Rates of HIV in Florida Before versus After Syringe Services Program Implementation: An Exploratory Difference-in-Difference Analysis

Bedis Elkamel

Dr. Joy D. Scheidell

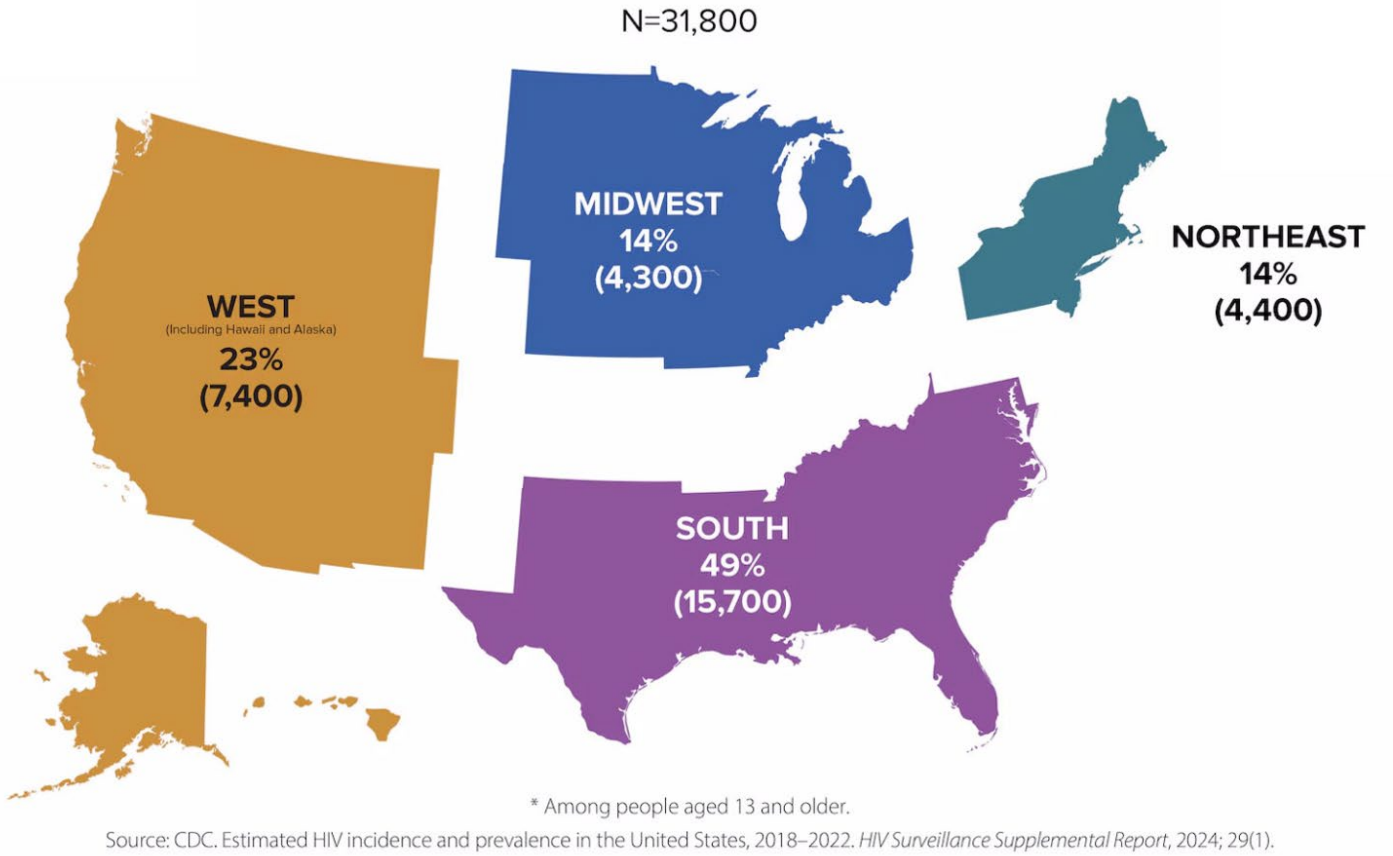
University of Central Florida

Outline

Introduction

- HIV remains a major U.S. public health issue, affecting over a million people
- Florida has the 3rd highest rate of new HIV diagnoses in the U.S. (22 per 100,000), with notable disparities by county and demographic group
- Needle sharing is a common route of HIV transmission
- Syringe service programs (SSPs) provide sterile equipment and connect individuals to care, but remain underutilized in Florida despite their proven effectiveness in reducing blood-borne infections

