their patient care. This should also extend to the mental healthcare of patients that are not directly served by MCPAP for Moms.

Procedures and Measures

The MCPAP for Moms encounter data set contains information about the calling clinician and their associated practice, the rationale for the encounter, details of the encounter (e.g., challenges & diagnoses discussed, suggested treatments, planned next steps), the outcome of the encounter, and any resources or referrals given to the calling clinician. For a full list of variables, please see **Supplementary Table S4.1**.

Exposures

The exposure was the utilization of the MCPAP for Moms program by calling clinicians. This was operationalized as a clinician's number (count) of annual encounters

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

(**Table 4.1**); encounters refer to any interaction an individual clinician may have with the program (phone consultations, face-to-face consultations, and resource and referral encounters), as outlined in the study setting above and in **Table 4.1**. Encounters were hypothesized to be the best measure of program utilization as they indicate active clinician participation. Volume of encounters by clinician were evaluated by year.

The effects of utilization of specific encounter types, as outlined in the study setting section and **Table 4.1**, were also examined. Phone consultations with the calling clinician and face-to-face consultations with patients were hypothesized to be more edifying and empowering for calling clinicians than resource and referral encounters or any encounter generally. For example, a resources and referral encounter, while critical for supporting clinicians in accessing community mental health resources for their patients, likely does not impart further knowledge to the calling clinician. This is thought to be less likely to increase their capacity to address and treat PMADs going forward. Conversely, a face-to-face consultation with a patient should increase the calling clinician's capacity because the consulting psychiatrist will provide tailored education, recommendations, and feedback to the clinician based on the specific patient. The calling clinician may be also be more likely to provide direct treatment for an illness they would not have treated without the diagnostic evaluation and treatment recommendations in hand.

Outcomes

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

The outcomes of interest were the extent to which the calling clinicians: (1) provided more frequent direct mental health treatment over time; and (2) treated more complex illnesses (i.e., BD) over time. This was estimated by the rates at which calling clinicians were found to have provided direct care and treated their patients themselves after a MCPAP for Moms encounter. We expected to see that, with increased program utilization, we would see increases in the rates at which calling clinicians provided direct mental health treatment after an encounter and that calling clinicians would more frequently treat conditions of increasing complexity.

Increasing complexity of illnesses managed by the calling clinician was examined by comparing trends in the management of unipolar depressive disorders versus BD. Unipolar depressive disorders are some of the most common PMADs seen in perinatal patients. Because of this, and because they can often be managed without pharmacotherapy or with antidepressant monotherapy, front-line clinicians feel comfortable providing treatment.^{48,49,54} Patients with BD tend to be viewed as more “complex,” usually require continuous pharmacotherapy, and their associated medications, like Lithium, tend to be viewed with trepidation by front-line clinicians.^{48,49,54} Obstetric clinicians have previously reported being comfortable in prescribing antidepressants but has less comfort with medications for BD.⁴⁸ Thus, increasing rates of encounters about BD that end with the calling clinician providing direct care for BD may indicate that clinicians are more willing and able to treat this complex illness.

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

We operationalized our outcomes using the following from the MCPAP for Moms encounter data (**Table 4.1**). The primary outcome was the **rates** of encounters annually (measured as longitudinal count data) that ended with the calling clinician treating their patients themselves. This was measured overall and by diagnosis (unipolar depression vs BD), the latter to estimate increasing complexity.

Other covariates

Other characteristics of the calling clinicians, as well as the encounters themselves, were identified in the data set (professional credentials, clinical specialty, region, practice size, number of births/practice). Additionally, using the area zip code for the clinician's associated practice site, we examined the calling clinician location (rural or urban community) and the median income of the community in which the clinician practiced. Rural community was defined using MA census data's rural classifications.

Statistical analyses

We described the sample of calling clinicians that interacted with the MCPAP for Moms program. Characteristics of clinicians were measured at first encounter and considered time invariant for the purposes of analyses. Additionally, we described the program's annual trends of clinician utilization overall, by type, by diagnoses discussed in the encounter, and by the fraction of diagnoses that ended in with the calling clinician providing direct patient care.

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

For the primary outcome analyses, longitudinal negative binomial models were used to estimate Incidence Rate Ratios (IRR) and 95% confidence intervals (95% CI). Negative binomial models were chosen over Poisson because the distributions of the count-based outcomes showed evidence of over-dispersion. Outcomes were measured as counts over the course of a calendar year. Shorter time units (volume of encounters by half year, by quarter) were thought to encompass too many individual fluctuations to be reliable. Analyses included clinicians that can prescribe medications only (physicians, nurse practitioners, physician assistants), as the treatment outcomes often refer to prescription of pharmacological therapies.

IRR can be estimated from longitudinal count data because the beta coefficients from negative binomial regressions represent the difference between the log of expected counts. Since our count data can inherently be considered a rate (the number of encounters ending in “clinician treats”/year), the beta coefficient can also be interpreted as the log of the rate at which our outcome occurs. The difference of logs is transitively equal to the ratio of 2 logs, thus yielding a rate ratio (RR). We are measuring the rate incidence at which the RR occurs (incidence), thus, yielding an IRR.¹⁴⁰

To adjust for pertinent covariates, we first examined univariate associations of covariates with each outcome; those that showed a greater than 10% change in the outcome effect estimate or were hypothesized to be important based on the literature were included in the final adjusted models. Ultimately, only calling clinician location in a rural community (yes/no) was included in the final, adjusted models. All models were run

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

with random effects to account for between clinician differences. Additionally, given that the healthcare utilization changes associated with the COVID-19 pandemic could affect associations, sensitivity analyses were conducted in which the study time period ended one year earlier (June 2019) and compared.

As an exploratory sub-analysis, we examined whether specific calling clinician sub-groups existed within the program utilization data. We did this using group-based trajectory modeling (GBTM) procedures.¹⁴¹ Since the majority of calling clinicians enrolled during the first two years of the program, we examined a subset of clinicians that enrolled in the first calendar year (July 2014 – July 2015, n=362) for this sub-analysis, to reduce missing data across time points. A series of zero-inflated Poisson models were fitted to estimate clinician trajectory groups, based on total count of any encounter with the program annually. Models were evaluated with a range of two to six subgroups and evaluated for model fit. This was done by incrementally increasing each model by one subgroup and evaluating model fit statistics (BIC, AIC) as well as graphical display. Once the number of sub-groups was determined, the order of the polynomial for each group of the number of encounters and the excessive zeros was varied from linear to quadratic and evaluated for model fit, using the same methods as stated above.

Supplemental Table S4.2 includes data on how we chose the most parsimonious model, including fit statistics. After choosing the final model, we assigned each clinician into the trajectory group with the highest posterior probability. Descriptive labels were assigned for ease of reference based on trajectory shape. Using the final sub-groups for each

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

clinician, we ascertained group prevalence, associated characteristics, and associated outcomes. Analyses were conducted in Stata 14 and SAS 9.4.

RESULTS

Overview of clinicians utilizing the MCPAP for Moms program

Since July 2014, 1,006 individual clinicians have utilized MCPAP for Moms. The program has had a total of 18,428 encounters for 10,229 perinatal individuals. Though the majority were physicians (59.9%, **Table 4.2**), other front-line clinicians for perinatal individuals have been frequent utilizers. Most encounters were with obstetric clinicians (76.4%) from mid-sized practices (mean=24.2 clinicians \pm 17.8) in urban settings, with an average of 728.3 deliveries per practice per year (SD = 513.2). Most clinicians enrolled in MCPAP for Moms by the end of 2015 (62.8%).

Descriptive programmatic trends over time

Since program inception, utilization has increased annually, with a downtick in the 7/2019 – 6/2020 time period (**Figure 1**) and peaking at 3,495 in 2019. When comparing the frequency with which unipolar depression versus BD was discussed during encounters, unipolar depression vastly exceeded BD at all time points (**Figure 4.2**). In contrast, when examining the percentage of all encounters that ended with the calling clinician treating their patient by diagnosis, distinctly different diagnosis-specific

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

patterns emerge. For example, in the 7/2019-6/2020 time period, which includes the initial surge of the COVID-19 pandemic, more than 50% of those encounters for BD ended with the clinician treating the patient. This was an increase from less than 40% in 2014. In contrast, rates of treatment for unipolar depression and any diagnosis more broadly decreased from approximately 38-45% in 2014 to approximately 25% in the 7/2019 – 6/2020 period (**Figure 4.3**).

Longitudinal trends of the effects of MCPAP for Moms utilization

With regard to the primary outcomes, utilization of the MCPAP for Moms program had differential effects on the rates at which encounters concluded with the calling clinician treating their patient, based on the interaction *type* and *diagnosis* (**Table 4.3**). Overall, utilization of any encounter type (resources and referral, phone consultations with a calling clinician, and/or face-to-face consultations with patients) were modestly predictive of increased rates of the calling clinician providing direct mental health treatment, after accounting for elapsed time and rural community. Utilization of phone consultations with a calling clinician and face-to-face consultations with patients were more predictive of calling clinician treatment rates than any encounter or resource and referrals. Exposure to resource and referral encounters had effects that mirrored those of any encounter types generally. Repeated utilization of face-to-face consultations with patients was most predictive of increased rates of encounters related to BD ending with the calling clinician providing direct mental health treatment (IRR =

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

2.12, 95%CI: 1.82 to 2.41). Clinician presence in a rural community was strongly predictive of increases in the rates of clinicians providing direct mental health treatment, across almost all encounter types and diagnoses.

Sensitivity analyses excluding the dates of the COVID-19 pandemic exhibited similar results.

Exploratory sub-analysis trajectory groups of specific providers & associations

In our exploratory sub-analysis of calling clinician trajectories of utilization of the MCPAP for Moms program, three distinct clinician subgroup patterns of utilization emerged (**Figure 4**): 1) low and stable utilizers (79.3%), 2) moderate and stable utilizers (16.8%), and 3) high and increasing utilizers (3.9%). Low/moderate and stable utilizers exhibited largely static patterns of program utilization over 2014-2020. High and increasing utilizers exhibited a slightly increasing rate of utilization since program inception. Sub-groups differed on some clinician characteristics and associated outcomes (**Table 4**). Specifically, those in the in the high and increasing utilizers group exhibited the strongest predictive association of encounters ending with the calling clinician providing treatment all diagnoses.

DISCUSSION

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

In this study, we examined the longitudinal trends of clinician utilization of MCPAP for Moms and associated outcomes. Consistent with other findings, utilization of the program across all examined metrics has continued, generally, to increase with each year.⁶⁶ However, utilization patterns, such as diagnoses discussed in encounters and rates of calling clinician treatment have changed with time. Calling clinicians are providing direct mental health treatment to their patients with increasing frequency and for more complex illnesses, like BD. In particular, utilization of face-to-face consultations was associated with increased rates of direct treatment of BD by calling clinicians. This suggests that face-to-face consultations increase the calling clinician's capacity to treat BD. This is striking because BD is considered complex to treat, even amongst psychiatric clinicians. Increases in calling providers' treatment of BD is beyond what would have been expected at the advent of the MCPAP for Moms program, which was initially created to help address perinatal depression.⁵⁸

This work provides evidence in support of the hypothesized mechanism by which Access Programs are thought to work. Specifically, it suggests that more utilization and exposure to the program leads to increased rates of calling clinicians providing direct mental health treatment, suggestive of improved clinician comfort and capacity in addressing perinatal mental health conditions. We found evidence to support this across all encounter types and diagnoses.

Importantly, though, we found that utilization of all encounter types does not yield equal gains in clinician capacity. Increased utilization of phone consultations with

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

calling clinicians and face-to-face consultations with patients were most effective in increasing the rates at which clinicians provided direct care to patients. Face-to-face consultations, in particular, appear to be critical in increasing clinician ability to address complex mental health conditions like BD. The differential effects based on encounter type are striking for two reasons. One is that it suggests that front-line clinicians can be empowered to address even complex illnesses, like BD, with the support of an Access Program. This is something they would be unlikely to do on their own. The support of Access Programs, therefore, is a critical way to help address the current gaps in care that perinatal patients with BD face. Second is that this suggests that these encounters that foster direct engagement and education between the consulting psychiatrist and calling clinician (i.e., phone consultations with calling clinicians and face-to-face consultations with patients) are the most effective in increasing clinician capacity by a significant margin. Though they may be resource intensive, it is important that all developing and future Access Programs consider including phone and face-to-face consultation encounter types in their programs. As the goal of Access Programs is to increase clinician capacity, aspiring and developing programs should be encouraged to include encounters that have the most and strongest evidence and that are suggested to be the driving mechanisms by which the programs work.

Calling clinicians with increased utilization of MCPAP for Moms who practiced in rural communities were among those with the greatest increases in treatment rates of patients. This is not unexpected; clinicians in communities with more limited resources, as rural communities tend to be, often are forced to take on treating patients themselves

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

rather than referring to specialists.¹⁴² Barriers to mental healthcare for patients tend to be higher in rural communities and those distant from academic hubs.¹⁴² Thus, it is all the more important to find ways to empower front-line clinicians to provide direct patient care. It is reassuring that this model has been successful for clinicians that care perinatal individuals in rural communities in MA and provides support for the MCPAP for Moms model to be used in other communities. This also has important and promising implications for the success of emerging Access Programs in areas of the country that are generally less densely populated than MA as a whole.

We also observed down-tick in utilization in the 7/2019-6/2020 period, compared to prior trends. This aligns with the initial surge of the COVID-19 pandemic in the U.S., which was a time where overall “non-essential” healthcare utilization went down. Many prenatal appointments were missed for various reasons during this time, though the mental health of perinatal individuals certainly suffered.¹⁴³ Interestingly, though overall utilization was down, utilization of phone consultations with calling providers and face-to-face consultation with patients never experienced a drop in this time. This suggests that, though care utilization for healthcare overall was down, many clinicians were still calling and referring patients for consultations and generally relying on MCPAP for Moms in this difficult time, perhaps more than ever. Indeed, after the initial surge, utilization increased to rates higher than ever. This, again, aligns with our hypothesis that utilization of MCPAP for Moms increases clinician capacity to address perinatal mental health conditions directly with their patients in times of limited resources.

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

Our exploratory use of the group-based trajectory modeling techniques and resultant sub-groups of clinicians was informative and instructive for future work. It appears that some clinicians exhibit distinctly different utilization patterns than others, perhaps partly based on some of the predictors examined here (e.g., medical discipline) as well as others yet to be explored. It is important to further elucidate these patterns and predictors of differential Access Program utilization, as our data indicate that utilization directly impacts clinician capacity to provide direct patient care. A better understanding of what predicts clinician utilization may help to better tailor future Access Program outreach efforts and maximize the benefits that clinicians may gain exposure to Access Programs.

This work contributes two salient ideas to the literature. First, it helps to provide further evidence for the mechanisms behind how MCPAP for Moms program and other Access Programs may work to build front-line clinician capacity to provide direct mental health treatment for their patients. Though there has been prior work examining the program's utilization and clinician reception,⁶⁶ there has been no data on longitudinal trends that may suggest causality. Our findings illustrate that helping front-line clinicians to tackle more complex conditions like BD is possible and sustainable. As Access Programs are emerging and determining where to focus efforts, it is important that their emphasis expands beyond perinatal or postpartum depression, as it is just one of the many mental health and substance use disorders that occurs in pregnancy.⁶ Secondly, as aforementioned, these data come at a critical time to help inform the ongoing efforts establishing other Access Programs across the U.S. and abroad. This work should inform

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

what existing and emerging programs choose to focus on, dedicate resources to, and prioritize in terms of services provided. Currently, most emerging and existing Access Programs are funded via tax-payer funder initiatives, grants, and insurance reimbursement. By establishing evidence for Access Program mechanisms and the importance of some encounter types (e.g., face-to-face consultations with patients) in increasing clinician capacity, this work can inform policymakers and funders as Access Programs continue to be implemented across the US.

This study has many strengths. The use of longitudinal data, with multiple encounters over a time span of multiple years, yields rich insight into trends and trajectories. This work contributes to an area that is largely unexplored but in need of a substantive evidence base. We used multiple methodologies to examine our central hypotheses. However, it also has limitations. These data stem from a clinical data set that collects limited clinician information for privacy reasons. Therefore, data to contextualize clinician characteristics is limited. Additionally, we were unable to link our findings to patient outcomes; therefore, it is unclear to what extent these trends affect patient outcomes. Finally, we do not follow clinicians after program encounters and cannot ensure that they implement direct patient care. However, given that clinician utilization is entirely voluntary, it would be unusual to expect that clinicians would interact with MCPAP for Moms repeatedly of their own volition without implementing the consultant psychiatrists' recommendations.

Conclusions

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

This study examines the longitudinal effects of clinician utilization of the Perinatal Psychiatry Access Program, MCPAP for Moms, to determine if increased utilization teaches and empowers front-line clinicians to provide direct mental health treatment to their patients. Our data provide compelling evidence in support of this hypothesis, even helping clinicians to treat complex illnesses like bipolar disorder. Further work is necessary to elucidate the more nuanced trends in clinician utilization and generalizability to other programs around the country, as well as to determine individual-level barriers and facilitators to capacity building. Overall, this study contributes to the growing body of evidence in support for the Access Program model that aims to increase access to perinatal mental health care by building help front-line clinician capacity to provide direct mental health care for their perinatal patients.

