



AT THE FOREFRONT

**UChicago**  
**Medicine**

# Mental Health & IBD

**Alyse Bedell, PhD**

**Adar Zinger, MD/PhD**

**Natalie K. Choi, BA**

**Allie McDermott, BA**

**Ashley M. Sidebottom, PhD**

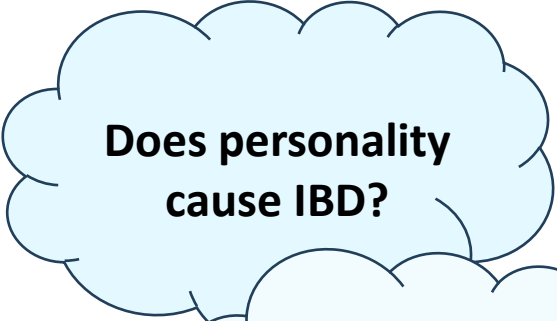
**David T. Rubin, MD**

# Relationship Between Mental Health and IBD

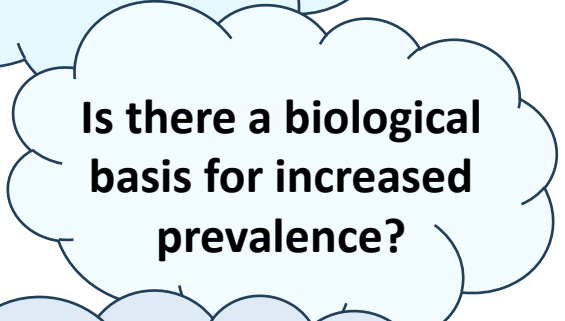
- Depression and anxiety are higher among patients with IBD compared to the general population
- Our current clinical and research initiatives are aimed at:
  - Creating a system for assessing every IBD patient for symptoms of depression and anxiety
  - Developing pathways to address these symptoms and improve quality of life
  - Understanding the relationships between depression, anxiety, and IBD and more broadly, the brain and the gut
  - Generating novel solutions for addressing depression and anxiety in IBD

# Reactive Explanations for Increased Anxiety and Depression Among Patients with IBD

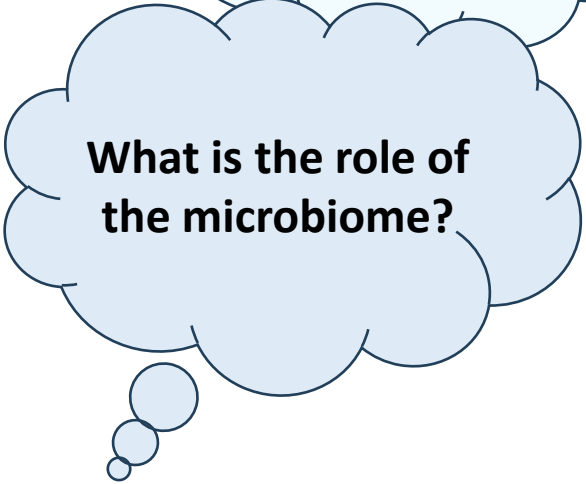
- Hypotheses:
  - Having a chronic condition is stressful
  - Having a chronic condition involving the bowel is socially isolating and embarrassing
- *Could it be biological?*
  - Do mental health and IBD have similar etiopathogenesis?
  - Does IBD as a disease result in neurochemical imbalances?



Does personality cause IBD?



Is there a biological basis for increased prevalence?



What is the role of the microbiome?