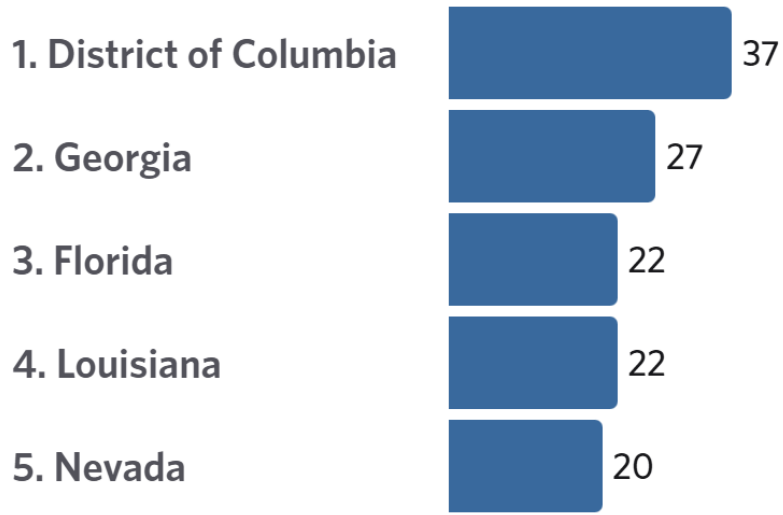
HIV Infections in the US by Region and State in 2022



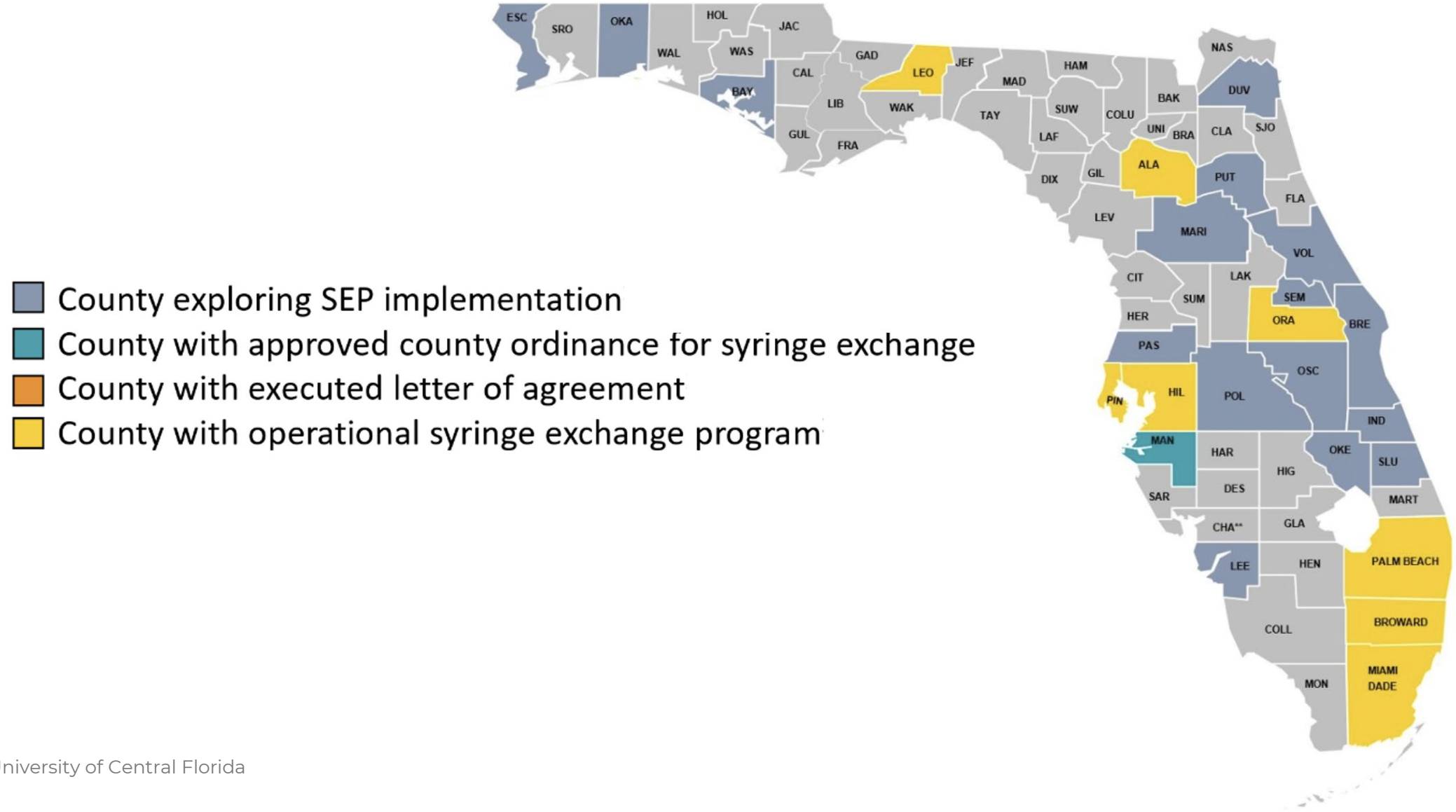
* Among people aged 13 and older.