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

Table 4.1: Operationalization of study exposure and outcome variables of MCPAP for Moms utilization

<i>Conceptualized domain</i>	<i>Specific MCPAP for Moms data for measurement</i>	<i>Hypotheses</i>
Study exposures, to suggest utilization of the MCPAP for Moms program		
Utilization of any encounter type	Count of any encounter type in MCPAP for Moms (# encounters with MCPAP for Moms/year)	Exposure will increase treatment rates, as utilization should be educational
Utilization of phone consultations with calling clinician	Count of only those in which the encounter type was a phone consultation with a calling clinician. In these encounters, a consulting psychiatrist provides recommendations to the calling clinician to help them provide direct patient care (# phone consultations/year)	Exposure will increase treatment rates, as phone consults are a tailored educational experience for the calling clinician and utilization should be educational
Utilization of face-to-face consultations with patients	Count of only those in which the encounter type was a one-time face-to-face consultation with a patient. This is followed by a discussion between the consulting psychiatrist and the calling clinician about the patient, allowing them to compare assessments and for the psychiatrist to provide specific recommendations about clinical care. (# face-to-face consultations/year)	Exposure will increase treatment rates, as phone consults are a tailored educational experience for the calling clinician and utilization should be educational
Utilization of resource and referral encounters	Count of those in which the encounter type involves resources and referrals only. In these encounters, a resource and referral specialist will make recommendations to the calling clinician. (# resource and referral encounters/year)	Exposure may or may not increase treatment rates. This encounter involves a provision of resources, rather than education and subsequent clinician experience in providing direct patient care
Study outcomes, to suggest increased treatment rates by the calling clinician and increased complexity of treatments for perinatal mental health conditions		
Count data , estimating management of mental health conditions with more frequency and complexity	Count of encounters annually that end with the calling clinician resuming treatment	Increasing count → increasing treatment rates
	Count of encounters annually that end with the calling clinician resuming treatment for unipolar depression vs. count for bipolar disorder	If counts of depression treatment ≤ bipolar disorder → increasing treatment complexity If counts of depression treatment > bipolar disorder → no change in treatment complexity

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

Table 4.2: Characteristics of calling clinicians that utilized MCPAP for Moms

Characteristic	All calling clinicians (n = 1,006) (n,%)
	(n,%)
Professional credentials	
<i>Physician</i>	583 (59.9)
<i>Midwife</i>	199 (20.4)
<i>Nurse Practitioner/ Physician Assistant</i>	180 (18.5)
<i>Other^a</i>	12 (1.2)
Clinician specialty/discipline	
<i>Obstetrics/Gynecology</i>	753 (76.4)
<i>Family Medicine</i>	84 (8.5)
<i>Internal Medicine</i>	24 (2.4)
<i>Psychiatry</i>	94 (9.5)
<i>Pediatrics</i>	31 (3.1)
Region of Massachusetts^b	
<i>Boston-area</i>	182 (22.1)
<i>Central</i>	191 (23.2)
<i>Western</i>	174 (21.1)
<i>Metro-west</i>	114 (13.9)
<i>Southeast</i>	107 (13.0)
<i>Northeast</i>	51 (6.2)
<i>Cape and the Islands</i>	4 (0.5)
Average number clinicians in practice	
<i>1-5 Clinicians</i>	50 (6.8)
<i>6-10 Clinicians</i>	111 (15.1)
<i>11-20 Clinicians</i>	189 (25.8)
<i>21-50 Clinicians</i>	293 (39.9)
<i>51+ Clinicians</i>	91 (12.4)
Average # annual practice births	
<i>Up to 100</i>	35 (5.6)
<i>101-500</i>	229 (36.5)
<i>501-1000</i>	220 (35.0)
<i>1000+</i>	144 (22.9)
Clinician in rural setting	20 (2.5)
Median income of community in which obstetric practice is located	

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

< \$40,000	94 (13.0)
\$41-50,000	179 (24.8)
\$51-65,000	210 (29.1)
\$65-100,000	137 (19.0)
\$100,000+	101 (14.0)
Average # annual encounters (mean, SD)	
<i>Year 1 (7/2014 – 6/2015)</i>	1.2 (5.9)
<i>Year 2 (7/2015 – 6/2016)</i>	2.3 (6.4)
<i>Year 3 (7/2016 – 6/2017)</i>	2.5 (6.5)
<i>Year 4 (7/2017 – 6/2018)</i>	2.8 (7.6)
<i>Year 5 (7/2018 – 6/2019)</i>	3.2 (7.9)
<i>Year 6 (7/2019 – 6/2020)</i>	2.7 (6.3)

^aOther = Nurse, SW, “BH professional”, office administrator; ^bRegions were created by MA county

Missing data: professional credentials (32); specialty/discipline (20); region (183); practice size (272); births (378); rural (203); income (289)

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

Table 4.3: Primary outcomes results - association of repeated encounters (by type) on “clinician treats” at encounter conclusion, by diagnosis

	Any diagnosis		Unipolar depressive disorders		Bipolar-spectrum disorders	
	<i>IRR^a</i>	<i>95% CI</i>	<i>IRR^a</i>	<i>95% CI</i>	<i>IRR^a</i>	<i>95% CI</i>
Any encounter type						
Exposure to any encounter type	1.07	1.06 to 1.07	1.06	1.06 to 1.07	1.07	1.06 to 1.08
Time ^b	0.94	0.91 to 0.97	0.88	0.85 to 0.92	1.10	1.02 to 1.19
Rural community ^c	3.58	2.17 to 5.90	3.09	1.78 to 5.36	6.32	2.33 to 17.13
Phone consultations with calling clinicians						
Exposure to phone consultations with calling clinicians	1.30	1.28 to 1.33	1.31	1.28 to 1.34	1.25	1.20 to 1.29
Time ^b	0.99	0.96 to 1.02	0.94	0.91 to 0.97	1.12	1.04 to 1.21
Rural community ^c	1.50	1.04 to 2.16	1.23	0.77 to 1.85	3.28	1.46 to 7.36
Face-to-face assessments with patients						
Exposure to face-to-face assessments with patients	1.70	1.60 to 1.81	1.66	1.53 to 1.79	2.12	1.86 to 2.41
Time ^b	0.90	0.86 to 0.93	0.86	0.82 to 0.89	1.00	0.93 to 1.08
Rural community ^c	2.09	1.21 to 3.62	1.68	0.91 to 3.07	2.86	1.18 to 6.94
Resource and referral encounters						
Exposure to resource and referral encounter type	1.05	1.05 to 1.06	1.06	1.05 to 1.07	1.07	1.05 to 1.09
Time ^b	0.93	0.90 to 0.96	0.88	0.84 to 0.91	1.10	1.01 to 1.19
Rural community ^c	3.89	2.17 to 6.95	3.54	1.91 to 6.57	7.23	2.47 to 21.15

IRR = Incidence Rate Ratio, CI = Confidence Interval

^aModels adjusted for rural community and time elapsed only, in addition to the exposure. Univariate analyses examined effects of clinician type, discipline, year of enrollment, practice size, and # of practice births.

^bTime is measured by year, where year 1 = 7/2014-6/2015. Exposure to any encounter type is a rate, comprised of the count of MCPAP for Moms encounters annually.

^cRural community is binary (yes/no); based on Massachusetts census data.

Longitudinal negative binomial regression models were used to estimate the adjusted models. Beta coefficients generated from the models were exponentiated into IRRs and 95% CIs. They can be interpreted as the estimated rate ratio for a one unit increase in the exposure count. For example: when accounting for elapsed time and presence in a rural community, for every increase in one interaction (of any type) a clinician has with the MCPAP for Moms program, the rate of “clinician treats” goes up by a factor of 1.06 (rate of their encounters that end with “clinician treats” goes up by 1.06).

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

Table 4.4: Characteristics of exploratory GBTM-based clinician sub-groups, based on MCPAP for Moms utilization data

Characteristic	Low and stable utilizers (n=289)	Moderate and stable utilizers (n=59)	High and increasing utilizers (n=14)
Professional credentials*			
<i>Physician</i>	243 (77.9)	55 (17.6)	14 (4.5)
<i>NP/PA</i>	45 (93.8)	3 (6.3)	0
Specialty/discipline***			
<i>Obstetrics/Gynecology</i>	224 (81.5)	48 (17.5)	3 (1.1)
<i>Family Medicine</i>	49 (92.5)	2 (3.8)	2 (3.8)
<i>Internal Medicine</i>	2 (33.3)	2 (33.3)	2 (33.3)
<i>Psychiatry</i>	4 (33.3)	3 (25.0)	2 (41.7)
<i>Pediatrics</i>	4 (44.4)	3 (33.3)	2 (22.2)
Year of enrollment***			
<i>2014</i>	156 (72.6)	45 (20.9)	14 (6.5)
<i>2015</i>	133 (90.5)	14 (9.5)	0
Region of Massachusetts***			
<i>Boston-area</i>	58 (89.2)	7 (10.8)	0
<i>Central</i>	115 (78.2)	26 (17.7)	6 (4.1)
<i>Western</i>	71 (81.6)	15 (17.2)	1 (1.2)
<i>Metro-west</i>	13 (65.0)	2 (10.0)	5 (25.0)
<i>Southeast</i>	10 (71.4)	3 (21.4)	1 (7.1)
<i>Northeast</i>	8 (57.1)	5 (35.7)	1 (7.1)
Average # annual encounters (mean, SD)			
<i>Year 1 (7/2014 – 6/2015)</i>	3.1 (3.2)	10.6 (9.1)	26.6 (28.8)
<i>Year 2 (7/2015 – 6/2016)</i>	3.8 (4.1)	11.6 (10.0)	30.2 (16.9)
<i>Year 3 (7/2016 – 6/2017)</i>	3.9 (4.3)	11.4 (11.9)	22.9 (12.5)
<i>Year 4 (7/2017 – 6/2018)</i>	3.7 (3.6)	11.9 (15.6)	28.4 (21.8)
<i>Year 5 (7/2018 – 6/2019)</i>	4.4 (4.6)	14.3 (18.1)	28.5 (20.7)
<i>Year 6 (7/2019 – 6/2020)</i>	4.3 (4.1)	11.6 (15.1)	25.1 (17.2)
Outcome comparisons^a			
<i>Clinician treats</i>	Reference	IRR = 2.8 [2.3 to 3.3]	IRR = 11.3 [5.4 to 23.8]
<i>Clinician treats, unipolar depressive diagnoses</i>	Reference	IRR = 3.0 [2.5 to 3.7]	IRR = 11.3 [5.0 to 25.2]

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

<i>Clinician treats, bipolar-spectrum diagnoses</i>	Reference	IRR = 1.8 [1.3 to 2.6]	IRR = 13.5 [4.2 – 43.2]
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Data from a subset of clinicians that enrolled in the first calendar year of the program (year 1 – 7/2014 – 6/2015) so as to minimize missing data. Clinicians were assigned to the trajectory group with which they had the highest posterior probability of belonging to, according to the identified GBTM model. Trajectories were built off of phone consultations with a calling clinician encounters, given that these are thought to be more predictive of clinician behaviors and represents a substantial portion of the encounter types overall.

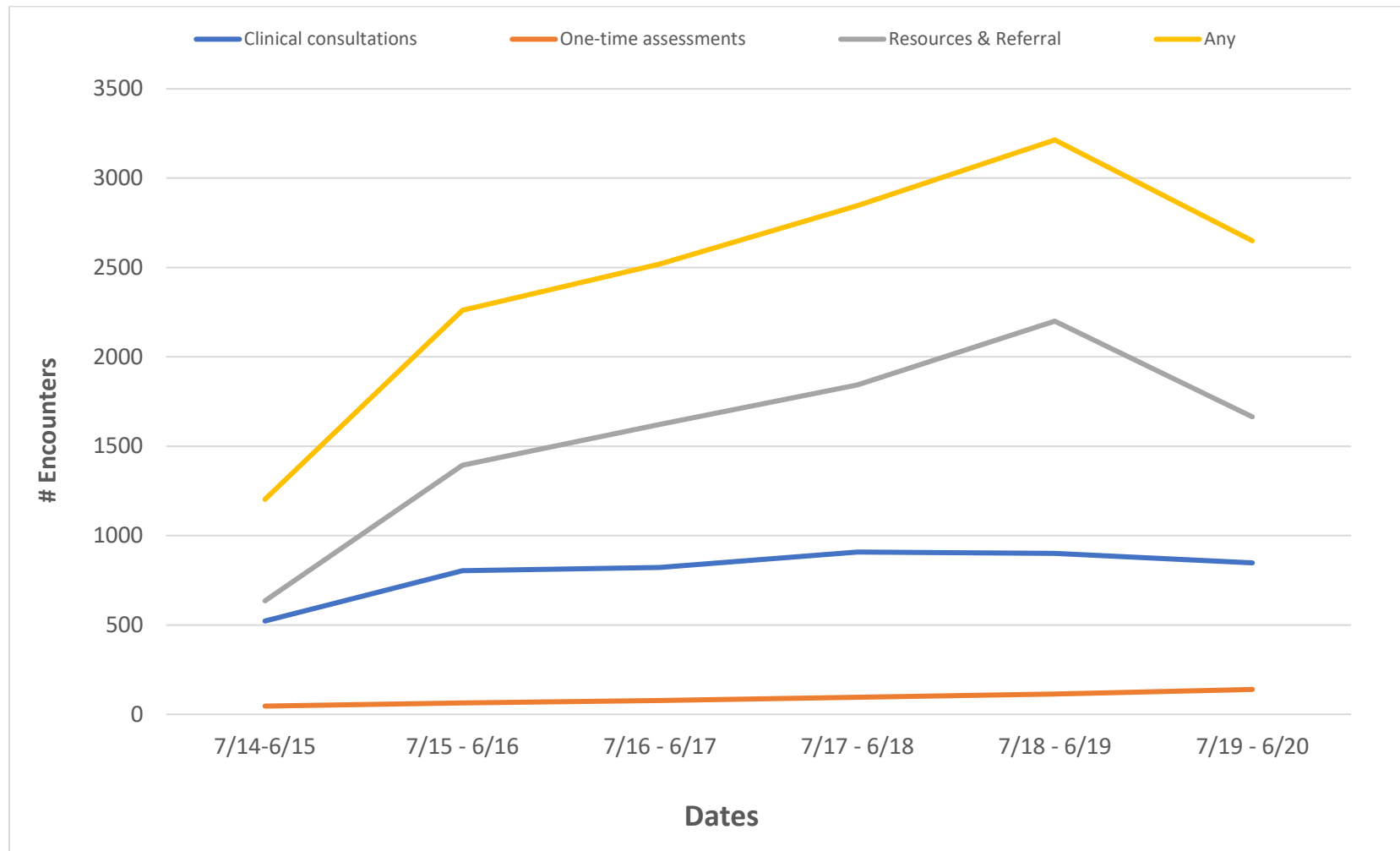
^aAdjusted for time elapsed (year) and rural community (yes/no)

*Differences between groups were significant (notations: * $p < 0.05$; *** $p < 0.001$)*

Missing data: professional credentials (2); specialty/discipline (7)