PSYCHOTHERAPY

in  
CHRONIC ULCERATIVE  
COLITIS

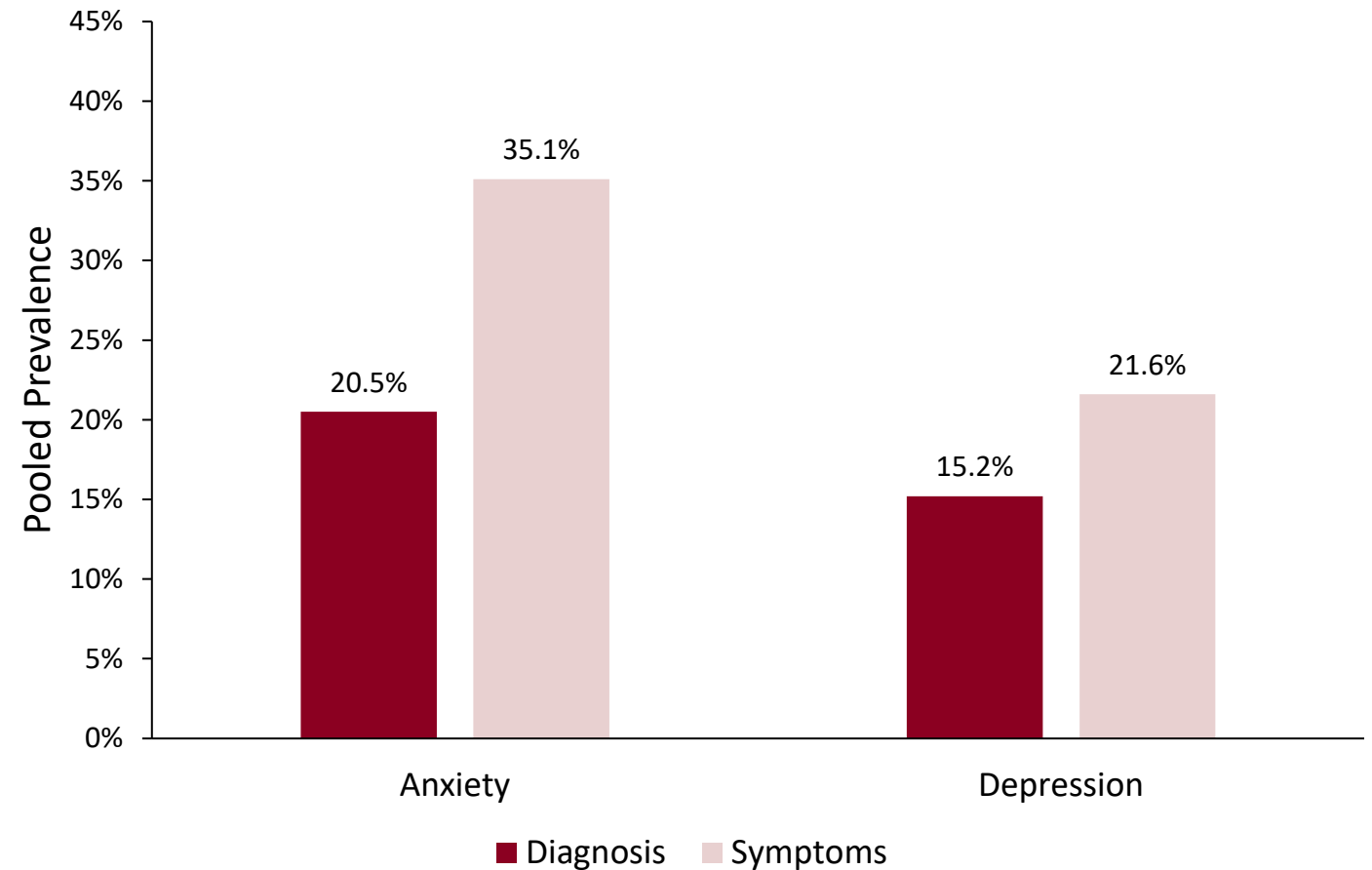
DANIELS • KARUSH  
FLOOD • O'S





# Prevalence of Anxiety and Depression in IBD

- **Systematic Review of 171 studies**
- **N= 158,371**



# Prevalence and Risk Factors of Undiagnosed Depression and Anxiety Disorders

N=242	Total Diagnosed	Previously Undiagnosed
Depression	97 (40.1%)	34 (35.0%)
Anxiety	74 (30.6%)	48 (64.9%)

- **Men** were **more likely** to have an undiagnosed depressive disorder (OR 3.36; 95% CI 1.28–8.85).
- **Nonwhite** participants were **less likely** to have an undiagnosed anxiety disorder (OR 0.17; 95% CI 0.042–0.72).

# IBD Psychology Interest Group (I-PInG)

Dedicated to understanding and addressing the psychosocial needs of IBD patients

- 1. Clinical Care:** Incorporating mental health screening and treatment into the care of patients with IBD.
- 2. Clinical Research:** Studying the association between psychosocial factors (sexual health, mental health, socioeconomic status) and IBD outcomes.
- 3. Biological Mechanisms:** Basic and translational research. Understanding the biology of mental health and IBD.



Alyse Bedell, PhD



Allie McDermott



Adar Zinger, MD/PhD



Natalie Choi, BA

# Understanding Mental Health in IBD Patients

JOURNAL ARTICLE

## P314 C-Reactive protein is associated with depression and anxiety in patients with inflammatory bowel disease <sup>FREE</sup>

T Rodriguez, J Karpin, C Traboulsi, V Rai, D Rubin

*Journal of Crohn's and Colitis*, Volume 14, Issue Supplement\_1, January 2020, Page S311,  
<https://doi.org/10.1093/ecco-jcc/jjz203.443>

**Published:** 15 January 2020

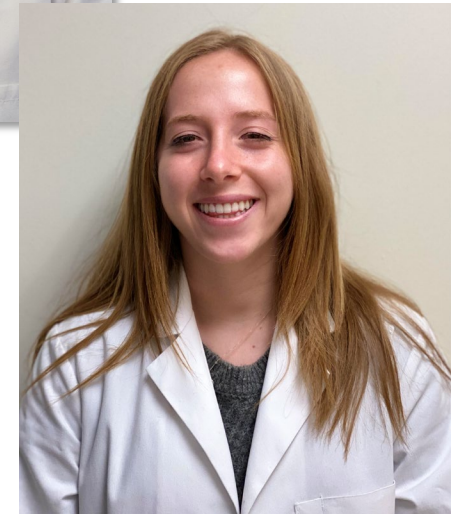
> *Crohns Colitis* 360. 2021 Jan;3(1):otaa095. doi: 10.1093/crocol/otaa095. Epub 2021 Feb 6.

## Assessment of Comorbid Depression and Anxiety in Inflammatory Bowel Disease Using Adaptive Testing Technology

Jordan Karpin <sup>1 2</sup>, Tina G Rodriguez <sup>1 2</sup>, Cindy Traboulsi <sup>2</sup>, Victoria Rai <sup>2</sup>, Robert D Gibbons <sup>3</sup>,  
David T Rubin <sup>2</sup>