Source: CDC. Estimated HIV incidence and prevalence in the United States, 2018–2022. *HIV Surveillance Supplemental Report*, 2024; 29(1).

New Diagnoses Rate per 100k by State



Syringe Service Program Implementation in Florida



Current Findings

- The IDEA SSP in Miami, launched in 2016, has shown sustained success, including reducing opioid-related deaths through naloxone distribution and aiding in early HIV detection
- Although SSPs were authorized statewide in 2019, most counties have not implemented them, making Miami the focus of current research
- The Miami SSP has led to fewer improperly discarded syringes, helped address wound and skin infections among participants, and proven to be a cost-effective strategy for managing the health risks of people who inject drugs

Research Gaps

- Most existing research in Florida has focused on Miami's SSP, with limited evaluation of programs in other counties
- Studies have largely examined individual-level outcomes, with little evaluation of population-level effects
- No studies have used a difference-in-difference (DID) method, which could strengthen evaluations of SSPs' population-level impact and provide valuable insights for public health policy

Research Question:

To what extent has SSP implementation affected HIV rates in Florida counties, compared to their non-implementing counterparts?

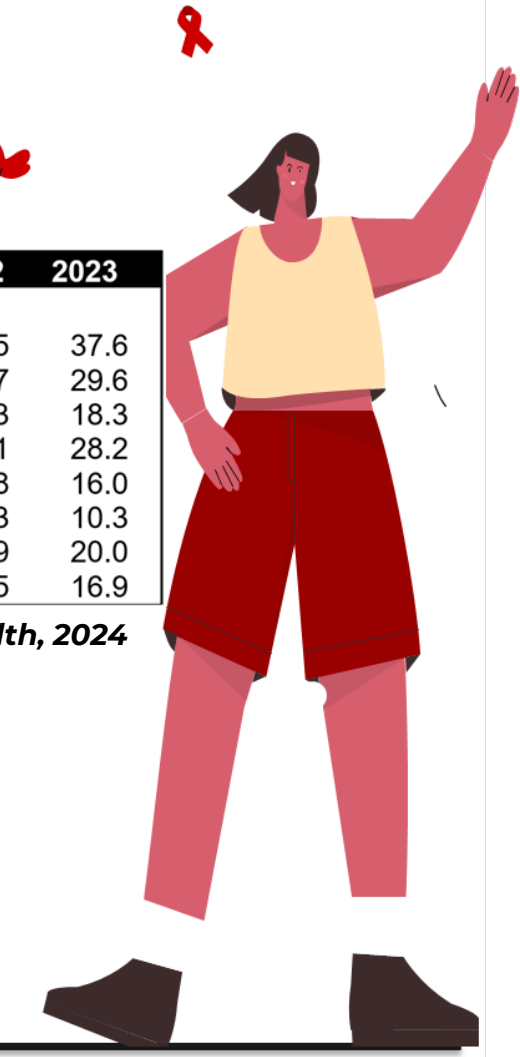
Methodology: Study Design & Sample

- Secondary data analysis of annual county-level rates of HIV in Florida from 2010 to 2023
- Counties were organized based on SSP status:
    1. **Category 1:** Counties with SSPs (Miami-Dade, Broward, Palm Beach)
    2. **Category 2:** Counties with similar population sizes and disease rates but have not yet committed to a SSP (Bay, Collier, Pasco, Polk, and St. Lucie)

HIV Incidence per 100,000 Population by Florida County (2010-2023)