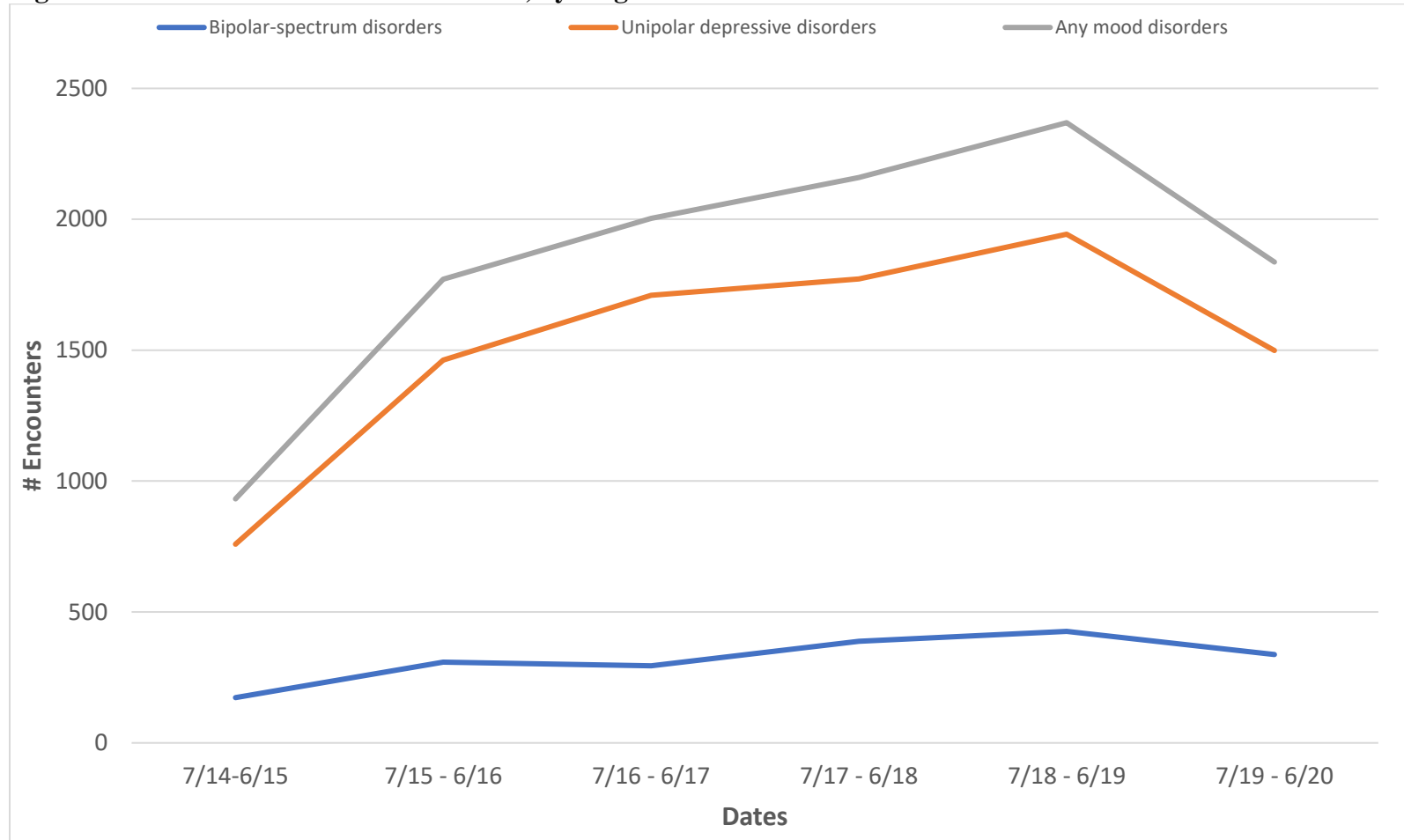
CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

Figure 4.1 – MCPAP for Moms encounters, by type



CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

Figure 4.2 – MCPAP for Moms encounters, by diagnosis discussed in encounter



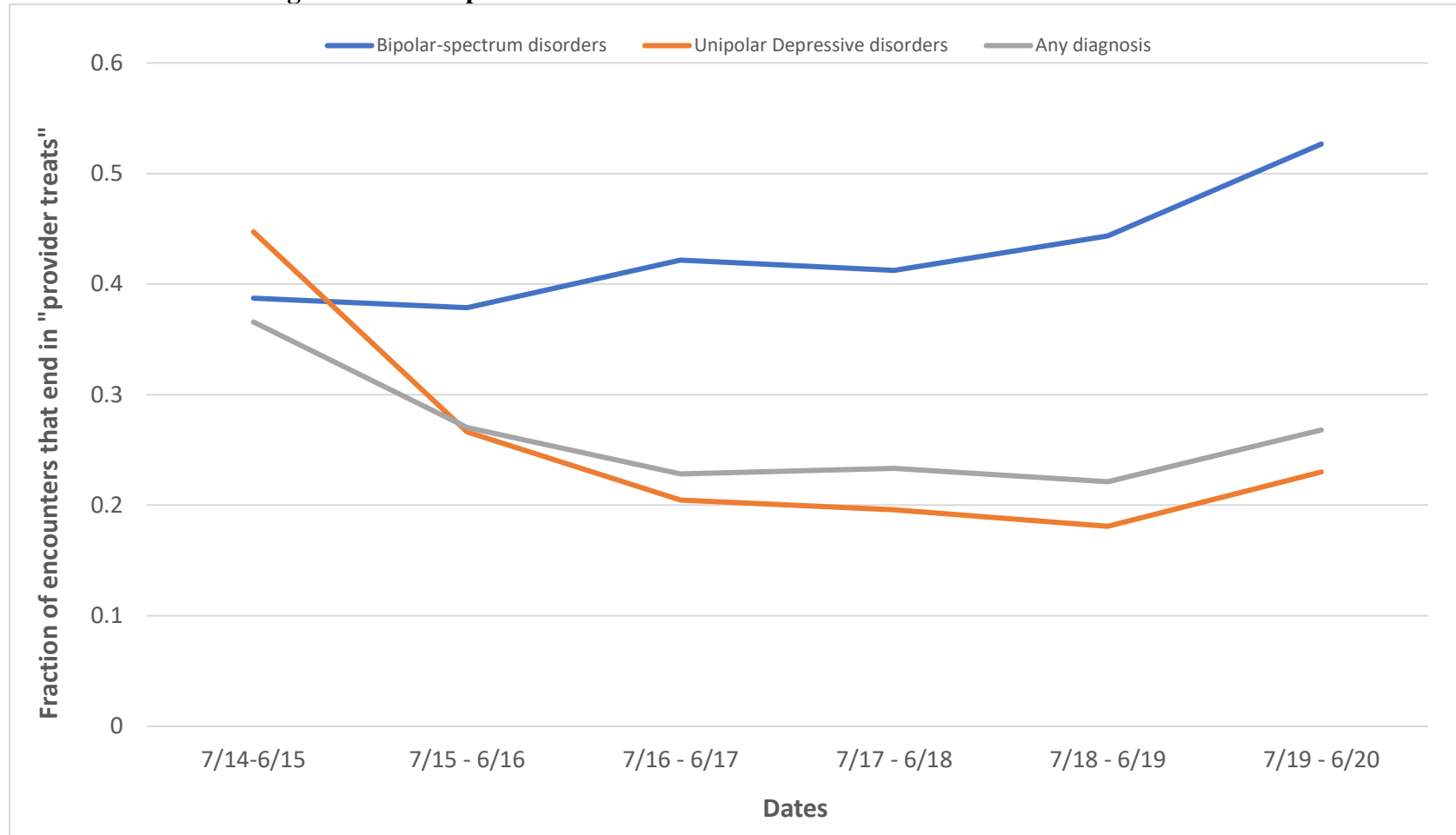
Bipolar-spectrum disorders includes: BDI, BDII, BD unspecified, substance-induced BD

Unipolar depression includes: MDD, dysthymia, unspecified depression, substance-induced depression

Any Dx includes: bipolar-spectrum and unipolar depression diagnoses, as well as anxiety disorders (GAD, PD, unspecified anxiety), borderline personality disorder, psychotic disorders (SZ, SZA, unspecified psychosis), OCD, Adjustment disorders, PTSD, unspecified trauma, ADHD, Complicated grief, eating disorders, disruptive mood disorders, and other diagnoses

CHAPTER IV: IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER

Figure 4.3 – For all encounters pertaining to bipolar-spectrum disorders or unipolar depressive disorders, the fraction of those encounters for each diagnosis that the provider will treat



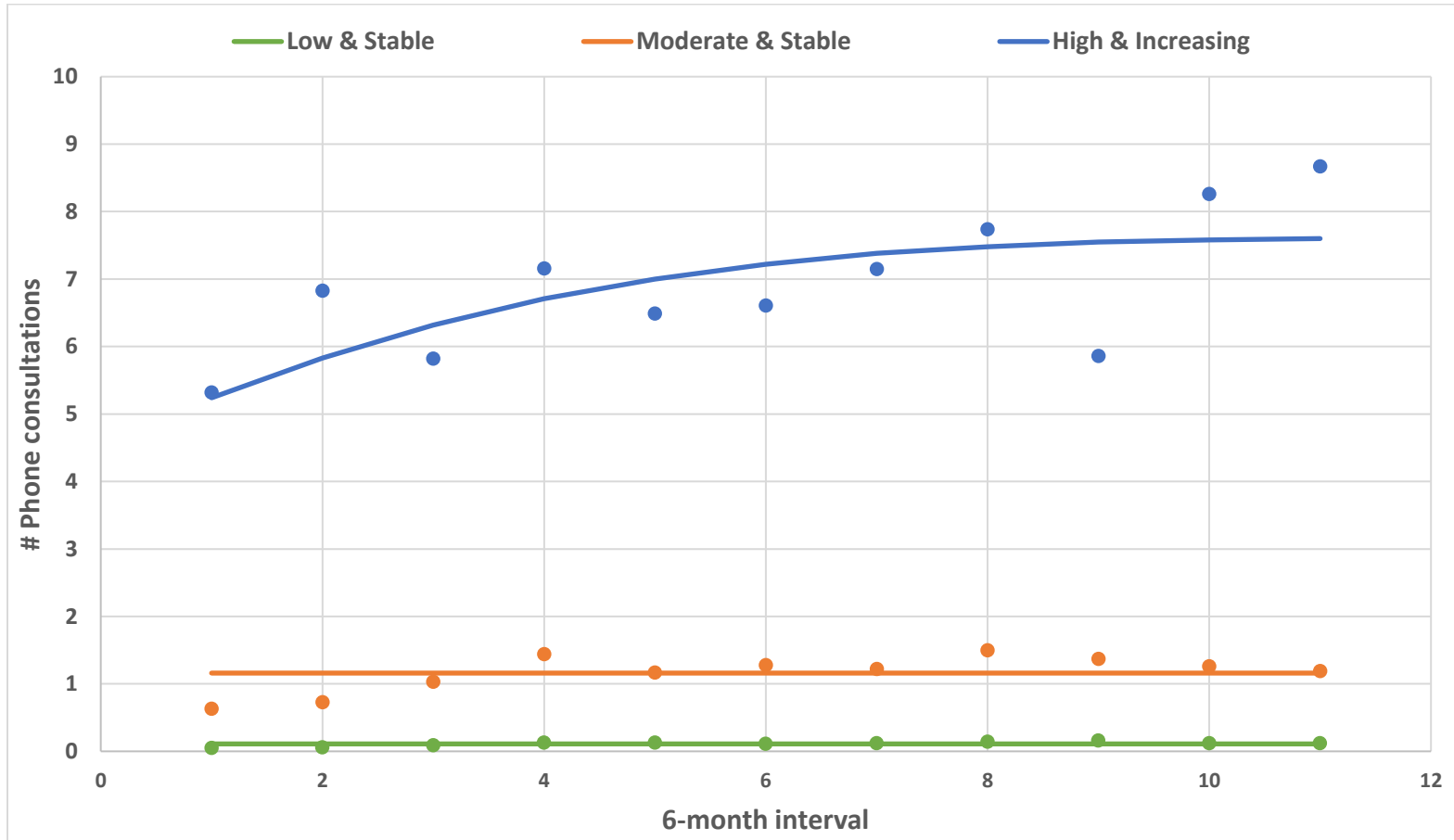
“Provider treats” outcomes includes the following encounter outcomes: back to provider, face-to-face consultation, bridge pharmacotherapy treatment

Bipolar-spectrum disorders includes: BDI, BDII, BD unspecified, substance-induced BD

Unipolar depression includes: MDD, dysthymia, unspecified depression, substance-induced depression

Any Dx includes: bipolar-spectrum and unipolar depression diagnoses, as well as anxiety disorders (GAD, PD, unspecified anxiety), borderline personality disorder, psychotic disorders (SZ, SZA, unspecified psychosis), OCD, Adjustment disorders, PTSD, unspecified trauma, ADHD, Complicated grief, eating disorders, disruptive mood disorders, and other diagnoses

Figure 4.4 – Exploratory group-based trajectory modeling of clinician utilization patterns, based on MCPAP for Moms data



Data points represent the actual utilization values, based on trajectory group. Connected lines represent the estimated trajectories for the group, based on the model.

**CHAPTER V:
DISCUSSION AND CONCLUSIONS**

Review of Purpose and Specific Aims

The intention of this dissertation research was to provide a foundational understanding of the prevalence of bipolar disorder (BD) in the perinatal period, gaps in mental healthcare for individuals with BD, and identify healthcare system-based solutions to address said gaps. Specifically, this research was designed to highlight the importance of addressing BD in the perinatal period and describe and evaluate models and methodologies which may be used to connect perinatal patients with BD to mental healthcare. Given this intent, this work was driven by the following questions:

AIM 1. Based on peer-reviewed literature, what is the estimated overall prevalence of BD and bipolar-spectrum mood episodes in pregnant and postpartum individuals?

Answering this question included the following:

- a) Identifying and describing studies in the peer-reviewed literature that measured BD or bipolar-spectrum mood episodes in pregnant and postpartum patients,
- b) Estimating the pooled prevalence of BD in women in the perinatal period, with and without a known psychiatric illness, and
- c) Estimating the pooled prevalence of bipolar-spectrum mood episodes of women in the perinatal period, with and without a known

CHAPTER V: DISCUSSION & CONCLUSIONS

psychiatric illness, as well as the timing at which they occur (pregnancy versus postpartum).

AIM 2. What are the attitudes of front-line, obstetric professionals towards incorporating BD into their efforts to provide comprehensive care? What are their perceived barriers and facilitators to managing BD in the obstetric setting? How might MCPAP for Moms and others Perinatal Psychiatry Access Programs like it help or hinder the integration of BD management into the obstetric setting? Answering these questions included the following:

- a) Eliciting the attitudes and experiences of obstetric professionals towards screening, assessing, treating, and following patients with BD,
- b) Identifying qualitative themes based on obstetric professional responses and categorizing them into facilitators, barriers, and recommended solutions for the future, and
- c) Evaluating how identified themes may compare based on exposure (or lack thereof) to MCPAP for Moms.

AIM 3. How does MCPAP for Moms influence the rates at which clinicians treat patients with perinatal mood and anxiety disorders, including that of BD? How does it affect the level of diagnostic complexity of the mental health conditions that front-line clinicians are able to treat? Do types of utilization (i.e., use of different types of MCPAP for Moms

CHAPTER V: DISCUSSION & CONCLUSIONS

encounters) influence these outcomes? Answering these questions included the following:

- a) Examining and describing the MCPAP for Moms utilization trends since the program's first encounter (2014),
- b) Discerning longitudinal changes in utilization and associated clinician rates of treatment, and
- c) Exploring whether differential clinician utilization patterns exist based on factors like demographics, and whether this is predictive of rates of clinician treatment and complexity of illnesses they are able to treat (BD versus unipolar depression).

Overall Summary of Results

Based on a meta-analysis of peer-reviewed literature, this dissertation helped to establish that the perinatal period is associated with high rates of bipolar-spectrum mood episodes. BD occurs in 2.6% of perinatal women, where 20.1% of women without a psychiatric history and 54.9% in women with a prior BD diagnosis have a bipolar-spectrum mood episode (including depressed, hypomanic/manic, or mixed episodes) in the perinatal period. Though it is well-known that many women experience depressive episodes isolated to the perinatal period, this work helped to amplify the fact that women without BD are also experiencing manic/hypomanic and mixed episodes in this time.

CHAPTER V: DISCUSSION & CONCLUSIONS

The relative prevalence of bipolar-spectrum mood episodes in the perinatal period, among other perinatal mood and anxiety disorders, combined with the scarcity of mental health resources has necessitated the creation of other solutions to address the gaps in mental healthcare. Included amongst these are Perinatal Psychiatry Access Programs, which aim to help front-line professionals provide mental healthcare to their perinatal patients directly and to connect them to other available psychiatric resources. Front-line professionals like obstetric clinicians have been identified as key medical professionals poised to help perinatal patients access mental healthcare. However, it has been unclear if, even with the help of an Access Program, front-line professionals will be able to address the complex needs of illnesses like BD. Thus, we conducted focus groups with obstetric professionals to understand their experiences with and perspectives on addressing BD in the obstetric setting. We discovered that, though several barriers do exist, obstetric professionals will exposure to an Access Program (here, MCPAP for Moms) can be made to feel comfortable in treating patients with BD. Indeed, they recommend it as part of a solution to help other clinicians.

We also found that utilization of an Access Program (again, MCPAP for Moms) helps obstetric clinicians directly treat their perinatal patients with complex illnesses like BD. As part of their mission to enable front-line professionals to address the mental health needs of their perinatal patients, Access Programs offer different types of consultations to clinicians that tailor their education to the clinical scenario as needed. Using longitudinal negative binomial models, we analyzed MCPAP for Moms' clinical encounter data to determine if increased utilization of these consultative services

CHAPTER V: DISCUSSION & CONCLUSIONS

influenced clinicians' ability to treat their patients with unipolar depression and BD with appropriate pharmacotherapies. Overall, increased utilization was associated with clinicians providing mental healthcare to their patients at greater rates. In particular, increased utilization of services that included one-on-one clinical decision-making education (i.e., phone consultations with a calling clinician and face-to-face consultations with a patient) were associated with significantly greater rates of treatment by the clinician than resource and referral-based utilization. After a face-to-face consultation, front-line clinicians were most able to provide direct mental healthcare to their patients with BD, increasing treatment rates by a factor of 2.12 (95% CI: 1.86 to 2.41). These data are important because they provide evidence for the Access Program model and help us to understand their mechanisms of action.