Tina Rodriguez

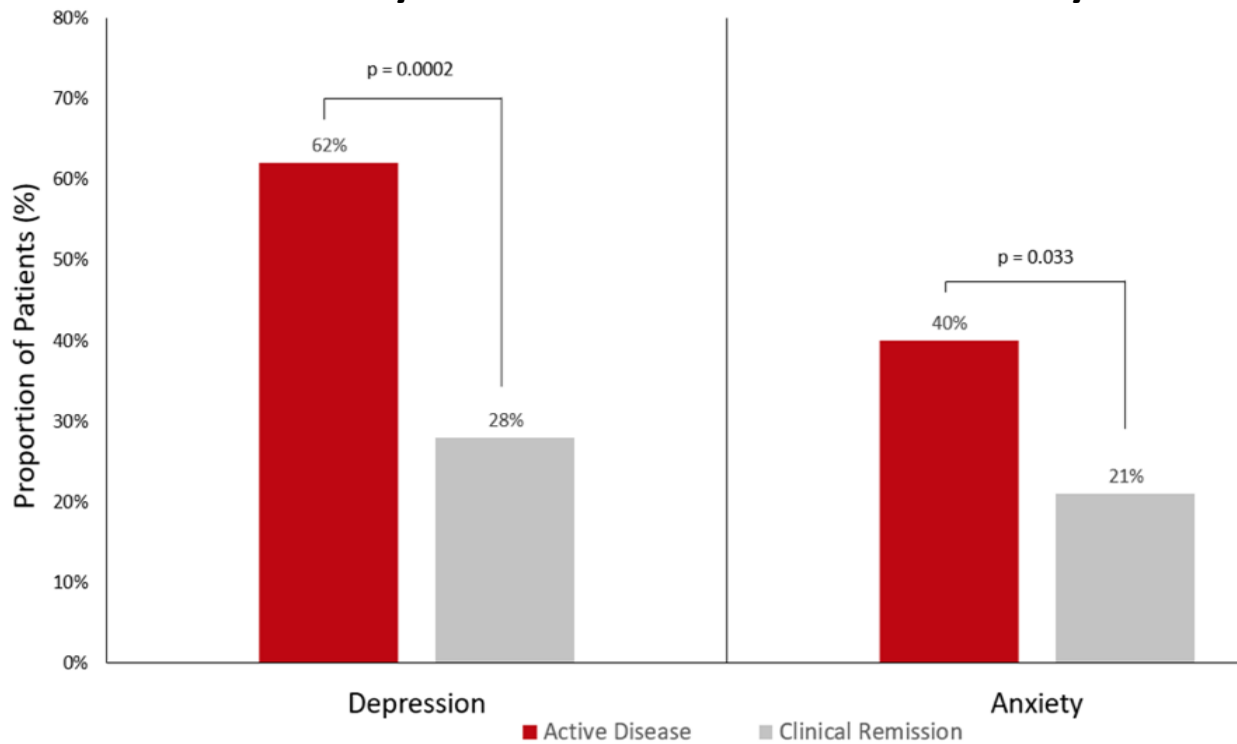


Jordan Karpin

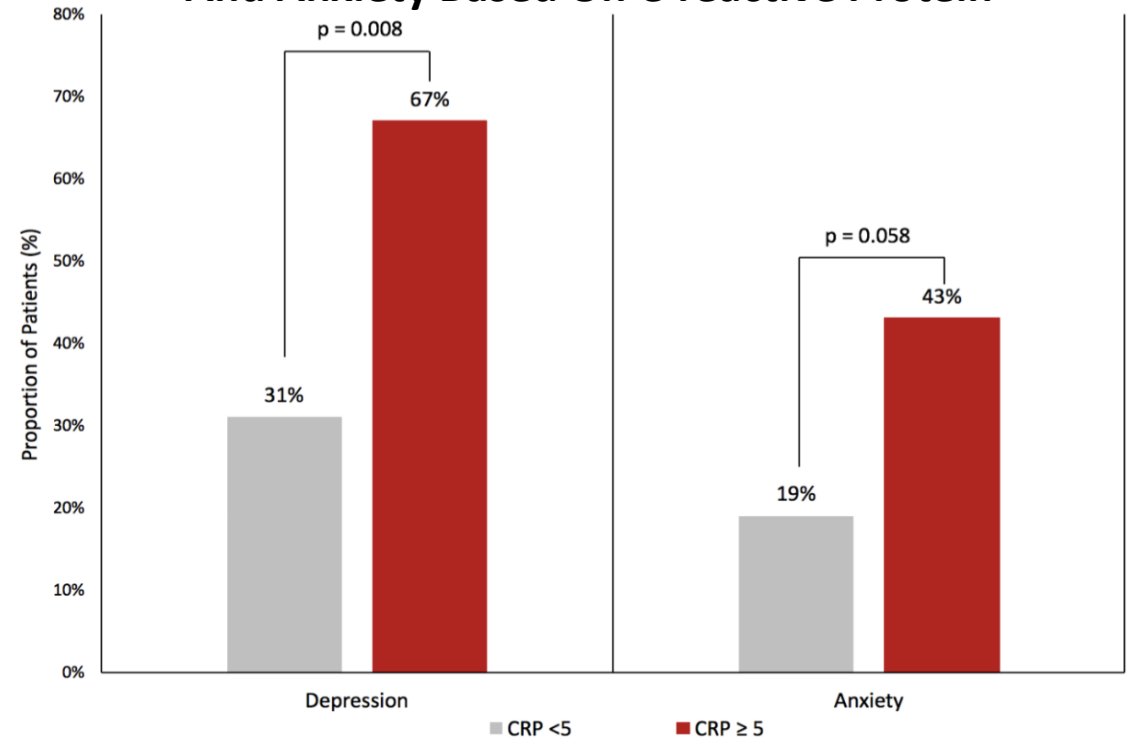


# Depression and Anxiety are More Prevalent in Patients with Active IBD

## Proportion Of Patients With Depression And Anxiety Based On Clinical Disease Activity



## Proportion Of Patients With Depression And Anxiety Based On C-reactive Protein

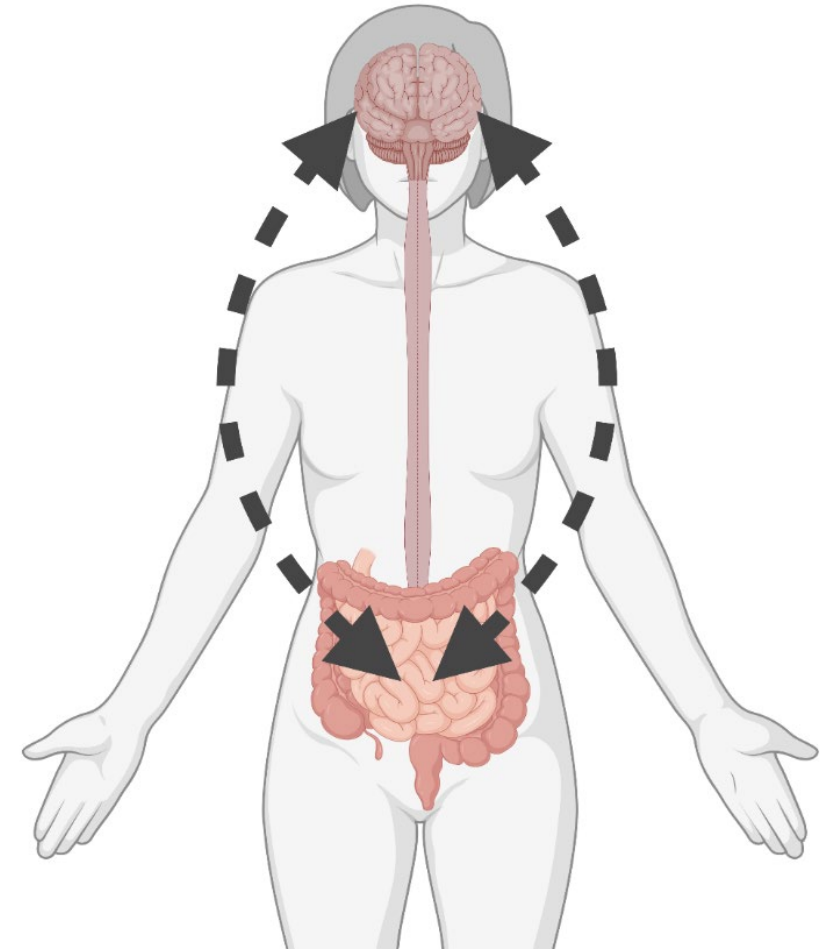
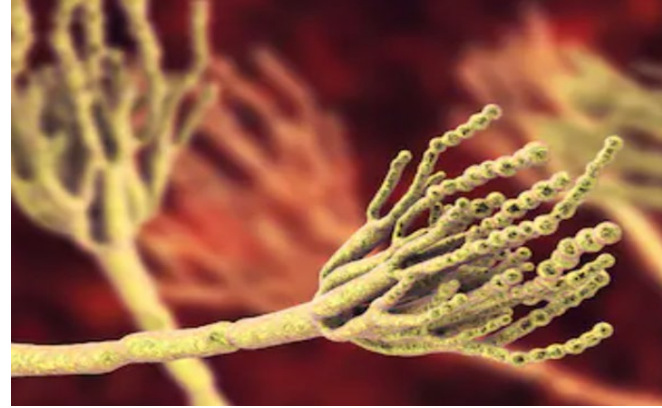