County	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
							HIV Rates							
Miami-Dade	46.7	44.6	42.6	42.9	43.3	48.5	44.8	39.3	38.6	37.2	25.5	30.4	36.5	37.6
Broward	44.7	44.3	38.4	36.5	36.7	32.9	35.8	35.3	30.5	29.1	21.9	28.1	29.7	29.6
Palm Beach	23.6	23.4	19.4	23.3	23.1	19.9	20.4	20.4	18.5	15.4	13.6	18.6	19.3	18.3
Bay	14.8	10.0	10.0	16.5	12.8	9.8	10.2	17.3	17.6	17.8	7.4	24.3	22.1	28.2
Collier	12.7	12.6	11.2	9.9	9.5	12.7	14.2	12.0	9.8	9.3	3.6	8.0	14.8	16.0
Pasco	6.4	9.9	8.7	5.5	7.1	8.8	9.2	7.7	9.8	8.2	7.0	8.4	13.3	10.3
Polk	16.6	15.4	13.8	14.1	13.8	15.4	18.1	14.3	15.4	18.3	10.6	16.8	15.9	20.0
St. Lucie	21.2	18.9	14.6	15.3	16.9	11.8	17.0	21.7	16.1	14.2	8.5	12.2	16.5	16.9

Source: Florida Department of Health, 2024

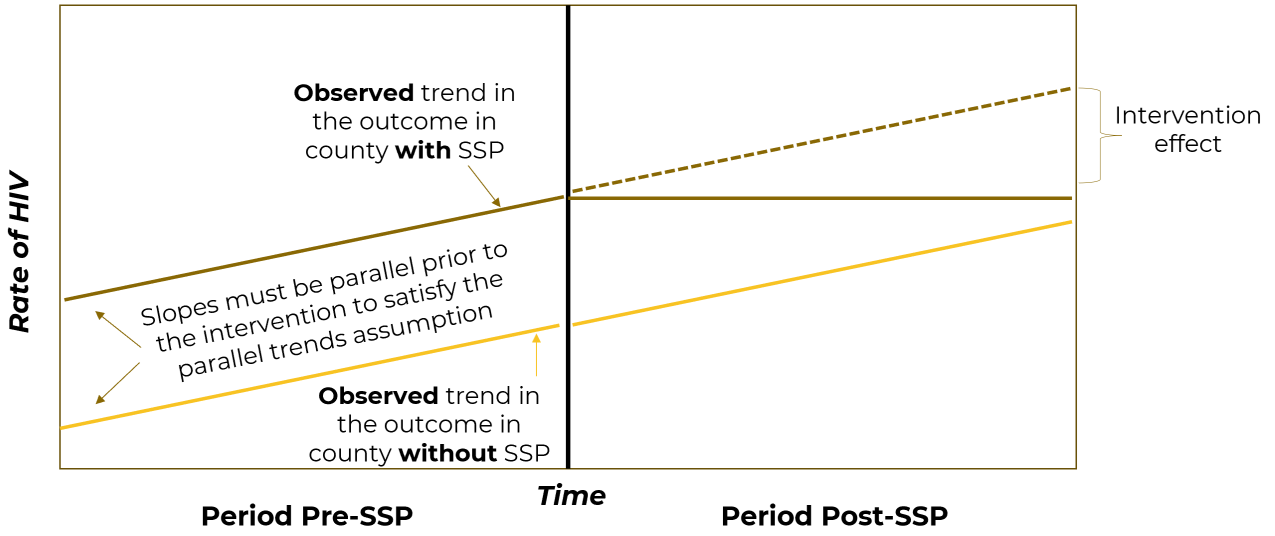


Measures

- HIV Rates: Annual number of new HIV diagnoses per 100,000 population
- Time Periods: Pre-implementation (2010–2016) vs. post-implementation (2017–2023)
- County Population Data: Annual county population estimates were used to calculate HIV rates per 100,000 residents
- Status: Defined by official SSP implementation dates

Analysis: The Difference-in-Difference Method

- The difference-in-difference method is a quasi-experimental design that allows for casual inference
- It was first used by John Snow in the famous cholera epidemic investigation
- It compares changes in the outcome over time between the treatment group and a control group that did not receive the intervention
- Requires the satisfaction of the parallel trends assumption, which ensures that in the absence of an intervention, the rates in the treatment and control counties would remain constant