In sum, this dissertation demonstrated that BD is relatively common in perinatal individuals, thus highlighting the importance of filling gaps in mental healthcare. We found that front-line clinicians want to help their patients with BD but may not know how to do so. MCPAP for Moms and other Access Programs may be useful in assisting these clinicians to care for their patients with BD.

Summary of Results by Specific Aim

AIM 1: In Aim 1, we conducted a systematic review of the literature as well as a meta-analysis of a subset of relevant articles using random-effects models to estimate the prevalence of BD in perinatal individuals and of bipolar-spectrum mood episodes in

CHAPTER V: DISCUSSION & CONCLUSIONS

pregnancy and the postpartum period. After examining the peer reviewed literature through March 2020, we found 22 articles that enumerated rates of BD and/or bipolar-spectrum mood episodes in perinatal individuals; 12 of the 22 had sufficient data for estimating pooled prevalences. Most studies used validated diagnostic instruments to estimate rates of BD (77.3%) and less than one-third used a validated screening tools to estimate rates of women suspected to have the diagnosis (31.8%). When comparing prevalence rates reported by the included studies, estimates were higher among those that used screening tools (3.3%-25.6%) versus diagnostic (0-2.9%).

Pooled prevalences from the meta-analyses estimated the rates of BD in perinatal women without a psychiatric history to be around 2.6% (95% CI:1.2-4.5%). Pooled prevalences of bipolar-spectrum mood episodes were found to be 20.1% in women without a psychiatric history and 54.9% in women with a history of BD. The timing of mood episodes was fairly equally spread across pregnancy and the postpartum period. A few studies explicitly compared the rates of depressive episodes in women with evidence of unipolar vs. bipolar depression; in these, women with evidence of BD were 6.5-times (95% CI: 2.0-20.8%) as likely to have a depressive episode than those with evidence of unipolar depression.

A manuscript containing the results from AIM 1 are currently under review in the *Journal of British Psychiatry* (submitted February 2021).

CHAPTER V: DISCUSSION & CONCLUSIONS

AIM 2: In Aim 2, we employed a mixed method design to combine quantitative data with qualitative context. This was done in order to understand obstetric professionals' attitudes towards and experiences with addressing BD in the obstetric setting. We grouped and analyzed qualitative data from focus groups with obstetric professionals using a modified grounded theory. From these groups, identified barriers included: (1) the lack of formal education about BD in the context of perinatal patients; (2) lack of mental health professionals and resources available in the community as well as the difficulties in care coordination; (3) difficulties in screening for and the assessment of BD, particularly in places without the support of Access Programs; and (4) continued misinformation and stigma about pharmacotherapies for BD during the perinatal period. Relevant facilitators identified by obstetric professionals included that: (1) Access Programs (specifically, MCPAP for Moms) can help clinicians implement screening for BD and provide reassurance in assessment self-efficacy; (2) the support of a trained clinician or Access Program can help empower obstetric clinicians to provide bridge treatment to patients with BD; and (3) Access Programs may be indirectly increasing patient willingness to be treated for BD in the obstetric setting. Recommendations for the future focused on continuing education for all professionals that care for perinatal individuals and mental health conditions (including obstetric and psychiatric clinicians) as well as the use of integrated care and innovative care delivery models, like Access Programs.

In analyses comparing reported thematic prevalence by presence or absence of exposure to MCPAP for Moms, obstetric professionals with exposure to MCPAP for

CHAPTER V: DISCUSSION & CONCLUSIONS

Moms were significantly more likely to report facilitators to caring for perinatal patients with BD (42.3% in those with exposure, 15.4% in those without, $p < 0.001$); those without exposure were more likely to make recommendations for how to improve their ability to care for these patients (39.4% in those without exposure, 20.6% in those with exposure, $p = 0.004$).

AIM 3: In Aim 3, we used longitudinal and group-based trajectory modeling to examine how utilization of the MCPAP for Moms program impacted the rates at which clinicians treated their patients with BD. We analyzed MCPAP for Moms clinical encounter data by examining if increased rates of annual clinician utilization overall and by encounter type (phone consultation with a calling clinician, face-to-face consultation with a patient, and resource and referral encounter) increased clinician rates of providing direct patient mental healthcare. This was further broken down by treatment rates overall and by diagnosis (BD and unipolar depression), to determine if increased utilization would help clinicians treat more complex illnesses like BD. Overall, increased utilization was predictive of greater rates of treatment by the calling clinician. Phone and face-to-face consultations exhibited the strongest effects on clinician treatment rates: in treating any diagnosis, phone consultations predicted a 1.30-fold increase in treatment (95% CI: 1.28 to 1.33) and face-to-face consultations a 1.70-fold increase (95% CI: 1.60 to 1.81), as compared to a 1.05-fold increase (95% CI: 1.05 to 1.06) predicted from resource and referral encounters. Face-to-face assessments appeared to have the strongest effects in

CHAPTER V: DISCUSSION & CONCLUSIONS

increasing clinician treatment rates for BD: rates of clinician treatment for BD after a face-to-face assessment increased significantly more than any utilization and treatment effect combination (IRR = 2.12, 95% CI: 1.86 to 2.41). Clinicians in rural communities also tended to have increased treatment rates with increased utilization of MCPAP for Moms. Thus, these data suggest that clinicians that treat perinatal patients can be helped to address BD in this population, with increased utilization of Access Programs.

Additionally, based on phone consultation utilization data, three distinct sub-groups of clinicians that use MCPAP for Moms emerged from the data. Two of the groups exhibited relatively stable and low utilization across all of the years sampled, averaging 0-1.5 phone consultations/year. The third group exhibited an increasing and high utilization pattern, increasing from an average of about 7 phone consultations in 2014 to over 8 in 2020. This high and increasing group also exhibited significantly higher rates of providing direct patient mental healthcare after utilization, when compared to the first two. Compared to the lowest utilization group (reference), the moderate and stable group had a 1.8-fold increase in treating patients with BD with use of phone consultations (95% CI: 1.3 to 2.6); the high and increasing group had a 13.5-fold increase in treating patients with BD with use of phone consultations (95% CI: 4.2 to 43.2). These data suggest that identification of the “type” of Access Program utilizer can help to understand how their capacity to treat BD will change over time.

Implications of this work

CHAPTER V: DISCUSSION & CONCLUSIONS

This dissertation research is meant to build a foundation for future research and, ultimately, aims to help connect perinatal individuals with BD to adequate mental healthcare. In particular, this work helps to establish early evidence for the ability of Access Programs to meet these needs. Certainly more substantiation of their effectiveness is required moving forward, particularly with regard to the generalizability of these data. However, these findings that clinicians are willing and able to provide mental healthcare for patients with BD with the assistance of MCPAP for Moms and increase their rates of treatment for BD with utilization of the program are promising.

Several major takeaways emerge from this work. First is that perinatal individuals may be at higher risk for BD than previously estimated. Thus, it should be an important consideration for front-line clinicians when caring for perinatal individuals with or at risk for mood episodes or exacerbations during this time. Our analyses suggest that the rates of mood episodes are quite high, especially for patients with a prior BD diagnosis, and that careful management is critical. We found evidence that some perinatal women experience isolated manic, hypomanic, and mixed episodes as well as diagnostic conversions from unipolar depression to BD. These phenomena are considerably less understood than depressive episodes in the perinatal period. It important that future work examines how detection and management may need to be tailored for the perinatal population with isolated bipolar-spectrum mood episodes.

A second major takeaway is that we found is that that educational efforts and reform are required for professionals at all levels and across medical specialties regarding

CHAPTER V: DISCUSSION & CONCLUSIONS

caring for perinatal individuals with BD. This includes more traditional educational venues, such as curricula around perinatal mental health and treatments for trainees. Luckily, many of these have been developed in recent years,^{130,131} so efforts focusing on increasing their spread are important. However, the training gleaned via hands-on experiences in real clinical situations, with tailored recommendations and feedback from Access Programs' consultation psychiatrists, is what appears to be effective. Our data show that the one-on-one training provided by the consulting psychiatrists in MCPAP for Moms to calling clinicians specifically their cases are associated with the greatest rates of treatment, even in complex illnesses like BD.

The final and most salient implication of this work involves Perinatal Psychiatry Access Programs and their future. Our work identified that clinicians across the country are ready and willing to address perinatal BD with appropriate support. Those with and without prior experience with Access Programs recognize the need for BD to be included in comprehensive obstetric care and are eager to determine how to do so in order to provide the best possible care for their patients. Access Programs seem palatable to those without exposure to them and are perceived as useful and well utilized by those that do have experience with them. Further, this dissertation work helps to establish the effectiveness of repeated utilization of Access Programs in increasing a clinician's ability to treat patients. This extends even to patients with complex illness like BD.

This dissertation work and accompanying implications come at a critical time, as Access Programs are emerging across the country and even internationally.⁶⁹ These

CHAPTER V: DISCUSSION & CONCLUSIONS

nascent programs are in the stages of determining where to allocate resources, which services to offer, and what clinicians may want and need the most to treat their patients. Concrete lessons can be translated from this work to inform implementation decisions by Access Programs. We have shown evidence that clinicians want these programs to include services for BD and that it should be included amongst the perinatal mental health conditions of focus within the program. MCPAP for Moms has helped front-line medical professionals like obstetric physicians, who do not normally treat BD, provide mental healthcare for their perinatal patients with BD. This directly increases access to care. We have also shown that increased utilization does enable clinicians to provide mental healthcare for their perinatal patients with BD more independently. And, we have shown that some services (like phone and face-to-face consultations) may be more effective in increasing clinician capacity. These tend to be more resource intensive services but appear to be worth the investment.

Strengths and Limitations

The work produced from this dissertation has both strengths and limitations, which should be considered when interpreting the results. Strengths include the novel contributions to the field in an understudied area and population. The use of multiple methodologies and mixed-method design provided rich qualitative and quantitative insights as well as many future avenues of inquiry. Additionally, as discussed above, this work contributes early evidence to the emerging field of Perinatal Psychiatry Access

CHAPTER V: DISCUSSION & CONCLUSIONS

Programs, an area that is growing rapidly but whose mechanisms of effectiveness lack formal understanding.

Conversely, because this is a field with limited peer-reviewed evidence, one of the major limitations of AIM 1 was the small sample size for the meta-analysis and heterogeneity of study design. This limits robustness of the pooled prevalence estimates and we suggest caution with their interpretation. We can be reassured by the fact the majority of included studies were of high quality and used validated diagnostic tools to estimate rates of BD. Still, it will be important to follow-up and reassess these estimates in the future.

Similarly, though our data from clinician participants in AIM 2 was nationally representative, it was also from a limited, small sample. There was a high degree of homogeneity of participants within each group, though there was a disproportionate breakdown of professional types. Qualitative work relies less on sample size than does quantitative, making this less of a limitation;¹¹⁸ still, it will be important to gather more qualitative and quantitative data from front-line caregivers about this topic area. Future work should also focus on surveying more racially, ethnically, and professionally diverse samples, to ensure that a broad range of experiences and viewpoints are captured. Additionally, our conceptualization of “exposure” to Access Programs in AIM 2 was limited to one program and state. More quantitative efforts to explore the effects of Access Program exposure on experiences and attitudes should be undertaken in the future.

CHAPTER V: DISCUSSION & CONCLUSIONS

Our longitudinal analyses of Access Program utilization and effects also stem from one clinical program that is unique in many ways. It will be imperative to replicate this work in other settings to ensure that we fully understand how contextual factors contribute to the implementation of Access Programs. Additionally, though our findings suggest that increased utilization increases clinician treatment, we do not know if this translates to improved patient outcomes. This is difficult to ascertain using the Access Program model and data, as these are programs focused on clinicians. However, it will be necessary to continue this work in order to build a base for Access Program effectiveness.

Future research

This work has illuminated several worthy avenues of future inquiry. First, it is important to dedicate more research generally to the study of BD in the perinatal period. In our systematic review in AIM 1, we were forced to exclude 25 studies from our review because they did not address BD, despite having the data available to do so. This would have more than doubled our sample size, and doubtlessly increased the robustness of our effect estimates. Research on BD in the perinatal period has not been prioritized in studies in the ways that perinatal depression or anxiety have been, and future work should try to rectify this.⁶

Second, prospective efforts should prioritize inclusiveness and emphasize a health equity lens. For example, there are very few studies that examine the intersection of race/ethnicity and BD in the perinatal period. Those that do have found that women of

CHAPTER V: DISCUSSION & CONCLUSIONS

color are at increased risk of mood episodes (refs). Given that there is currently a public health crisis surrounding maternal mortality in Black women, it is essential that future work explicitly focuses on these issues. Another example is that individuals with BD often have other psychosocial issues that contribute to health inequities, such as comorbid substance use disorders and a history of trauma (refs). These factors only increase the barriers to mental health care that perinatal individuals with BD face. In the last example we note all of the studies referenced in this work looked at cis-gendered women only or did not comment if they did otherwise. It is likely that perinatal individuals that do not identify as women experience greater barriers to care. This is another group that needs to be recognized and emphasized more in all future perinatal research.

Finally, the aforementioned spread of the Access Program model provides many ideal avenues for the next steps of this research. Evaluating and replicating some of these analyses in other areas and with other programs will help us to understand the level of generalizability of this work. Additionally, acknowledging these future research opportunities early will help us to ensure that pertinent data is collected and allow for collaboration, data sharing, and comparison across programs.

Conclusions

Perinatal mental health and substance use disorders are one of the leading obstetric complications in the US and are a preventable cause of perinatal morbidity and mortality. Bipolar disorder is among these and is most often overlooked, resulting in

CHAPTER V: DISCUSSION & CONCLUSIONS

serious consequences if inadequately treated. Because structural barriers to accessing mental healthcare are common, many perinatal individuals with BD end up being under- or inappropriately treated. Given this, obstetric clinicians and other front-line caregivers for perinatal individuals are increasingly being asked to take a leading role in caring for BD patients. Though barriers exist that would limit obstetric clinician ability, comfort, and effectiveness in caring for their patients with BD, facilitators like Perinatal Psychiatry Access Programs are emerging as a solution to help make this role acceptable, effective, and fulfilling to clinicians. The data from this dissertation provide compelling evidence in support of the effectiveness of the Access Program model in helping clinicians treat their perinatal patients, even those with complex illnesses like bipolar disorder. More work is necessary to further elucidate how best to help tailor the Access Program model to other states and clinical systems. However, overall, this dissertation work contributes to the growing body of evidence in support for the Access Program model, in order to help front-line clinicians care for their perinatal patients, including those with bipolar disorder.