# How do bacteria talk and how do they interact with the human body?

## Metabolomics in IBD

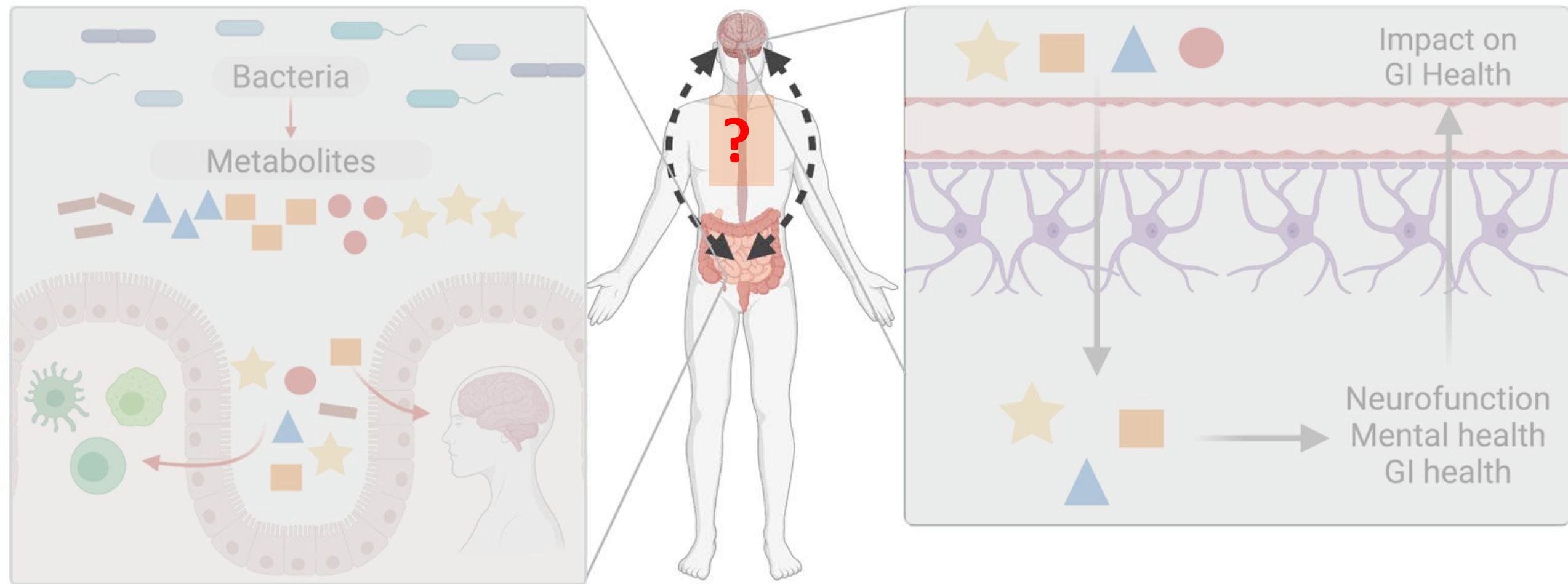
**Ashley M. Sidebottom, PhD**

# Microbes and the Environment



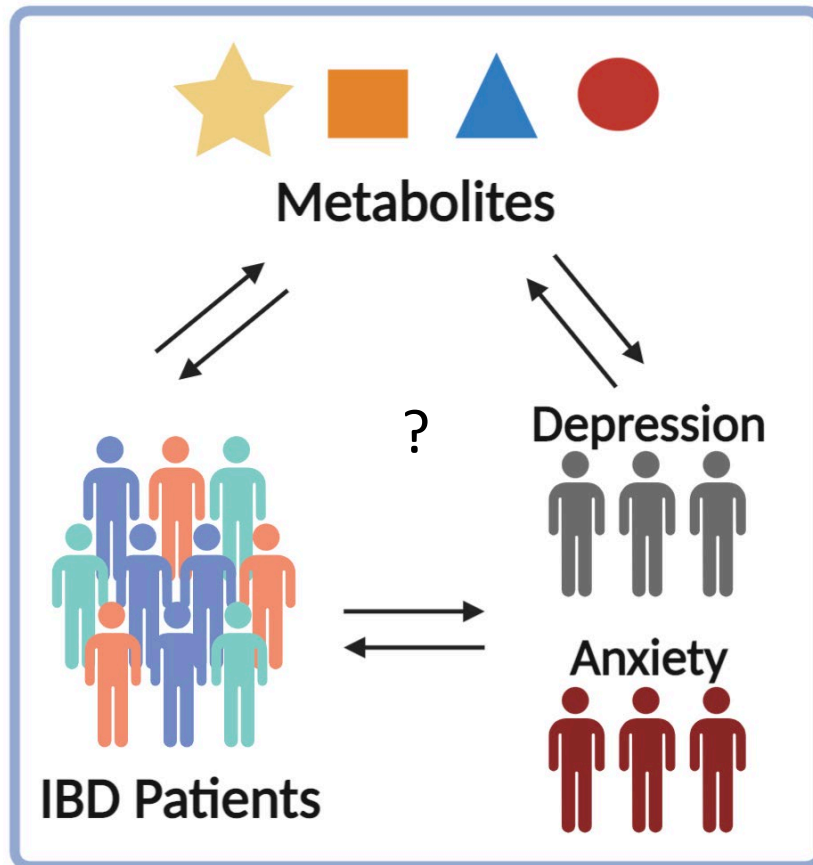


# Gut-Brain Axis Impact on IBD

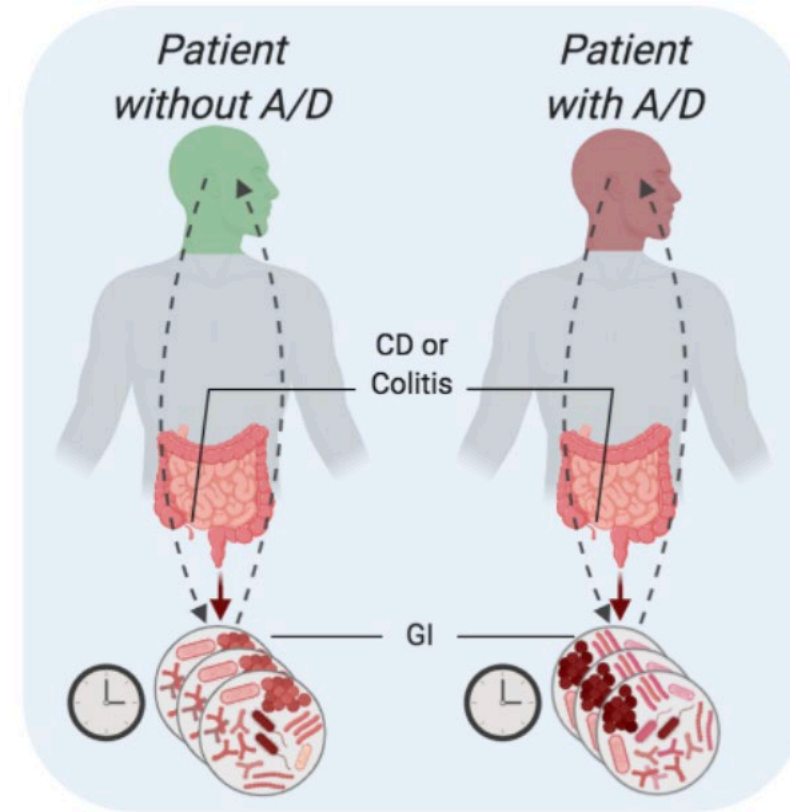


# Metabolite Analyses to Connect IBD and Mental Health

## IBD – Mental