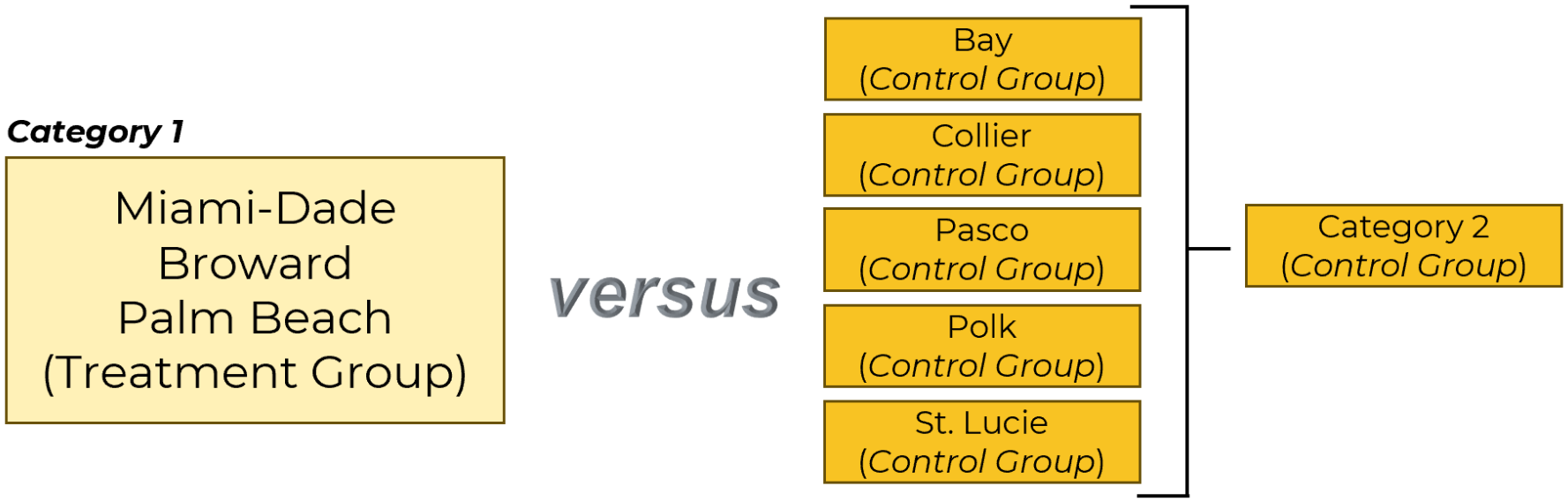


Analysis: Comparison Methods

- To estimate changes in HIV rates over time between counties with and without SSPs, we used two approaches:

1. Group Comparisons:

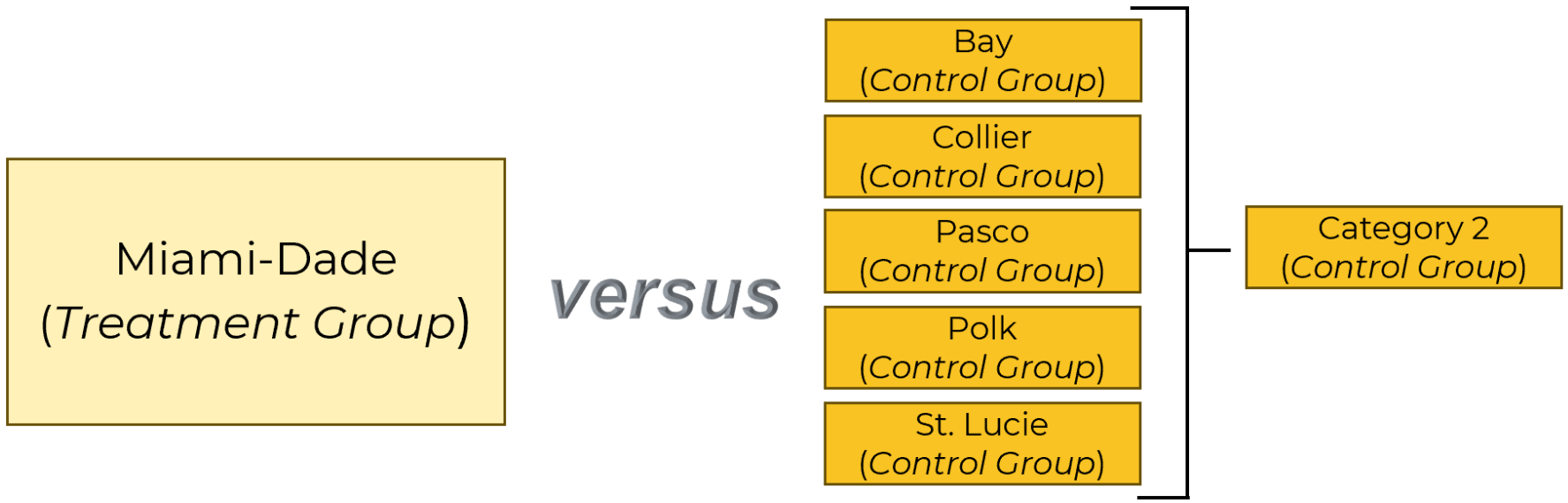
Category 1 (treatment group) was compared to each county in Category 2 individually, as well as to Category 2 counties grouped together, to assess broader trends in disease rate changes