APPENDICES

APPENDICES:

SUPPLEMENTAL FILES BY CHAPTER

- **Chapter II (prevalence of bipolar disorder in perinatal women) Appendix - Supplemental File: p. 140 – 147**
- **Chapter III (perspectives on addressing & treating bipolar disorder) Appendix – Supplemental File: p. 148 – 165**
- **Chapter IV (improving clinician capacity to address bipolar disorder) Appendix – Supplemental File: p. 166 – 172**

CHAPTER II (PREVALENCE OF BD IN PERINATAL WOMEN) APPENDIX

CHAPTER II (PREVALENCE OF BIPOLAR DISORDER IN PERINATAL WOMEN) APPENDIX

Supplemental File:

Supplemental Material for *Chapter II: Prevalence of bipolar disorder in perinatal women: a systematic review and meta-analysis*

CONTENTS

- **SUPPLEMENTAL TABLE S2.1** – Search string(s)/strategy
- **SUPPLEMENTAL TABLE S2.2** – Modifications to the Downs & Black Checklist
- **SUPPLEMENTAL TABLE S2.3** – Summary of studies included in the systematic review

CHAPTER II (PREVALENCE OF BD IN PERINATAL WOMEN) APPENDIX

SUPPLEMENTAL TABLE S2.1 – Search string(s)/strategy

Database: PubMed (1,110 results)
<p><u>Search:</u> ("Bipolar Disorder"[Mesh] OR "bipolar disorder"[All Fields] OR "manic depression"[All Fields] OR "manic depressive"[All Fields] OR "mood disorder"[All Fields] OR "affective disorder"[All Fields]) AND ("Perinatal Care"[Mesh] OR perinatal[All Fields] OR "Postnatal Care"[Mesh] OR postnatal[All Fields] OR "Postpartum Period"[Mesh] OR ("postpartum period"[MeSH Terms] OR ("postpartum"[All Fields] AND "period"[All Fields]) OR "postpartum period"[All Fields] OR "postpartum"[All Fields]) OR obstetric[All Fields] OR ("parturition"[MeSH Terms] OR "parturition"[All Fields] OR "delivery, obstetric"[MeSH Terms] OR ("delivery"[All Fields] AND "obstetric"[All Fields]) OR "obstetric delivery"[All Fields]) OR "Pregnancy"[Mesh] OR ("pregnancy"[MeSH Terms] OR "pregnancy"[All Fields]) OR "Prenatal Care"[Mesh] OR prenatal[All Fields] OR antepartum[All Fields] OR ("postpartum period"[MeSH Terms] OR ("postpartum"[All Fields] AND "period"[All Fields]) OR "postpartum period"[All Fields] OR "puerperal"[All Fields]) OR ("postpartum period"[MeSH Terms] OR ("postpartum"[All Fields] AND "period"[All Fields]) OR "postpartum period"[All Fields] OR "puerperium"[All Fields])) AND (("mass screening"[MeSH Terms] OR ("mass"[All Fields] AND "screening"[All Fields]) OR "mass screening"[All Fields] OR "screen"[All Fields] OR "early detection of cancer"[MeSH Terms] OR ("early"[All Fields] AND "detection"[All Fields] AND "cancer"[All Fields]) OR "early detection of cancer"[All Fields] OR identify[All Fields] OR ("J Rehabil Assist Technol Eng"[Journal] OR "rate"[All Fields]) OR detect[All Fields] OR ("diagnosis"[MeSH Terms] OR "diagnosis"[All Fields] OR "diagnose"[All Fields]) OR "diagnosis"[Mesh] OR ("epidemiology"[Subheading] OR "epidemiology"[All Fields] OR "prevalence"[All Fields] OR "prevalence"[MeSH Terms]) OR ("epidemiology"[Subheading] OR "epidemiology"[All Fields] OR "incidence"[All Fields] OR "incidence"[MeSH Terms]))</p> <p><u>Sort by:</u> Most recent</p>
Database: Scopus (1,954 results)
<p><u>Search:</u> (TITLE-ABS-KEY ("Bipolar Disorder" [mesh]) OR TITLE-ABS-KEY ("bipolar disorder") OR TITLE-ABS-KEY ("manic depression") OR TITLE-ABS-KEY ("manic depressive") OR TITLE-ABS-KEY ("mood disorder") OR TITLE-ABS-KEY ("affective disorder")) AND (TITLE-ABS-KEY ("Perinatal Care" [mesh]) OR TITLE-ABS-KEY (perinatal) OR TITLE-ABS-KEY ("Postnatal Care" [mesh]) OR TITLE-ABS-KEY (postnatal) OR TITLE-ABS-KEY ("Postpartum Period" [mesh]) OR TITLE-ABS-KEY (postpartum) OR TITLE-ABS-KEY (obstetric) OR TITLE-ABS-KEY (parturition) OR TITLE-ABS-KEY ("Pregnancy" [mesh]) OR TITLE-ABS-KEY (pregnancy) OR TITLE-ABS-KEY ("Prenatal Care" [mesh]) OR TITLE-ABS-KEY (prenatal) OR TITLE-ABS-KEY (antepartum) OR TITLE-ABS-KEY (puerperal) OR TITLE-ABS-KEY (puerperium)) AND (TITLE-ABS-KEY (screen) OR TITLE-ABS-KEY (identify) OR TITLE-ABS-KEY (detect) OR TITLE-ABS-KEY (rate) OR TITLE-ABS-KEY (diagnose) OR TITLE-ABS-KEY (diagnosis) OR TITLE-ABS-KEY (prevalence) OR TITLE-ABS-KEY (incidence)) AND (LIMIT-TO (DOCTYPE , "ar") OR LIMIT-TO (DOCTYPE , "re") OR LIMIT-TO (DOCTYPE , "cp") OR LIMIT-TO (DOCTYPE , "ip")) AND (LIMIT-TO (LANGUAGE , "English"))</p>
Database: PsycINFO (389 results)
<p><u>Search (in title/abstract/key concepts categories:</u> (bipolar disorder OR manic depression OR manic depressive OR mood disorder OR affective disorder) AND (perinatal OR postnatal OR postpartum OR obstetric OR parturition OR pregnancy OR prenatal OR antepartum OR puerperal OR puerperium) AND (screen OR identify OR detect OR rate OR diagnose OR diagnosis OR prevalence OR incidence)</p>

CHAPTER II (PREVALENCE OF BD IN PERINATAL WOMEN) APPENDIX

<p style="text-align: center;">Database: Cochrane (231 results)</p>
<p><u>Search:</u> ("bipolar disorder" OR "manic depression" OR "manic depressive" OR "mood disorder" OR "affective disorder") AND (perinatal OR postnatal OR postpartum OR obstetric OR parturition OR pregnancy OR prenatal OR antepartum OR puerperal OR puerperium) AND (screen OR identify OR detect OR rate OR diagnose OR diagnosis OR prevalence OR incidence)</p>
<p style="text-align: center;">Database: CINAHL (127 results)</p>
<p><u>Search:</u> S1 AND S2 AND S3 S1) TI ("bipolar disorder" OR "manic depression" OR "manic depressive" OR "mood disorder" OR "affective disorder") OR AB ("bipolar disorder" OR "manic depression" OR "manic depressive" OR "mood disorder" OR "affective disorder") OR SU ("bipolar disorder" OR "manic depression" OR "manic depressive" OR "mood disorder" OR "affective disorder") S2) TI (perinatal OR postnatal OR postpartum OR obstetric OR parturition OR pregnancy OR prenatal OR antepartum OR puerperal OR puerperium) OR AB (perinatal OR postnatal OR postpartum OR obstetric OR parturition OR pregnancy OR prenatal OR antepartum OR puerperal OR puerperium) OR SU (perinatal OR postnatal OR postpartum OR obstetric OR parturition OR pregnancy OR prenatal OR antepartum OR puerperal OR puerperium) S3) TI (screen OR identify OR detect OR rate OR diagnose OR diagnosis OR prevalence OR incidence) OR AB (screen OR identify OR detect OR rate OR diagnose OR diagnosis OR prevalence OR incidence) OR SU (screen OR identify OR detect OR rate OR diagnose OR diagnosis OR prevalence OR incidence) <u>Sort by:</u> Newest <u>Limit to:</u> English, Peer reviewed, Research articles, Human</p>
<p style="text-align: center;">Database: Clinicaltrials.gov (241 results)</p>
<p><u>Search:</u> (bipolar disorder OR manic depression OR manic depressive OR mood disorder OR affective disorder) AND (perinatal OR postnatal OR postpartum OR obstetric OR pregnancy OR prenatal OR antepartum) AND (screen OR identify OR detect OR rate OR diagnose OR diagnosis OR prevalence OR incidence)</p>

CHAPTER II (PREVALENCE OF BD IN PERINATAL WOMEN) APPENDIX

SUPPLEMENTAL TABLE S2.2 – Modifications to the Downs & Black Checklist

Item #	Question	Included in this review
Reporting		
1	Is the hypothesis/aim/objective of the study clearly described?	Yes
2	Are the main outcomes to be measured clearly described in the Introduction or Methods section?	Yes
3	Are the characteristics of the patients included in the study clearly described?	Yes
4	Are the interventions of interest clearly described?	Yes
5	Are the distributions of principal confounders in each group of subjects to be compared clearly described?	Yes
6	Are the main findings of the study clearly described?	Yes
7	Does the study provide estimates of the random variability in the data for the main outcomes?	Yes
8	Have all important adverse events that may be a consequence of the intervention been reported?	Yes
9	Have the characteristics of patients lost to follow-up been described?	Yes
10	Have actual probability values been reported (e.g., 0.035 rather than <0.05) for the main outcomes except where the probability value is less than 0.001?	Yes
External validity		
11	Were the subjects asked to participate in the study representative of the entire population from which they were recruited?	No
12	Were those subjects who were prepared to participate representative of the entire population from which they were recruited?	No
13	Were the staff, places, and facilities where the patients were treated, representative of the treatment the majority of patients receive?	No
Internal validity - bias		
14	Was an attempt made to blind study subjects to the intervention they have received?	No
15	Was an attempt made to blind those measuring the main outcomes of the intervention?	No
16	If any of the results of the study were based on “data dredging”, was this made clear?	Yes
17	In trials and cohort studies, do the analyses adjust for different lengths of follow-up of patients, or in case-control studies, is the time period between the intervention and outcome the same for cases and controls?	Yes
18	Were the statistical tests used to assess the main outcomes appropriate?	Yes
19	Was compliance with the intervention/s reliable?	Yes
20	Were the main outcome measures used accurate (valid and reliable)?	Yes
Internal validity – confounding/selection bias		
21	Were the patients in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited from the same population?	Yes
22	Were study subjects in different intervention groups (trials and cohort studies) or were the cases and controls (case-control studies) recruited over the same period of time?	Yes
23	Were study subjects randomised to intervention groups?	No
24	Was the randomised intervention assignment concealed from both patients and health care staff until recruitment was complete and irrevocable?	No
25	Was there adequate adjustment for confounding in the analyses from which the main findings were drawn?	Yes

CHAPTER II (PREVALENCE OF BD IN PERINATAL WOMEN) APPENDIX

26	Were losses of patients to follow-up taken into account?	Yes
<i>Power</i>		
27	Did the study have sufficient power to detect a clinically important effect where the probability value for a difference being due to chance is less than 5%?	Yes

CHAPTER II (PREVALENCE OF BD IN PERINATAL WOMEN) APPENDIX

SUPPLEMENTAL TABLE S2.3– Summary of studies included in the systematic review

Article identifier	Location, time frame, & study design	Objective	Study sample	Downs & Black quality rating
Celik (2016) ¹⁰⁴	Location: Batman, Turkey Setting: Family medicine practice Time period: February 2016 Study design: Cross-sectional	To screen for postpartum depression and bipolar disorder and determine proportion of bipolarity and mixed depression	Sample size: 63 Age, years (mean, SD): 30.1 (5.2) Study participants: Postpartum women Pertinent inclusion criteria: none	76.9%
Clark (2015) ⁸⁶	Location: Pittsburgh, PA, USA Setting: Labor & delivery unit Time period: Oct 2011 – March 2012 Study design: Cross-sectional	To use the MDQ & EPDS to identify depression and history of hypomania/mania in postpartum women	Sample size: 1,279 Age: differed by group Study participants: Postpartum women Pertinent inclusion criteria: none	85.7%
Driscoll (2017) ⁹⁹	Location: Pittsburgh, PA, USA Setting: Specialized women's mental health center Time period : July 2006 – March 2011 Study design: Prospective	To explore course of bipolar disorder and impact of pharmacotherapy on symptoms, characterize depression and mania in perinatal period, and compare symptom levels of treated women to untreated women	Sample size: 159 Age, years (mean, SD): 26.3 (6.2) Study participants: Pregnant and postpartum women Pertinent inclusion criteria: Bipolar disorder diagnosis	85.7%
Dudek (2014) ⁸⁷	Location: Krakow & Tarnow, Poland Setting: Obstetric clinic Time period: February 2010 - April 2012 Study design: Cross-sectional	To investigate whether presumed postpartum depression with bipolar features differs from the unipolar postpartum depression	Sample size: 344 Age, years (mean, SD): 30.2 (4.3) Study participants: Postpartum women Pertinent inclusion criteria: No prior history of psychiatric illness or treatment	73.3%
Giardinelli (2012) ⁸⁸	Location: Florence, Italy Setting: Obstetric clinic Time period: April 2007 - April 2008 Study design: Prospective	To analyze prevalence of anxiety and mood disorders, risk factors, and sociodemographic features in perinatal women	Sample size: 590 Age, years (mean, SD): 34.3 (4.2) Study participants: Pregnant and postpartum women Pertinent inclusion criteria: none	64.3%
Jaeschke (2017) ⁸⁹	Location: Krakow & Tarnow, Poland Setting: Labor & delivery units Time period: Nov 2009 – Feb 2013 Study design: Cross-sectional	To analyze the prevalence, correlation, and associated characteristics of bipolar symptoms in women with or without postpartum depression	Sample size: 434 Age, years (mean, SD): 30.2 (4.3) Study participants: Postpartum women Pertinent inclusion criteria: No prior history of psychiatric illness	76.9%
Kim (2006) ⁹⁰	Location: Minneapolis, MN, USA Setting: Obstetric clinic Time period: Feb – Oct 2002 Study design: Cross-sectional	To assess prevalence of psychiatric illness in Spanish- and English-speaking obstetric patients with lower incomes in and examine associations between diagnoses and prenatal care utilization	Sample size: 154 Age, years (mean, SD): 25 (5.7) Study participants: Pregnant women Pertinent inclusion criteria: none	61.5%

CHAPTER II (PREVALENCE OF BD IN PERINATAL WOMEN) APPENDIX

Kimmel (2015) ¹⁰⁰	Location: Baltimore, MD, USA Setting: Mood disorders center Time period: not reported Study design: Prospective	To associate depression during pregnancy and use of medications, and clinical risk factors for postpartum depression	Sample size: 93 Age, years (mean, SD): 30.5 (6.2) Study participants: Pregnant and postpartum women Pertinent inclusion criteria: History of a mood disorder	71.4%
Kumar (2016) ⁹¹	Location: Mysore, India Setting: Labor & delivery unit Time period: Jun – Dec 2011 Study design: Cross-sectional	To assess psychiatric morbidity and correlates in postpartum women	Sample size: 152 Age, years (mean, SD): 23 (4.8) Study participants: Postpartum women Pertinent inclusion criteria: none	69.2%
Masters (2019) ⁶¹	Location: Multiple cities in MA, USA Setting: Obstetric clinics Time period: May 2016 – Jun 2018 Study design: Cross-sectional	To describe proportion of perinatal women who screen positive for bipolar disorder in the obstetric setting and associations with characteristics and healthcare utilization	Sample size: 574 Age, years (mean, SD): 31.5 (5.3) Study participants: Pregnant and postpartum women Pertinent inclusion criteria: none	85.7%
Pingo (2017) ⁹²	Location: Cape Town, South Africa Setting: Obstetric clinic Time period: Feb 2005 - July 2010 Study design: Prospective	To evaluate frequency and factors associated with probable postpartum hypomania and postpartum depression	Sample size: 57 Age, years (mean, SD): 25.1 (6.4) Study participants: Pregnant and postpartum women Pertinent inclusion criteria: none	60.0%
Pope (2013) ⁹³	Location: London, ON, Canada Setting: Obstetric clinic Time period: Jun 2005 - Mar 2010 Study design: Prospective	To explore prevalence of suicidal ideation in perinatal period in women with history of major depression or bipolar disorder II and associated characteristics	Sample size: 147 Age, years (mean, SD): 29.0 (5.5) Study participants: Pregnant and postpartum women Pertinent inclusion criteria: Mood disorder diagnosis (MDD or BDII)	71.4%
Robakis (2015) ⁹⁴	Location: Palo Alto, CA, USA Setting: Obstetric clinic Time period: Sept 2011 - March 2014 Study design: Prospective	To explore relationship between antenatal optimism and depressive symptoms, attitudes toward maternity, and mother-to-infant bonding postnatally	Sample size: 98 Age, years (mean, SD): 32.2 (4.9) Study participants: Pregnant and postpartum women Pertinent inclusion criteria: 30% of recruited sample had mood disorder	61.5%
Sharma (2011) ⁹⁵	Location: London, ON, Canada Setting: Perinatal clinic in a psychiatric hospital Time period: 2005 – 2009 Study design: Cross-sectional	To study performance of the MDQ during the postpartum period among women with bipolar disorder	Sample size: 125 Age, years (mean, SD): 28 (5.2) Study participants: Postpartum women Pertinent inclusion criteria: Mood disorder diagnosis (MDD or BD)	61.5%
Sharma (2013) ⁹⁶	Location: London, ON, Canada Setting: Obstetric clinic Time period: not reported Study design: Prospective	To report on psychotropic drug use in bipolar disorder II in perinatal period risk of recurrence	Sample size: 53 Age, years (mean, SD): 27.7 (5.4) Study participants: Pregnant and postpartum women	92.9%