Health - Metabolites



## Analysis of UChicago Patients



*A/D = anxiety/depression*

# Blood Spot Card Collection and Analyses

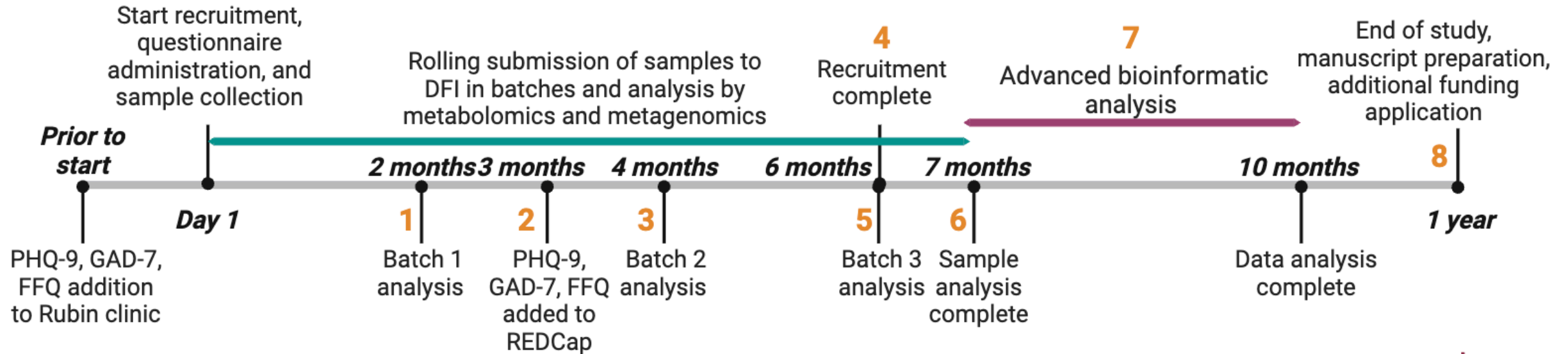


**Blood spot card sample collection**

- ✓ In clinic collection
- ✓ Small sample volume requirement
- ✓ Basic storage protocols
- ✓ Established protocols for compounds of interest
- ✓ Untargeted metabolomics – discovery