Analysis: Comparison Methods

2. Individual County Comparisons:

Miami-Dade, which is home to the most established SSP site in Florida, was individually compared to each Category 2 county to evaluate the impacts of SSP implementation, as well as to Category 2 counties grouped together, to assess broader trends in disease rate changes

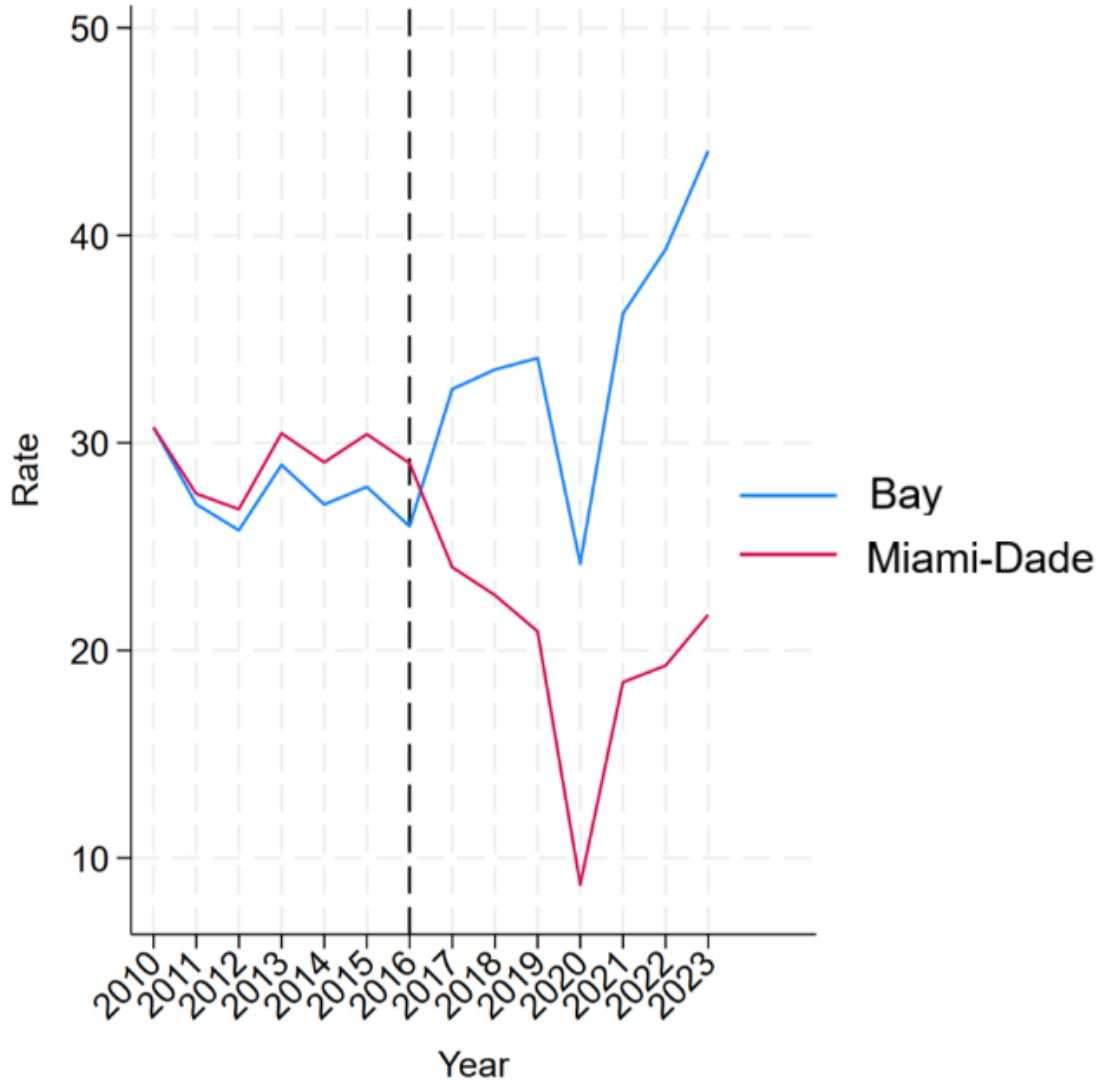


Results: Effect of SSPs on HIV Rates: DID Analysis Across Category 1, Miami-Dade, and Category 2 Counties