CHAPTER II (PREVALENCE OF BD IN PERINATAL WOMEN) APPENDIX

			Pertinent inclusion criteria: BDII diagnosis	
Sharma (2014) ¹⁰¹	Location: London, ON, Canada Setting: Perinatal clinic in a psychiatric hospital Time period: 2005 – 2009 Study design: Prospective	To investigate rate and risk factors for diagnostic conversion from major depression to bipolar disorder & from bipolar disorder II to bipolar disorder I during perinatal period	Sample size: 146 Age: differed by group Study participants: Pregnant and postpartum women Pertinent inclusion criteria: Mood disorder diagnosis (MDD or BDII)	57.1%
Sit (2014) ⁹⁷	Location: Pittsburgh, PA, USA Setting: Obstetric hospital (not specified if inpatient or outpatient) Time period: not specified Study design: Prospective	To investigate relationship between having a maternal mood disorder and adverse pregnancy outcomes	Sample size: 192 Age, years (mean, SD): 28.7 (6.0) Study participants: Pregnant women Pertinent inclusion criteria: Diagnosis of MDD, BD, or women without history of psychiatric illness	92.9%
Sole (2019) ¹⁰²	Location: Barcelona, Spain Setting: Perinatal Psychiatry Program Time period: Jan 2005 - March 2017 Study design: Prospective	To evaluate obstetric outcomes and labor type in pregnant women with bipolar disorder compared with pregnant women without any psychiatric disorder, and possible risk factors associated	Sample size: 200 Age, years (mean, SD): 34.9 (4.3) Study participants: Pregnant women Pertinent inclusion criteria: Diagnosis of BD or women without history of psychiatric illness	45.5%
Uguz (2019) ⁹⁸	Location: Konya, Turkey Setting: Labor & Delivery unit Time period: not reported Study design: Cross-sectional	To compare prevalence of mood and anxiety disorders in pregnant and non-pregnant women	Sample size: 1,154 Age, years (mean, SD): 28.3 (5.7) Study participants: Postpartum women Pertinent inclusion criteria: none	66.7%
Vesga-López (2008) ⁵⁰	Location: USA Setting: NESARC survey (civilians by census) Time period: 2001-2002 Study design: Cross-sectional	To present prevalence of psychiatric disorders among pregnant women and compare these with the prevalence in non-pregnant women, and identify risk factors and treatment-seeking rates	Sample size: 1,524 Age: differed by group Study participants: Pregnant and postpartum women Pertinent inclusion criteria: none	85.7%
Wisner (2004) ¹⁰³	Location: Pennsylvania, USA Setting: not reported Time period: Aug 1996 - July 2000 Study design: Prospective	To see if valproate immediately postpartum in women with bipolar disorder would prevent episodes and how it affects time to recurrence	Sample size: 37 Age: differed by group Study participants: Pregnant and postpartum women Pertinent inclusion criteria: Diagnosis of bipolar disorder	71.4%
Wisner (2013) ³⁵	Location: Pittsburgh, PA, USA Setting: Obstetric hospital (not specified if inpatient or outpatient) Time period: not specified Study design: Retrospective	To determine proportion of women with perinatal depression with episode onset postpartum, during pregnancy, or predating pregnancy, to evaluate the rate of self-harm ideation, and define disorders associated with positive screens	Sample size: 826 Age, years (mean, SD): 28.8 (5.9) Study participants: Postpartum women Pertinent inclusion criteria: Postpartum depression (via positive EPDS)	84.6%

EPDS = Edinburgh Postnatal Depression Scale; MDQ = Mood Disorder Questionnaire; MDD = Major Depressive Disorder; BD = Bipolar Disorder

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BIPOLAR DISORDER) APPENDIX

Supplemental File:

Supplemental Material for *Chapter III: Perspectives on addressing and treating bipolar disorder in the obstetric setting: a mixed-methods study*

CONTENTS

- **SUPPLEMENTAL TABLE S3.1** – Quantitative questionnaire administered to participants
- **SUPPLEMENTAL TABLE S3.2** – Guideline for the 5 areas of discussion in the focus groups
- **SUPPLEMENTAL TABLE S3.3** – Final qualitative codebook, used to code all 3 focus groups
- **SUPPLEMENTAL TABLE S3.4** – Participant identified themes, sub-themes, and illustrative quotes
- **SUPPLEMENTAL TABLE S3.5** – Clinician recommendations for solutions and illustrative quotes

SUPPLEMENTAL TABLE S3.1– Quantitative questionnaire administered to participants

1. What is your gender?
 - Female
 - Male
 - Other (Specify): _____
 - Prefer not to answer

2. What race do you consider yourself? (select all that apply)
 - American Indian/Native American
 - Alaska Native
 - Asian/Asian American
 - Black/African American/African
 - Native Hawaiian
 - Other Pacific Islander
 - White/Caucasian
 - Other (Specify): _____
 - Prefer not to answer

3. What is your Ethnicity?
 - Hispanic or Latino
 - Non-Hispanic or Latino
 - Prefer not to answer

4. What is your professional title?
 - Physician
 - Attending
 - Fellow
 - Resident
 - Certified Nurse Midwife
 - Nurse Practitioner
 - Nurse Manager

 - Social Worker
 - Case Manager
 - Other (Specify): _____

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BD) APPENDIX

5. What is your primary medical specialty?
- Obstetrics only
 - Gynecology only
 - General Obstetrics and Gynecology
 - Maternal-Fetal Medicine Specialist
 - General Psychiatry
 - Perinatal Psychiatry
 - Primary Care/Family Medicine
 - Other (Specify): _____
6. What is your field of expertise? _____
7. Which of the following best describes your type of practice?
- Solo Private Practice
 - Partnership or Group Practice
 - Multi-specialty Group
 - HMO/Staff Model

 - University Full-time Faculty and Practice
 - Military
 - Other (Specify): _____
8. How many years have you been in practice? _____

At the following time points, which of the following do you consistently screen for (using a validated screening tool):					
	<i>Never</i>	<i>Rarely</i>	<i>Sometimes</i>	<i>Often</i>	<i>Always</i>
Bipolar disorder?					
Early pregnancy					
Late pregnancy					
Early postpartum					
Late postpartum					

SUPPLEMENTAL TABLE S3.2– Guideline for the 5 areas of discussion in the focus groups

- 1) What has been your experience caring for pregnant and postpartum women with bipolar disorder?
- 2) What is your reaction to the standard of care set forth by ACOG’s safety bundle* with regards to screening for bipolar disorder? What challenges have you encountered, or do you anticipate, in implementing screening for bipolar disorder?
- 3) How do you respond to positive screens for BD or those who report having the disease? If a patient is identified as having or potentially having BD, what do you typically do or what might you consider as the most feasible plan of action?
- 4) Are you comfortable prescribing any psychotropic medications for bipolar disorder, if necessary?
- 5) Now knowing the safety bundle recommends to screen for and bipolar disorder and refer for treatment, and what would help you address them? What are your general experiences with and reactions to the MCPAP for Moms program when caring for women with BD or suspected BD? What resources would help you to best address your patients with BD? This can be in addition to, alteration of, or outside of MCPAP for Moms.

*This was briefly explained at the outset of the ACOG focus group

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BD) APPENDIX

SUPPLEMENTAL TABLE S3.3– Final qualitative codebook, used to code all 3 focus groups

Bipolar disorder and Providers - GROUP CODEBOOK Codes, definitions and illustrative quotes	
Code (child codes indented)	Definition
1. Knowledge & current understanding	Comments from providers around their existing/prior knowledge of anything related to bipolar disorder
a. BD epidemiology, risks, etc.	Comments from providers around their existing knowledge of rates of BD in their patients, the risks of treating or not treating BD, etc.
b. BD treatment, management, etc.	Comments from providers around their existing knowledge of how to treat BD in perinatal women, what drugs to use, risks/rewards of drugs, other therapies, etc.
i. BD relation to MDD and other perinatal mood disorders	Comments from providers around their knowledge of BD as a risk in their patients with specific regard to other PMADs
c. Knowledge - Other	Anything else not covered in the above that references existing knowledge of anything related to bipolar disorder
2. Reaction and attitudes	Comments from providers around their attitudes towards any type of management of bipolar disorder in the perinatal setting
a. Thoughts about role in management	Reaction/attitudes to the suggestion that OBs should play a role in treating mental health conditions; thoughts about role in management (e.g., what they should or should not be doing)
b. Importance of management/ Valuable use of time and resources	Reaction/attitudes to relative importance of OBs managing mental health conditions and whether it is a valuable use of their time/resources
c. New policies and recommendations	Reaction/attitudes to formal recommendations about managing BD (e.g., MMH safety bundle); thoughts about national or internal new policies and recommendations (e.g., Safety bundle)
d. Legal issues/ramifications	Thoughts (generally concerns) about legal issues/litigation risks for OBs that manage BD
e. Provider reaction/attitudes - Other	Reaction/attitudes to content not included above
3. Experience	<i>Should be examples of actual experiences</i>
a. Education	Experiences with ongoing/current education for BD or suggestions for the future
b. Screening	Experiences with screening for BD
c. Assessing	Experiences with assessing for BD (after positive screen or other scenarios)
i. Patients come in having stopped medications	Patients come in after self-discontinuing meds, or after a provider tells them to do so.
d. Psychiatric consultations	Experiences with psychiatric consultations for BD; should be examples of one-time consults but can include formal and more informal/curbside/relying on friends
e. Treating	Experiences treating BD
i. Bridge treatment	Experiences in providing bridge treatment for BD
ii. Psychiatric emergency	Experiences in handling psychiatric emergencies
f. Follow-up while treating	Experiences following-up after initial treatment or referral This is done by original provider
g. Referral for long term services	Experiences referring patients for further treatment for BD
h. Transition of care at end of perinatal period	Experiences transitioning women with BD to other care at the end of the perinatal period, including communication with other providers and care coordination
i. Time/resources	Experiences specific to time/resource allocation

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BD) APPENDIX

i. Language/ cultural/ etc. considerations	Experiences specific to time/resource allocation that have to do with language needs, cultural, religious, sexual, etc. needs
j. Care coordination	Experiences working with other professionals; this is in contrast with one-time consults and should be examples of longer-term/sustained relationships
i. Intra-practice coordination	Experiences working with or relying on other staff/ assistants/ other providers within their practice
ii. Inter-practice coordination	Experiences working with or relying on other staff/ assistants/ other providers outside of their practice
k. Acceptance/ pushback/ stigma	Experiences with or exposure to any acceptance in OBs managing BD
i. Acceptance/stigma from patients	Experiences with or exposure to patient acceptance in OBs managing BD
ii. Acceptance/stigma from providers	Experiences with or exposure to provider acceptance in OBs managing BD
b. Provider experience - Other	Other experiences in managing BD that aren't covered above
4. Provider questions	Questions providers have about any of the management of BD
5. Codebook - Other	Other provider comments that do not fit into any of the above categories.
<i>The below categories may or may not be co-coded with the above categories</i>	
6. Successes/Facilitators	Successes or facilitators noted
7. Challenges	Challenges noted
8. Recommendations	Provider recommendations for how to best help other providers manage BD and incorporating it into the perinatal setting
9. Great Quotes	

SUPPLEMENTAL TABLE S3.4– Participant identified themes, sub-themes, and illustrative quotes

Supp Table S3.4a – THEME 1: Formal education about bipolar disorder in perinatal patients is lacking. Exposure to continuing education can help.					
Ref	Sub-thematic element	Category	Exposure group		Illustrative Quote(s)
			None	MCPAP for Moms	
2a.1.	Lack of formal education on BD	<i>Barrier</i>	X	X	<p><i>I did have, I did have a psych rotation, you know, 15, 20 years ago. You know, like, it was an inpatient psych unit that was completely different than really what I'm dealing with on a daily basis, you know? So you know, hopefully we have more training within our residency education and things like that, but you know, I think there's a lot of system changes that have to occur - Physician 1, Exposure to MCPAP for Moms</i></p> <p><i>I was at a big facility [for residency] that would typically have some champion in psychiatry or perinatal psychiatrist, someone of interest who would probably give a grand rounds or something a year, but I don't know if there was any formal education. It was just kind of, you would learn in clinic that these are medicines that are typically prescribed. Again, they're typically SSRIs that are the ones you feel comfortable with - Physician 2, No exposure</i></p> <p><i>And as a midwife, you know, we learned about depression and treating mental illness, especially depression in pregnant postpartum women, but bipolar disorder was not part of the core curriculum or anything, like, so that is a whole new level - Midwife 1, Exposure to MCPAP for Moms</i></p>
2a.2.	Awareness of the new standards of care for BD	<i>Facilitator</i>	X	X	<p><i>We need to do it [screen for BD]. I mean, the Council of Patient Safety has a lot of algorithms and recommendations and they're all based on science, and we've instituted all of them - Physician 3, No exposure</i></p>
2a.3.	Continuing education have helped to mitigate prior education deficits about the risks of untreated illness and to evolve views on the benefits of pharmacotherapy for BD	<i>Facilitator</i>		X	<p><i>And I've certainly been to enough lectures now where the topic is untreated depression, untreated anxiety causes, here's all the bad things that could happen, so it used to be no medications is best and we're going to take people off of their antidepressants. And it's certainly not, we have, I feel like we have a different mentality about that - Physician 4, Exposed to MCPAP for Moms</i></p>

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BD) APPENDIX

Supp Table S3.4b – THEME 2: Screening is occurring sporadically in places without Access Program exposure. Without adequate support, participants report seeing no point in screening.

Ref	Sub-thematic element	Category	Exposure group		Illustrative Quote(s)
			None	MCPAP for Moms	
2b.1.	Screening feels futile because of paucity of resources	<i>Barrier</i>	X		<i>Why screen for something that we can't do anything about? - Physician 5, No exposure</i> <i>Lack of resources [prevents screening] of where you're going to make the referral. Because even if we find something and we don't know what we can do with it and we don't have a line of doctors or psychiatrists that are going to be willing to see a patient who's pregnant and prescribed, then why do it? - Physician 6, No exposure</i>
2b.2.	Unaware that validated screens exist for BD in the perinatal setting	<i>Barrier</i>	X		<i>I think just adding a couple of simple questions filled out with the medical assistant would be a simple way to catch some people [with BD] that you maybe would miss - Physician 2, No exposure</i> <i>And there's probably not the simple two questions that you can ask about depression. You'd have to ask more than that to even figure it out - Physician 7, No exposure</i>
2b.3.	Screening is occurring infrequently in places lacking support	<i>Barrier</i>	X		<i>[We are not screening for BD]...just thinking about putting it into the workflow - Physician 8, No exposure</i> <i>I don't believe there's anything we pushed out [for BD screening] - Physician 3, No exposure</i>
2b.4.	Screening is occurring in most or all patients for BD in places with more support	<i>Facilitator</i>		X	<i>We do it [with every patient] at the suppressed menses visit - Medical Assistant 1, Exposed to MCPAP for Moms</i> <i>[We use] the bipolar screen that MCPAP has given us, the two question... I just usually ask those types, you know, have you felt times of, you know, lots of energy and, you know, a kind of, and just looking at their history, I always ask, has anyone ever said, you know, have given you the diagnosis of bipolar or anything else besides depression and anxiety? Usually [for every patient] - Physician 9, Exposed to MCPAP for Moms</i>
2b.5.	Access Programs may be a facilitator for implementing screening processes	<i>Facilitator</i>		X	<i>Before [MCPAP for Moms] this there was always kind of a futility to it where you're like, well, let's talk about depression. You should go see a psychiatrist. There's none available... You know, now there's something we can talk to them about it and then say, and we have this option for you to just actually get care instead of both laying it all on the patient - Physician 9, Exposed to MCPAP for Moms</i>

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BD) APPENDIX

Supp Table S3.4c – THEME 3: Patient assessment is one of the most challenging parts in addressing bipolar disorder in perinatal patients for all obstetric clinicians, regardless of exposure level.					
Ref	Sub-thematic element	Category	Exposure group		Illustrative Quote(s)
			None	MCPAP for Moms	
2c.1.	Assessment of patients with suspected or diagnosed BD is very difficult	Barrier	X	X	<i>I think [bipolar disorder is] a little bit more, at least for me, it's a more scary diagnosis or it had more impact or more difficult thing to treat. Like I feel more comfortable and feel like most of the antidepressant meds would actually help depression and anxiety, but those are not necessarily better for bipolar, well, actually contraindicated, so I feel like I actually have not been screening for it, so I will try and change that - Physician 7, No exposure</i> <i>Well, ideally is they already have the [bipolar] diagnosis and they're already on the medication, but because again, I'm just an obstetrician...Honestly I couldn't tell you if somebody's bipolar one, two, or three and all the other subtleties that go with this... - Physician 10, Exposed to MCPAP for Moms</i>
2c.2.	Difficulties in assessment can be exacerbated by existing assumptions, misconceptions, or stigma	Barrier	X		<i>And there's probably, I'd think there'd be a little bit of a stigma behind [a BD diagnosis] so maybe people don't tell you the truth or they downplay it as just depression - Physician 7, No exposure</i> <i>The woman with the diagnosis of bipolar, I think if she is honest we will recommend the test for safety profile in pregnancy because I probably wouldn't mess with it - Physician 2, No exposure</i>
2c.3.	Will send patients with suspected or diagnosed BD to higher level of care if unable to adequately assess	Barrier	X	X	<i>Okay, so worst case scenario, I have a psych ER. And so, the psych ER will determine if she can be admitted to the main hospital or there's a psychiatric hospital that's five minutes away... [worst case scenario] is like if I feel like there is a danger and she's somebody who I cannot like call a friend and see if they can see her. I mean, they can't see her today. So next week. So if I feel like it can't wait, I'll do the psych ER - Physician 3, No exposure</i> <i>So I mean, in a jam I probably would send the patient to the emergency room - Physician 10, Exposed to MCPAP for Moms</i> <i>Do you guys ever do inpatient psych referrals postpartum for people who are, who've never been hooked up? Because that's my go-to. That's my default. - Midwife 1, Exposure to MCPAP for Moms</i>
2c.4.	Discomfort with assessment properties of BD screening tool	Barrier		X	<i>You know, so we have the screening tool [for BD] now, which it's an interesting tool. I feel like a lot of it has to be positive for it to be a positive screen, but in some patients we're, like, there's these things that does not technically rule in that concerns me for bipolar or something else, I don't know, so I guess I'm not super comfortable with it, even though I'm glad we have it - Physician 11, Exposure to MCPAP for Moms</i>