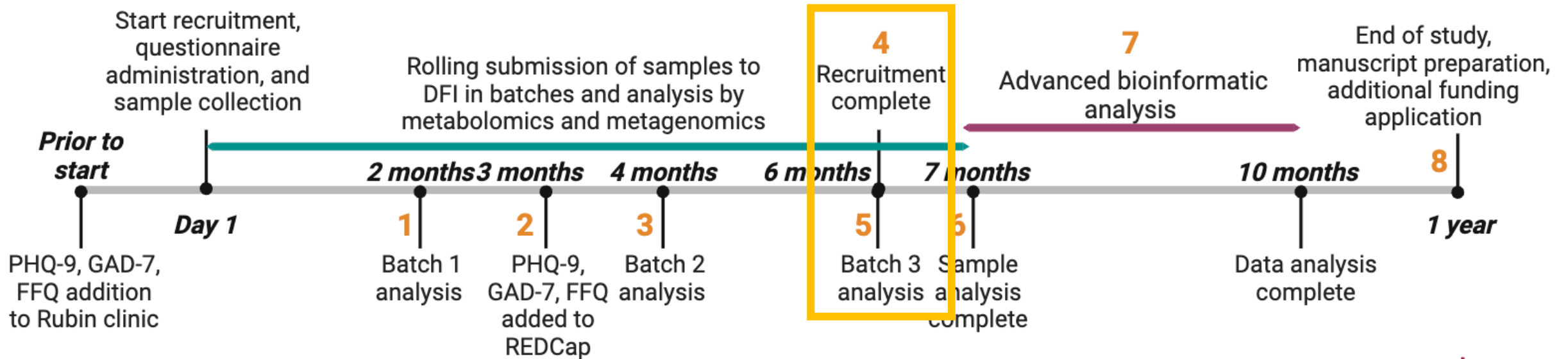


# Study and Analyses Timeline



## — Milestones


# Current Progress



## ● Milestones

- **Blood spot card method development:** High enrollment and successful implementation of blood spot cards in clinic
- **Metabolomics:** Analyzed Batches 1, 2 and analyzing Batch 3.
- **PHQ-9 and GAD-7:** Successfully implemented in clinic. More patients needed in higher score groups for statistical analyses.
- **IRB amendment:** Amended IRB protocol to increase patients in mental health groups.

# Clinic to Data Analysis



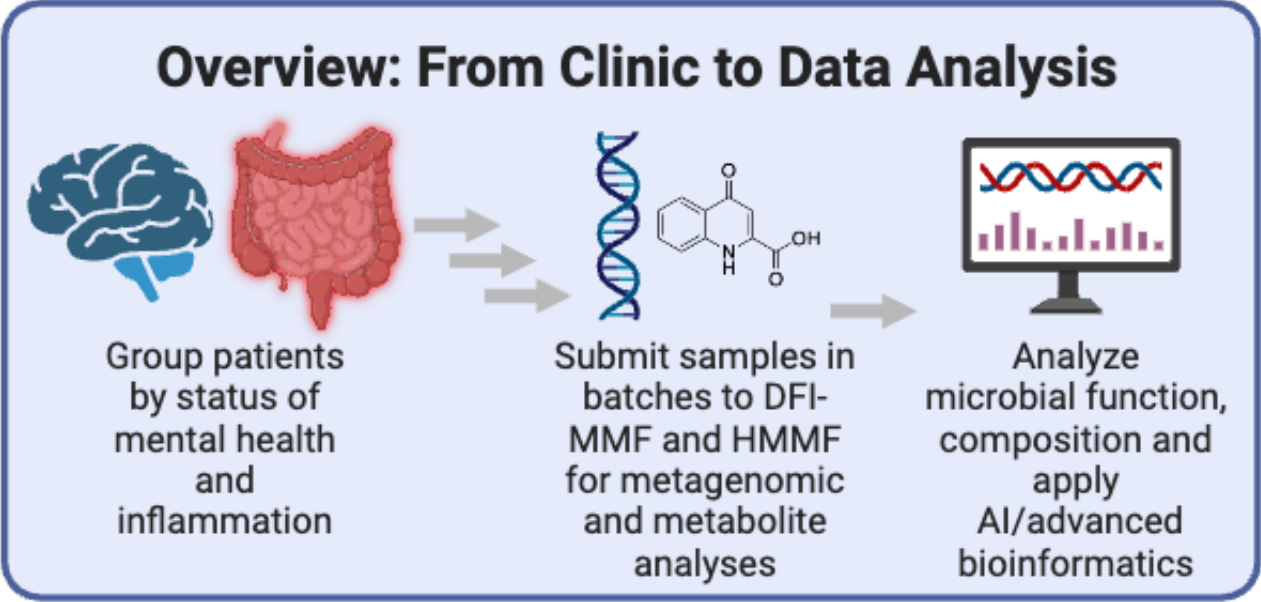
## Overview of questionnaires and sample collection strategy

Mental Health	Inflammation	Diet and Lifestyle
PHQ-9* GAD-7*	Endoscopy and/or Patient reported & CRP levels	Home stool collection questionnaire (GENESYS) and FFQ*