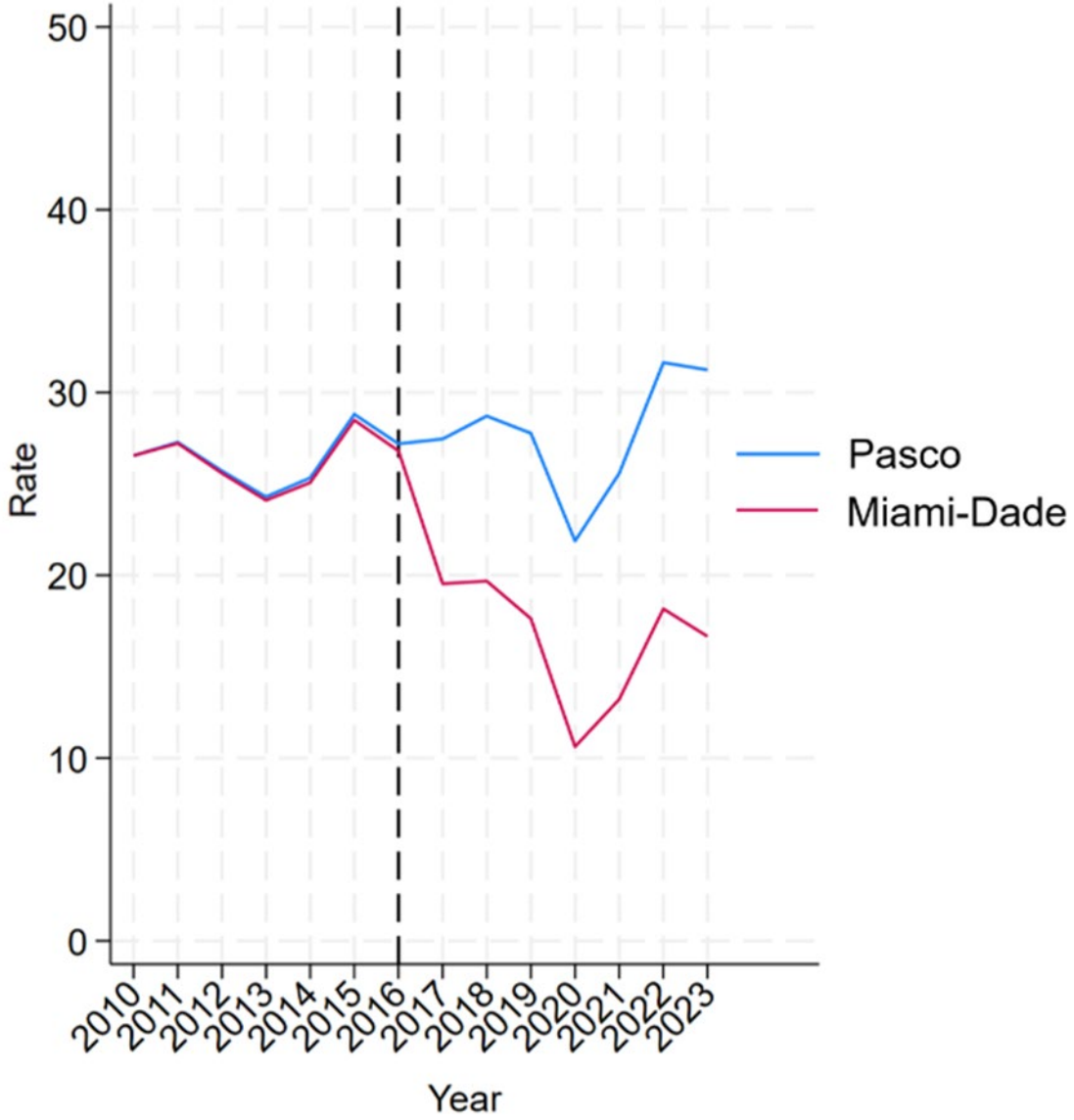
95% Confidence Interval	
County Comparison	**HIV**
Category 1 vs. Bay	-15.0 (-21.2, -8.7) **
Category 1 vs. Collier	-6.4 (-12.7, -0.2) **
Category 1 vs. Pasco	-9.0 (-15.3, -2.8) **
Category 1 vs. Polk	-8.3 (-14.6, -2.1) **
Category 1 vs. St. Lucie	-6.4 (-12.6, -0.1) **
Category 1 vs. Category 2	-9.0 (-14.5, -3.5) **
Miami-Dade vs. Bay	-17.0 (-25.0, -9.0) **
Miami-Dade vs. Collier	-8.4 (-25.3, 8.4)
Miami-Dade vs. Pasco	-11.1 (-14.6, -7.6) **
Miami-Dade vs. Polk	-10.3 (-16.7, -4.0) **
Miami-Dade vs. St. Lucie	-8.4 (-11.1, -5.7) *
Miami-Dade vs. Category 2	-11.0 (-15.4, -6.7) **

* indicates statistical significance ($p < 0.05$).
** indicates statistical significance and satisfaction of the parallel trends assumption.