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BD) APPENDIX

2c.5.	Access Programs have cut down on use of ED for assessment and provided reassurance in assessment strategies	<i>Facilitator</i>	X	<p><i>Yeah, I guess the way we were shown [to use the screener for BD] that if it's a positive result, it's, like, a lifetime risk, even though they're not symptomatic. I guess I would only call MCPAP if, like...they had, when that was a marginal screen and then they have, like, depressive symptoms but I don't want to start them on an SSRI for, like, questionable bipolar – Physician 11, Exposure to MCPAP for Moms</i></p> <p><i>[MCPAP helps with] referral. Like, you know, if they have a history or if their [depression] screen's above 10, then MCPAP referral is automatically placed to get a list of services that are in the area. And then depending on the severity of it is whether or not a [MCPAP for Moms consultation] can be conducted - Midwife 1, Exposure to MCPAP for Moms</i></p> <p><i>Having the support of MCPAP to guide you through [assessment], that's not our specialty, and to be able to talk on the phone with the specific symptoms of the patient is very helpful – Physician 12, Exposure to MCPAP for Moms</i></p>
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Supp Table S3.4d – THEME 4: Clinician participants can be comfortable in treating patients with medications for bipolar disorder with the appropriate support.					
Ref	Sub-thematic element	Category	Exposure group		Illustrative Quote(s)
			None	MCPAP for Moms	
2d.1.	See patients with diagnosed BD that have stopped their medications	<i>Barrier</i>	X	X	<p><i>I think it is variable. I've worked in three different cities and so kind of environments of different mental health and like plus or minus people that are interested in pregnant and postpartum women and that certainly makes a difference. And absolutely there's providers out there that, like, "Oh, you're pregnant, you can't be on anything." That's it. See you later. - Physician 6, No exposure</i></p> <p><i>I think some of our experiences is that women find out they're pregnant and then they stop their meds. And then, so then they come to us, you know, uncontrolled and then we're kind of then faced with what to do... We've had multiple patients that, once they're pregnant, they'll call their psychiatrist and the psychiatrist just tells them to stop all their meds without any guidance, which I just think is, you know, really unfortunate and frustrating - Physician 1, Exposure to MCPAP for Moms</i></p> <p><i>Most of the people are told to stop or at least they say they were told to stop, and then you're scrambling to catch up. - Midwife 1, Exposure to MCPAP for Moms</i></p>
2d.2.	Feel pressure to treat their BD patients with medications and that this is unfair	<i>Barrier</i>	X	X	<p><i>So there are a lot the prescribers that take care of patients while they're not pregnant, and as soon as they become pregnant, they don't talk to them, but they're fired and then they send them to an MFM, and we're like, we don't know how to do it, but we'll figure it out because nobody else will - Physician 6, No exposure</i></p> <p><i>So my opinion is that I guess because there's not enough psychiatrists and people that handle it that it's kind of put on us, and so we're left, we're put in this awkward position of, well, she's not gonna get any</i></p>

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BD) APPENDIX

					<p>care, so we better start medications. And it's, I feel like we have more and more really, patients who are psychiatric, but you know, challe-, complex and we haven't had the education unless we had a psych rotation. I had that 25 years ago. And so it feels like I'm sad for the state of things. OK, we can start a medication but we're not seeing them necessarily on a weekly basis or doing therapy or coordinating all of that. So it feels almost like a sad answer to the current state of affairs - Physician 4, Exposed to MCPAP for Moms</p> <p>I think [we're being expected to make diagnoses and we expect it of ourselves], but I definitely think, I think it's expected by the patients that we're able to manage the, you know, especially when they call their psychiatrist and the psychiatrists say, now it's up to your OB to treat you. Which really gets me. It's unfair... When you have another physician telling a patient that is, you know, your obstetrical provider should deal with this, that's just frustrating. And it happens a lot in this community - Physician 1, Exposure to MCPAP for Moms</p>
2d.3.	Unlikely to prescribe medications for BD	Barrier	X		<p>And I would never write a prescription for bipolar disorder - Physician 3, No exposure</p>
2d.4.	May prescribe medications for BD under specific circumstances, such as refilling a prior prescription	Facilitator	X	X	<p>[I may prescribe meds for BD] if they're already on it. I feel like it's, that hopefully its working for them and they didn't already have an adverse outcome to it, so then I feel like it's less side effects to worry about or less that they're going to call me about potential side effects. That's my thought process - Physician 8, No exposure</p> <p>They need some help with their [BD management]. I'll redo [the prescription], reinstate or renew it and all that, but I won't start - Physician 10, Exposed to MCPAP for Moms</p>
2d.5.	Comfortable treating patients with BD with meds, with support of an Access Program, perinatal psychiatrist, or other specialist	Facilitator	X	X	<p>I'm a lot less scared to prescribe medications than I was probably four years ago because I see the benef-, I think the benefit outweighs the risks obviously, so, but I won't start somebody on a bipolar medication if I think they're bipolar. But if they've been on it and I call and I talk to Dr. XX or Dr. YY and we go do the case and they think it's appropriate, then I will happily prescribe it - Physician 1, Exposure to MCPAP for Moms</p> <p>And I feel like there's at least, in our, in [state], there are MFMs who are specializing more in mental health. They are taking it upon themselves to do more - Physician 3, No exposure</p> <p>I will [start a patient fresh on new meds for BD]. I'll do it. I've had times where they've come to a [visit] and they ask you, am I prescribing? - Physician 9, Exposed to MCPAP for Moms</p>

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BD) APPENDIX

Supp Table S3.4e – THEME 5: All participants noted that there is an extreme paucity of mental health clinicians nationwide, and that barriers to care abound. Access Programs and collaboration with other professionals that have specialized mental health training can help to fill some of these gaps.					
Ref	Sub-thematic element	Category	Exposure group		Illustrative Quote(s)
			None	MCPAP for Moms	
2e.1.	Paucity of psychiatric resources	<i>Barrier</i>	X	X	<p><i>Psychiatry is what's really bad about the system in terms of my access. Well, I have a numbers problem. There's not enough psychiatrists in the community - Physician 3, No exposure</i></p> <p><i>And for many, there's many barriers. Patients not able to call. The therapists not having availability. I mean, it's just there's a paucity of services in this area, so I think a lot of these women just kind of struggle or kind of, you know, they're just sub-optimally controlled, you know? And we try our best, but what can, you know, it's hard when we feel like we don't have a ton of resources - Physician 1, Exposure to MCPAP for Moms</i></p>
2e.2.	Psychosocial barriers to care	<i>Barrier</i>	X	X	<p><i>I have maybe 40% Medicaid [patients] and I have a lot of difficulty reaching out to specialists to help - Physician 3, No exposure</i></p> <p><i>Yeah, so it's access and also [finding] people that are willing to take Medicaid insurance...to try to find a psychiatrist that's willing to see my non-insurance person is going be weeks. Like what are we supposed to do? - Physician 6, No exposure</i></p> <p><i>It's just so many psychosocial factors that go into [barriers to care]. And I find there's a lot of trauma in these women and a lot of adverse childhood experiences that they've had that shape their psyche and their mental health and their physical health - Physician 1, Exposure to MCPAP for Moms</i></p>
2e.3.	Access Programs are a facilitator and mitigate access to care issues	<i>Facilitator</i>		X	<p><i>And it's also good to know that in our cases of the patients that are very unstable, is that [MCPAP for Moms] will take them for a face-to-face. So for those, again, that can get there, at least we have that, because without that we don't have anything. So we can get them to Worcester or Boston hopefully and they can get a face-to-face and at least have some ongoing management - Physician 12, Exposure to MCPAP for Moms</i></p>

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BD) APPENDIX

Supp Table S3.4f – THEME 6: Participants with adequate support see addressing perinatal BD as an important and valuable part of their role as obstetric professionals.					
Ref	Sub-thematic element	Category	Exposure group		Illustrative Quote(s)
			None	MCPAP for Moms	
2f.1.	Aversion to incorporating BD into their care	<i>Barrier</i>	X		<i>[Screening for BD] an unfunded mandate. You didn't get any more time in the day, you did your 25 hours, 24, and... - Physician 13, No exposure</i>
2f.2.	Appreciated and understood the importance of incorporating BD into their role	<i>Facilitator</i>		X	<i>I do [think managing BD is part of our role], you know. I mean, in conjunction with psychiatry and other support services. It's hard for just us to do it all alone, you know? I think it's a multidisciplinary treatment, right, you know? You need therapists, social workers, psychiatrists, OBs. I mean, we could all work together - Physician 1, Exposure to MCPAP for Moms</i>

Supp Table S3.4g – THEME 7: Participants with exposure to Access Programs perceive their patients as willing to be screened and treated for BD by their obstetric clinicians and are eager to talk about their mental health conditions					
Ref	Sub-thematic element	Category	Exposure group		Illustrative Quote(s)
			None	MCPAP for Moms	
2g.1.	Patients are accepting of BD treatment from OB	<i>Facilitator</i>		X	<i>It's [screening for BD] overall positive because people [patients] are happy for the information – Physician 11, Exposure to MCPAP for Moms</i>
2g.2.	Patients exhibit less stigma about mental illness and want to talk about it	<i>Facilitator</i>		X	<i>Yeah, there's not this stigma in psych, the psych diagnosis, that feels like it's less than it was years ago, that people are more open about talking about it, though people also say, I want to go through pregnancy on no medication, so they're weighing the risks of not being on meds and having the disease versus now the people I think are open to talking - Physician 4, Exposed to MCPAP for Moms</i>

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BD) APPENDIX

Supp Table S3.4h – THEME 8: Coordination of care with outside psychiatric professionals remains a challenge for all participants, regardless of exposure					
Ref	Sub-thematic element	Category	Exposure group		Illustrative Quote(s)
			None	MCPAP for Moms	
2h.1.	Encountered or tried to work with or refer to other clinicians that do not want to treat perinatal patients with BD	<i>Barrier</i>	X	X	<p><i>It's the same reason why we can't get some psychiatrists to keep seeing the patients. It's this fear of liability and fear of pregnancy. And potential exposures and litigations. So they just stop and we don't want to do it and we're not, it's conscientious objection to taking care of a pregnant woman that's going to be on medications. - Physician 6, No exposure</i></p> <p><i>Yeah, but [potential referral facilities] doesn't treat pregnant patients. I've tried...Anything perinatal - Physician 5, No exposure</i></p> <p><i>Yeah, I mean, I think we've tried to outreach [to providers] about a couple patients that I can think of, and you know, it really, they don't call back or I think they're, like, oh, they're pregnant, it's off my plate... - Physician 1, Exposure to MCPAP for Moms</i></p>
2h.2.	There are communication difficulties that specific to dealing with patient mental health information	<i>Barrier</i>	X	X	<p><i>I think that goes to when you request records from somebody. It's in the document and there's special boxes that you have to check that, like HIV, and [mental health] and substance abuse are kind of a specialized category of things, so that does impair...I think also if I got more of the [information from the records] of what is happening, I probably would learn over time, this is how they got managed and so I would boost my confidence to maybe step it up a little bit and maybe I would be more comfortable in sort of a little more complex patients - Physician 6, No exposure</i></p>

Some quotes are slightly modified (brackets) to help contextualize response to interview probe or another participant's comment.

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BD) APPENDIX

SUPPLEMENTAL TABLE S3.5– Clinician recommendations for solutions and illustrative quotes

Supp Table S3.5a – THEME 1: Clinician comfort and competency in managing perinatal BD may be increased with educational efforts and easily accessible resources				
Ref	Sub-thematic element	Exposure group		Illustrative Quote(s)
		None	MCPAP for Moms	
3a.1.	Emphasis on educating Trainees	X	X	<i>She had the psychiatric nurse practitioner, so having someone of relevance educating the residents - Physician 3, No exposure</i>
3a.2.	Education specific to the steps along the mental health care pathway	X	X	<i>Tell us how. Tell us how and how much time it takes - Physician 8, No exposure</i> <i>I think it'd be helpful to have, like, the recommendation of how frequently [to follow-up with patients with BD] because sometimes it does feel like we're prescribing that medication and then they disappear into the void... - Physician 9, Exposed to MCPAP for Moms</i>
3a.3.	Help on distinguishing BD from other mental health conditions	X	X	<i>I guess I also worry sometimes that, is there certain things that can be misdiagnosed as bipolar? In thinking of other medical scenarios, it's not only enough to know how something presents, but what are the things that can fool you and make you think it's this, but it's really something else – Physician 14, Exposed to MCPAP for Moms</i> <i>Another thing that I feel like with depression, I'm a little bit more comfortable making that call, but with something above and beyond that, like a psychotic disorder or a bipolar, I kind of feel like my distinguishing abilities as an MFM is less - Physician 6, No exposure</i> <i>For one, the screen is easy because it's just dispensing a questionnaire, but how to like talk to the patients and obtain the red flags. We need to recognize the red flags. Help me figure out how to recognize the red flags - Physician 3, No exposure</i>
3a.4.	More information to understand the risk/benefit profile of BD meds and to recognize their side effects	X	X	<i>Because we are more comfortable with the SSRIs, it'd be nice to have the review on the [BD] meds, on the current meds... So sure, and then for some of the counseling and, you know, maternal fetal medicine has their little blurb that they do for lithium and for different meds then whether or not to do an echo or whatever, but it'd be nice to sort of have a review - Physician 4, Exposed to MCPAP for Moms</i> <i>If I had a list of specific side effects that I needed to know about and I put that in their problem list and I read it every time they came in, I would probably be okay with that - Physician 5, No exposure</i>
3a.5.	Emphasis on destigmatizing mental health conditions for clinicians and patients	X		<i>And is there a way to like soften the term bipolar. Like what if the patient says, my doctor just called me crazy and I'm not going to go back and see her, then we've lost them. So how to talk to the patient about it? - Physician 7, No exposure</i>

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BD) APPENDIX

3a.6.	Use of Grand Rounds and other lecture series as a venue for education	X	X	<p><i>I mean, get some more speakers out there. I mean, I would have speakers when I'm on grand rounds - Physician 3, No exposure</i></p> <p><i>Yeah, just [a series of] rotating topics, because I'd probably need to relearn these things every year, so every, you know, few months a little quick update or... – Physician 11, Exposure to MCPAP for Moms</i></p>
3a.7.	Creation of more online content and education	X		<p><i>Some video content I think would be helpful that people just watch in their spare time - Physician 2, No exposure</i></p>
3a.8.	Circulation of more treatment algorithms and clinical decision-making tools	X	X	<p><i>I like one-pagers. A front and a back. Something that I can have on my desk or have in my frequently referenced pieces of paper that I just say, all right, hey, did I ask this question or this is my next move, something like that. So a one-pager - Physician 7, No exposure</i></p> <p><i>If we had a protocol we could follow or something where you can say, like, OK, if we're gonna start someone on Risperdal like, we're gonna follow up in three months and then we're gonna do the A1c...something like that - Physician 9, Exposed to MCPAP for Moms</i></p>
3a.9.	Outreach to other clinicians around preventative care	X	X	<p><i>I know we're talking from the OB side, but I think also on the psychiatry side, kind of like spreading the word [about not stopping meds]. Like at least, you know, think twice before you [stop them] – Physician 14, Exposed to MCPAP for Moms</i></p> <p><i>I'm interested in, like, preventative planning for postpartum depression. It has such a high concentration postpartum in someone who might not have any recognized psychiatric disorder before...you know, here's your plan for contraception, what's your plan for mental health postpartum, you know? You're in this community where no one's gonna help you unless you happen to have this amazing family or you're well, you know, you have more money or, you know, whatever...So to have, you know, a plan for success or resource guide, you know, just a more systematic, hey, this is hard for everyone, let's make this optimal for you – Physician 11, Exposure to MCPAP for Moms</i></p>

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BD) APPENDIX

Supp Table S3.5b – THEME 2: Incorporation of the management of BD in the obstetric setting may be further facilitated by recommending efficient ways to integrate practices into existing workflows