\*REDCap for virtual by 3 months

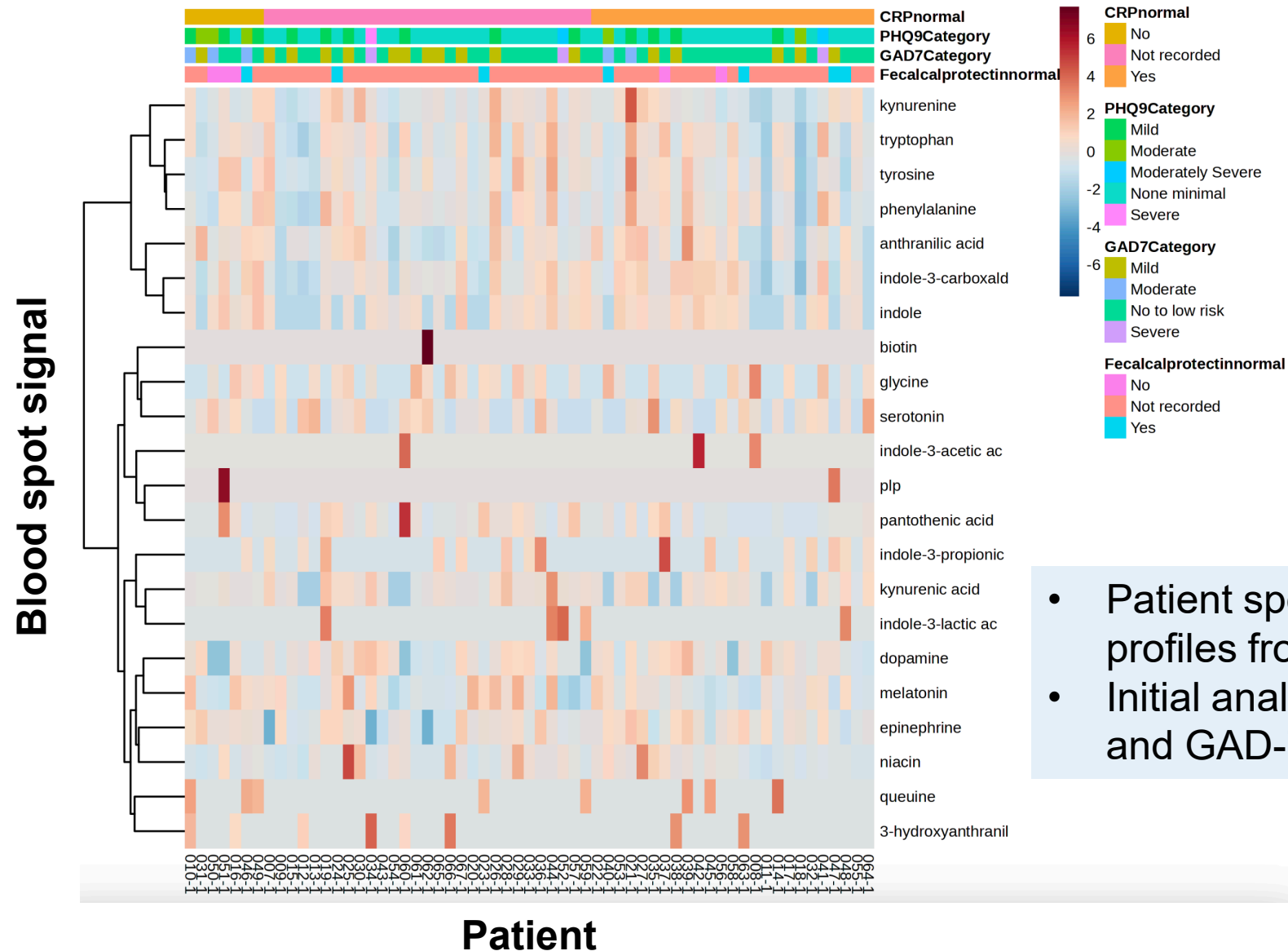
**Sample Collection (GENESYS<sup>1</sup> and IRB20-1949<sup>2</sup>)**

- Whole blood<sup>1</sup> - blood spot card and blood draw
- Urine<sup>1</sup>
- Fecal - at home<sup>1</sup> or in clinic<sup>2</sup>
- Biopsies<sup>1</sup> - endoscopy required





# Metabolite Profiles: Mental Health Score, CRP, Calpro



- Patient specific metabolite profiles from blood
- Initial analyses with PHQ-9 and GAD-7 scores

# Current PHQ – 9 and GAD – 7 in Population

## Patient Health Questionnaire - 9 PHQ - 9 Groups



None-Minimal  
Mild  
Moderate  
Moderately Severe  
Severe

## Generalized Anxiety Disorder Assessment - 7 GAD - 7 Groups



No to low risk  
Mild  
Moderate  
Severe

### Current Mental Health Status Results in Cohort

	None minimal (0-4) No to low risk (0-4)	Mild (5-9)	Moderate (10-14)	Moderately Severe (15-19, PHQ-9) Severe (15-21, GAD-7)	Severe (20-27, PHQ-9)
PHQ-9 Score (n=117)	58% (68)	24.3% (29)	12% (14)	2.5% (3)	2.5% (3)
GAD-7 Score (n=117)	61.5% (72)	23.1% (27)	11.1% (13)	4.3% (5)	NA