Ref	Sub-thematic element	Exposure group		Illustrative Quote(s)
		None	MCPAP for Moms	
3b.1.	Include discussion of BD into appointments with fewer required tasks	X		<i>We just kind of like talk about [perinatal depression] at a certain appointment I think, like maybe an appointment where you don't have a lot going on - Physician 7, No exposure</i>
3b.2.	Leverage other professionals in the OB practice to assist	X		<i>I work in a particularly resource-poor setting and lots of people are doing lots of things, but what I really learned over the years is leveraging my health care assistants to do a lot for me, and because they are all bilingual also...to give patients the info and just explain that Dr. ___ wants you to do X and she will be with you afterwards, and that's at least a couple of minutes that I don't need to do that piece of it, so I think that's where I think I would be interested in some assistance - Physician 8, No exposure</i>
3b.3.	Integration of BD screeners and reminders into the Electronic Medical Record (EMR/HER)	X		<i>[If there is a BD screen] that can also be embedded in the EMR because we've kind of embedded the EPDS, and then they have to click off the questions and what were their answers - Physician 6, No exposure</i> <i>But I think your comment about EHR is really important because I think sometimes, particularly when we share about the record with internists and family that we don't remember to put our OB diagnoses in there so everyone can see and vice versa, so I think it's really important for us to put postpartum depression on that shared list, even though the postpartum period may be over, that's still a flag for the internist who sees them. Maybe I should really talk to that lady about what she's doing now. I think we don't do a good job with our problem list - Physician 8, No exposure</i>
3b.4.	Use of patient registries in the practice to help with follow-up		X	<i>Following up with patients, I think [having a patient registry] where we keep track of patients so closely, I think other practices could benefit from doing the same. I think that's really helpful – Medical Assistant 2, Exposure to MCPAP for Moms</i>

CHAPTER III (PERSPECTIVES ON ADDRESSING & TREATING BD) APPENDIX

Supp Table S3.5c – THEME 3: Employment of integrated care models and other innovative care delivery methods for patients and babies

Ref	Sub-thematic element	Exposure group		Illustrative Quote(s)
		None	MCPAP for Moms	
3c.1.	Embedded psychiatric professionals into OB practices	X		<i>I will say that what has totally changed my practice in the last 12 months is our health center organization has undergone a pilot projection, which we are continuing with sort of embedding psychiatric social workers in every one of our sites. So I now have the ability to talk to woman who is distraught and has other social stressors and clearly probably a diagnosis, who I can literally say, “Would you like to talk to [social worker] today?” And [social worker] can come over and talk to her - Physician 8, No exposure</i>
3c.2.	Use of Perinatal Psychiatry Access Programs or other consultative professionals with mental health expertise	X	X	<i>We have OB Med so that’s a different specialty that has perhaps a little comfort in the behavioral stages, so I mean, they’re not psychiatrists, but it’s a specialty of internists who have done some intake for pregnancy woman with medical issues including behavioral health - Physician 8, No exposure</i> <i>And [having access to MCPAP for Moms has] been huge to have that as a resource and referral options, so sometimes she’ll take time to set someone up with therapy, other times she just works with our social worker or gets them set up with another therapist or other needs. And that’s amazing. Every practice should have that – Physician 11, Exposure to MCPAP for Moms</i>
3c.3.	Leveraging telemedicine and direct patient care over telemedicine	X	X	<i>One thing that might be nice for you and for anybody else would be like, I don’t know how comfortable I feel, like psych is doing more with tele medicine, but that would be essentially your visit, but you don’t have to travel - Physician 7, No exposure</i> <i>Maybe telemedicine, like, you know, I think that could really work in a psych setting, you know for a psychiatric issue, you know, with technology today and things. You could do that in the hospital. We could do that here - Physician 1, Exposure to MCPAP for Moms</i>
3c.4.	Inclusion of more comprehensive assessment strategies		X	<i>I think more trauma-informed approaches would be helpful other places – Physician 11, Exposure to MCPAP for Moms</i>

Some quotes are slightly modified (brackets) to help contextualize response to interview probe or another participant’s comment.

CHAPTER IV (IMPROVING CLINICIAN CAPACITY TO ADDRESS BIPOLAR DISORDER) APPENDIX

Supplemental File:

Supplemental Material for *Chapter IV: Improving front-line clinician capacity to address bipolar disorder among perinatal individuals: a longitudinal analysis of Massachusetts Child Psychiatry Access Program (MCPAP) for Moms*

CONTENTS

- **SUPPLEMENTAL TABLE S4.1** – All variables included in the MCPAP for Moms data set
- **SUPPLEMENTAL TABLE S4.2** – Model evaluation of exploratory group-based trajectory modeling of clinician subgroups
- **SUPPLEMENTAL TABLE S4.3** – Primary outcomes sensitivity analysis results - association of repeated encounters (by type) on “clinician treats” at encounter conclusion, by diagnosis, excluding the dates of the COVID-19 pandemic
- **SUPPLEMENTAL FIGURE S4.1** – Perinatal Mental Healthcare Pathway

CHAPTER IV (IMPROVING CLINICIAN CAPACITY TO ADDRESS BD) APPENDIX

SUPPLEMENTAL TABLE S4.1– All variables included in the MCPAP for Moms data set

Data field	Definition	Code options
ENCOUNTERID	Label identifying encounter date and provider	
MEMBERID	De-identified record ID	
DATEOFSERVICE	Date of encounter	
PRACTICEPROVIDERID	Provider ID	
PROVIDER_NAME	Provider that initiated encounter's name	
FKPROVIDERTYPE	Type of Provider	Pediatrician; Family Physician; Physician Asst; BH Clinician; BH Clinician/Care manager; PCMH Care Coordinator; Internal Medicine Physician; Nurse Practitioner; Obstetrician; Midwife; Psychiatrist; Other RN/LPN ; Other (<i>specify</i>)
PRACTICEID	Practice ID	
PRACTICENAME	Practice that provider that initiated encounter belongs to	
ACTIVITY	Nature of the encounter	BH network mgmt., Case conference, Case supervision, CME, Documentation only, Email, Face-to-Face Follow up, Face-to-Face In-Person, Face-to-Face No-show, Face-to-Face Phone, Face-to-Face Same day, Face-to-Face Video, Non Pt specific consultation, On the Fly consult, Phone f/u no connection, Phone other, Phone provider, Phone provider follow up, Phone to Family/Patient, Practice engagement, R&R - Follow up, R&R - outreach to patient, R&R - Resources to provider, SUD Training
DXNAME	Diagnoses related to encounter	<u>Choose all that apply:</u> Major Depressive Disorder; Persistent Depressive Disorder (Dysthymia); Unspecified Depressive Disorder; Substance/Medication Induced Depressive Disorder; Major Depression with Psychotic Features; Bipolar I; Bipolar II; Unspecified Bipolar and Related Disorders; Bipolar I with psychotic features; Substance/Medication Induced Bipolar and Related Disorders; Borderline Personality Disorder; Generalized Anxiety Disorder; Panic Disorder; Unspecified Anxiety Disorder; Schizophrenia; Schizoaffective Disorder; Unspecified Psychotic Disorder; OCD; Adjustment Disorder; PTSD; Unspecified Trauma/Stress related; ADHD; Complicated Grief Disorder; Eating Disorder; Other (<i>specify</i>); Deferred Diagnosis; Not Applicable

CHAPTER IV (IMPROVING CLINICIAN CAPACITY TO ADDRESS BD) APPENDIX

DXSUDNAME	SUD diagnoses related to encounter	<u>Choose all that apply:</u> Cocaine use disorder; Alcohol use disorder; Cannabis use disorder; Opioid use disorder; Benzodiazepine use disorder; Tobacco use disorder; Amphetamine use disorder; Use denied; Use not discussed; Other use disorder
OUTCOME	Outcome after encounter	<u>Choose all that apply:</u> Back to Provider; Face to Face visit; Refer to an existing psychiatrist; Refer to a new psychiatrist; Refer to partial hospital; Bridge treatment with calling provider; Refer to psychiatric emergency services; Refer to mobile crisis services; Refer to support group; Refer to outpatient therapist; Refer to Parent/Infant therapy; Refer to psychotherapy group; R&R - Resources to Provider; R&R - Outreach to patient; None
CONTACTREASON	Reason for the encounter initiation	<u>Choose all that apply:</u> Lactation question(s); Risk/benefits of med use in pregnancy; Positive screen; Medication question(s); Preconception question(s); Diagnostic question(s); Resources - Community access; Safety concerns; Screening tool question; Risks of substance use; Engagement in care COVID-19; Trauma exposure; Race/Racial discrimination; Mental health stigma; LGBTQ needs; Other (<i>specify</i>); Non member specific
MEDICATION	Medications recommend from the encounter/consultation	<u>Choose all that apply:</u> Antidepressants – SSRI; Antidepressants – SNRI; Antidepressant – Tricyclic; Antidepressants – other; Lithium; Lamictal; Gabapentin; Mood stabilizer – other; Haldol; Perphenazine; Atypical antipsychotic; Typical Antipsychotic – other; Benzodiazepine; Other sleep/anxiety agent; Stimulant; Naltrexone; Buprenorphine; Methadone; Other (<i>specify</i>); No meds after encounter
INTMEDICATIONACTIVITYIDFK	Activities related to the medication recommended from the encounter/consultation (numerical code)	<u>Choose all that apply:</u> Refer med treatment; Start first meds; Increase meds; Decrease meds; Add meds; Change meds; No meds before encounter; Non patient specific encounter; Taper off meds; No change
NAME	Activities related to the medication recommended from the encounter/consultation (corresponding text)	
MEASURE_CODE	Other related measure that was captured during the encounter (numerical code)	<u>Choose all that apply:</u> Patient status; EPDS score; PHQ-9 score; Self harm question 5- MDQ

CHAPTER IV (IMPROVING CLINICIAN CAPACITY TO ADDRESS BD) APPENDIX

M4M_MEASURE_NAME	Other related measure that was captured during encounter (corresponding text)	
M4M_MEASURE_VALUE	Response/outcome for measure (above) dependent upon which measure code/M4M_Measure_Name selected	<p><u>Choices for Measure code = 1- Patient status (choose 1):</u> 1st trimester; 2nd trimester; 3rd trimester; Postpartum lactating; Postpartum not lactating; Postpartum lactation unknown; Post adoption; Father; Preconception; Perinatal loss</p> <p><u>Choices for Measure code = 2- EPDS score (choose 1):</u> 0-8; 9-12; 13-18; >=19; N/A</p> <p><u>Choices for Measure code = 3- PHQ-9 score (choose 1):</u> 0-9; 10-14; 15-19; >=20; N/A</p> <p><u>Choices for Measure code = 4- self harm question (choose 1):</u> 0; 1; 2; 3; 4; N/A</p> <p><u>Choices for Measure code = 5- MDQ (choose 1):</u> Positive; Negative; N/A</p>

CHAPTER IV (IMPROVING CLINICIAN CAPACITY TO ADDRESS BD) APPENDIX

Supplemental Table S4.2: Model evaluation of exploratory group-based trajectory modeling of clinician subgroups. Models were evaluated with a range of two to six subgroups and evaluated for model fit. This was done by incrementally increasing each model by one subgroup and evaluating model fit statistics (BIC, AIC) as well as graphical display. Ultimately the 3-group model highlighted in green was chosen based on fit statistics and graphic display.

Order					iorder					Sample size BIC	BIC	AIC
0	0				0	0				-3933.11	-3939.10	-3923.38
0	0	0			0	0	0			-3532.24	-3541.83	-3516.67
0	0	1			0	0	0			-3534.74	-3545.53	-3517.23
0	0	1			0	0	1			-3537.15	-3549.14	-3517.69
0	0	1			0	0	-1			-3563.28	-3572.87	-3547.71
0	1	1			0	0	0			-3537.35	-3549.34	-3517.89
0	1	1			0	0	1			-3539.75	-3552.94	-3518.35
0	1	1			0	1	1			-3540.81	-3555.20	-3517.46
0	1	1			0	0	0			-3537.35	-3549.34	-3517.89
0	1	1			0	-1	-1			-3602.09	-3611.68	-3586.52
0	1	1			0	0	-1			-3565.89	-3576.68	-3548.37
0	1	2			0	0	0			-3537.78	-3550.97	-3516.38
0	1	2			0	0	1			-3540.18	-3554.57	-3516.83
0	1	2			0	1	1			-3541.24	-3556.83	-3515.95
0	1	2			1	1	1			-3544.17	-3560.95	-3516.93
0	1	2			0	0	-1			-3566.02	-3578.01	-3546.56
0	1	2			0	-1	-1			-3602.22	-3613.01	-3584.71
0	0	2			0	0	0			-3535.18	-3547.17	-3515.72
0	0	2			1	1	1			-3542.44	-3558.02	-3517.14
0	0	2			0	0	1			-3537.58	-3550.77	-3516.17
0	0	2			0	0	-1			-3563.41	-3574.20	-3545.90
1	1	2			0	0	0			-3540.32	-3554.71	-3516.97
1	1	2			0	0	1			-3542.72	-3558.31	-3517.43
1	1	2			0	0	-1			-3568.56	-3581.75	-3547.15
1	1	2			1	1	1			-3547.11	-3565.10	-3517.92
2	2	2			0	0	0			-3542.04	-3558.83	-3514.80
0	0	0	0		0	0	0	0		-3490.29	-3477.10	-3455.70
0	0	0	0	0	0	0	0	0	0	-3445.87	-3462.66	-3418.63
0	0	0	0	0	0	0	0	0	0	-3461.05	-3440.67	-3407.59

CHAPTER IV (IMPROVING CLINICIAN CAPACITY TO ADDRESS BD) APPENDIX

Supplemental Table S4.3: Primary outcomes sensitivity analysis results - association of repeated encounters (by type) on “clinician treats” at encounter conclusion, by diagnosis, excluding the dates of the COVID-19 pandemic

	Any diagnosis		Unipolar depressive disorders		Bipolar-spectrum disorders	
	<i>IRR^a</i>	<i>95% CI^b</i>	<i>IRR^a</i>	<i>95% CI^b</i>	<i>IRR^a</i>	<i>95% CI^b</i>
Any encounter type						
Exposure to any encounter type	1.07	1.06 to 1.08	1.07	1.06 to 1.08	1.07	1.06 to 1.09
Time	0.93	0.89 to 0.96	0.87	0.83 to 0.92	1.19	1.08 to 1.31
Rural community	3.18	1.92 to 5.27	2.64	1.45 to 4.81	5.33	1.96 to 14.50
Phone consultations with calling clinicians						
Exposure to phone consultations with calling clinicians	1.31	1.28 to 1.33	1.32	1.29 to 1.36	1.26	1.21 to 1.32
Time	1.03	0.99 to 1.07	0.98	0.93 to 1.02	1.30	1.17 to 1.43
Rural community	1.64	1.13 to 2.39	1.30	0.79 to 2.16	3.02	1.36 to 6.73
Face-to-face assessments with patients						
Exposure to face-to-face assessments with patients	1.63	1.52 to 1.75	1.61	1.48 to 1.76	2.10	1.80 to 2.44
Time	0.91	0.87 to 0.96	0.87	0.82 to 0.91	1.11	0.997 to 1.23
Rural community	2.01	1.15 to 3.51	1.58	0.84 to 2.98	2.56	1.04 to 6.34
Resource and referral encounters						
Exposure to resource and referral encounter type	1.07	1.06 to 1.08	1.07	1.05 to 1.08	1.07	1.05 to 1.10
Time	0.92	0.88 to 0.95	0.86	0.81 to 0.90	1.18	1.07 to 1.31
Rural community	3.75	2.11 to 6.66	3.09	1.59 to 6.00	6.72	2.30 to 19.69

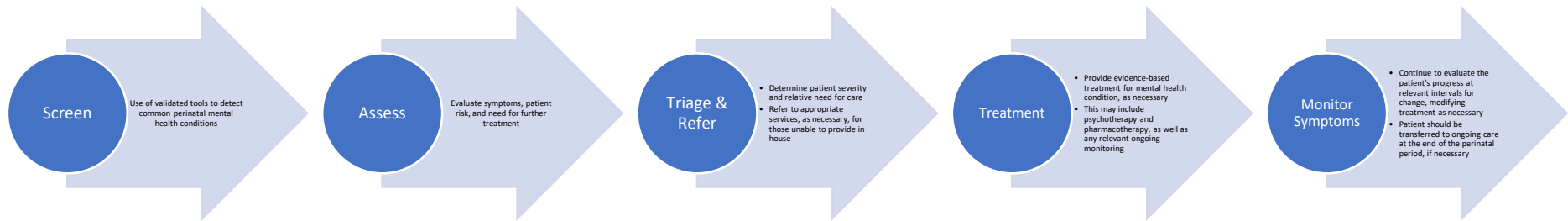
IRR = Incidence Rate Ratio, CI = Confidence Interval

Time is measured by year, where year 1 = 7/2014-6/2015. Exposure to any encounter type is a rate, comprised of the count of MCPAP for Moms encounters annually. Rural community is binary (yes/no).

^aModels adjusted for rural community and time elapsed only, in addition to the exposure. Univariate analyses examined effects of clinician type, discipline, year of enrollment, practice size, and # of practice births.

Longitudinal negative binomial regression models were used to estimate the adjusted models. Beta coefficients generated from the models were exponentiated into IRRs and 95% CIs. They can be interpreted as the estimated rate ratio for a one unit increase in the exposure count. For example: when accounting for elapsed time and presence in a rural community, for every increase in one interaction (of any type) a clinician has with the MCPAP for Moms program, the rate of “clinician treats” goes up by a factor of 1.06 (rate of their encounters that end with “clinician treats” goes up by 1.06).

Supplemental Figure S4.1. Perinatal Mental Healthcare Pathway



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