# Current IBD in Population

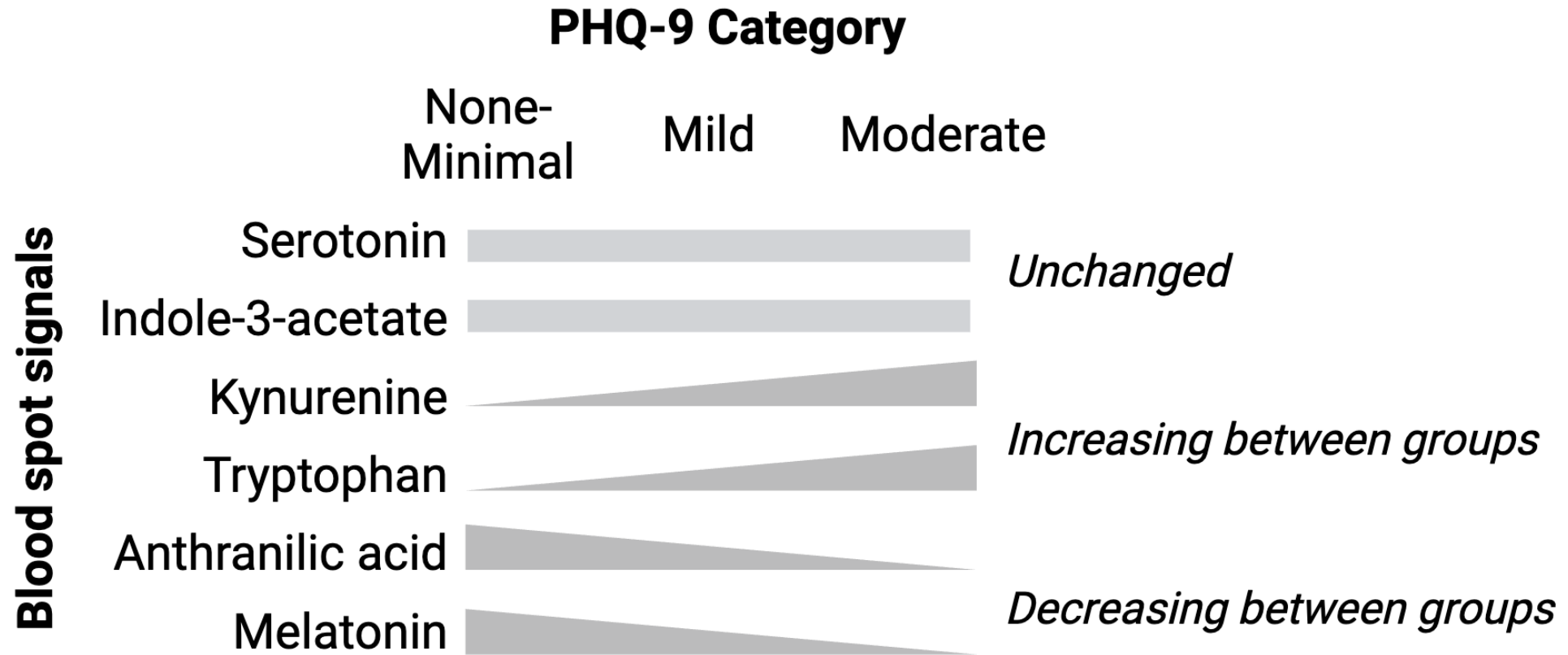
## Current IBD Diagnoses in Cohort

	None minimal (0-4) No to low risk (0-4)	Mild (5-9)	Moderate (10-14)	Moderately Severe (15-19, PHQ-9) Severe (15-21, GAD-7)	Severe (20-27, PHQ-9)
<b>Crohn's Disease (n=71)</b>					
PHQ-9	67.6% (48)	22.5% (16)	7% (5)	1.4% (1)	1.4% (1)
GAD-7	66.2% (47)	24% (17)	8.5% (6)	1.4% (1)	NA
<b>Ulcerative Colitis (n=39)</b>					
PHQ-9	43.6% (17)	28.2% (11)	20.5% (8)	5.3% (2)	2.6% (1)
GAD-7	53.9% (21)	20.5% (8)	15.4% (6)	10.3% (4)	NA

Clinical disease activity score, histology, and endoscopic findings to be included for full analyses

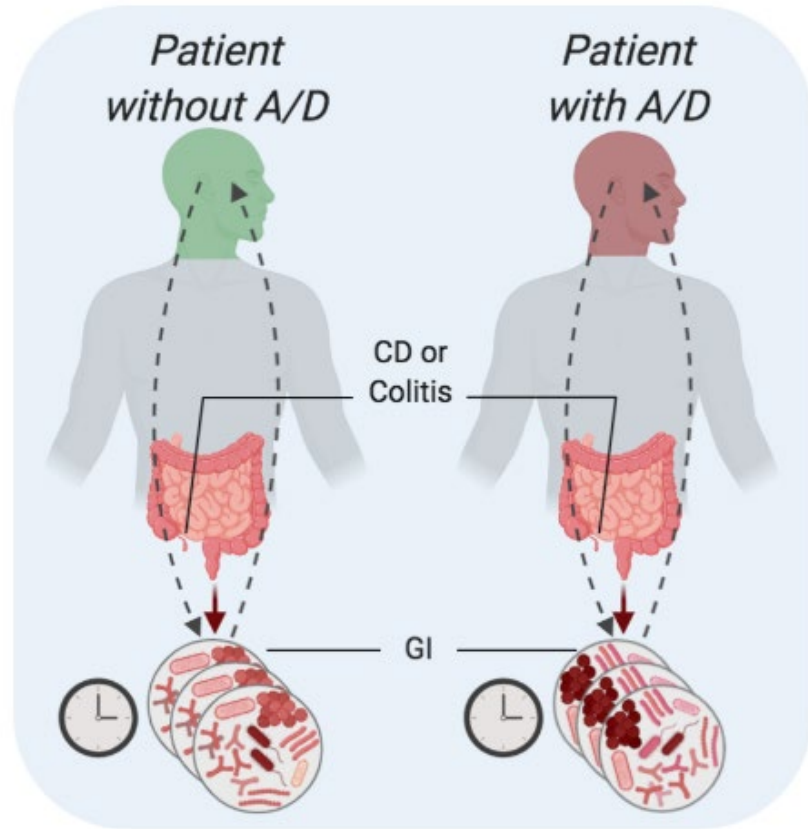


# Preliminary Distinguishing Signals with PHQ – 9 Group



- Significant blood spot signals between PHQ-9 None-minimal, Mild and Moderate
- Additional patients will be analyzed for more severe scores (Moderately severe, Severe)

# Future Studies and Work



*A/D = anxiety/depression*

## Research Questions

- What differences are detected over time in patients with or without A/D?

## Clinical Impact

- Discovery of new disease biomarkers
- Discovery of new pathways to target for treatment
- Groundbreaking work in gut-brain axis field