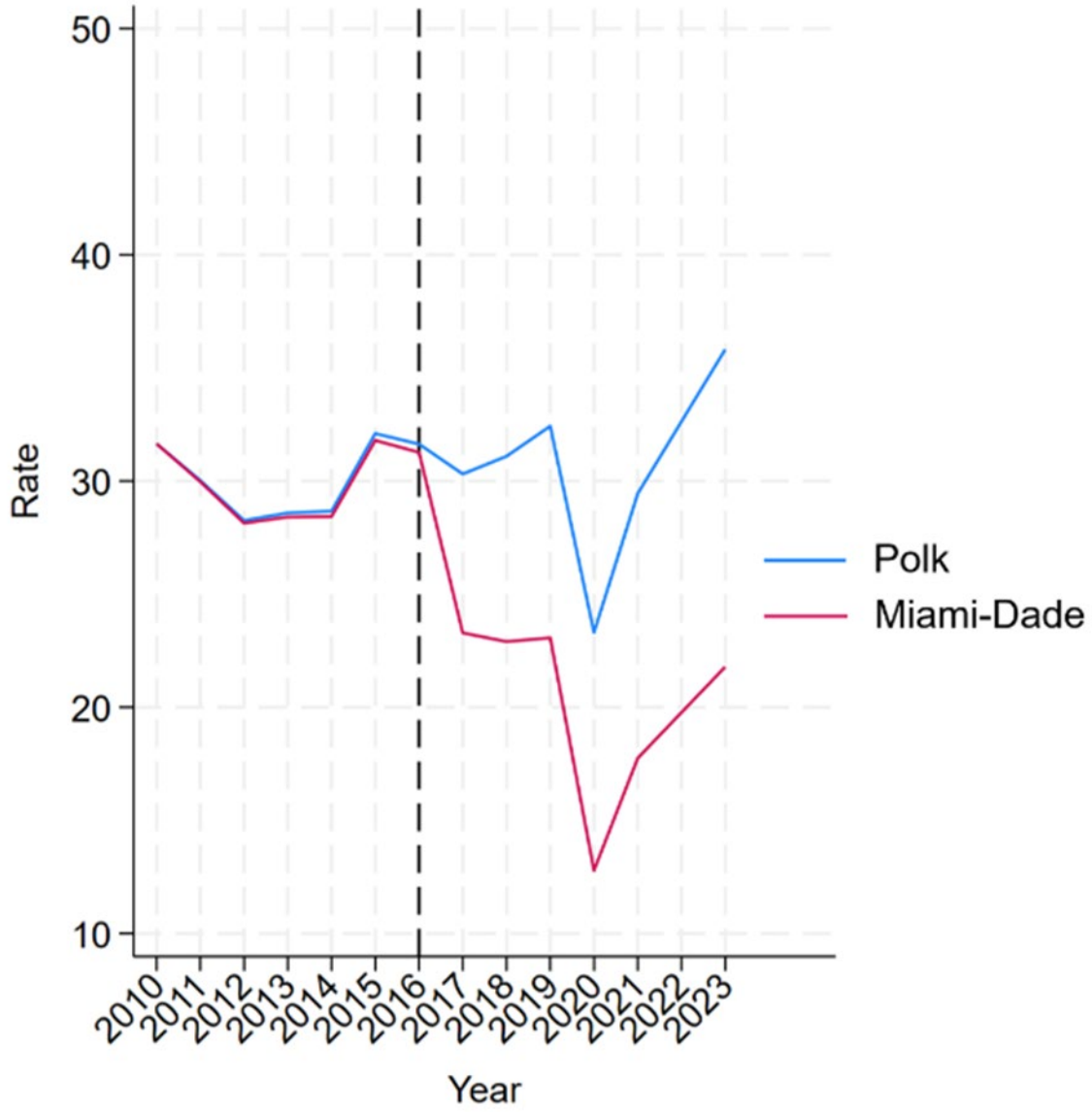
Visualizing the Parallel Trends Assumption for HIV Rates in Miami-Dade County vs. Bay County



Visualizing the Parallel Trends Assumption for HIV Rates in Miami-Dade County vs. Pasco County



Visualizing the Parallel Trends Assumption for HIV Rates in Miami-Dade County vs. Polk County



Discussion

- SSP implementation was associated with significant reductions in HIV rates in treatment counties compared to non-SSP counties
- Category 1 counties and Miami-Dade showed consistent post-implementation declines, though not all comparisons met statistical significance or parallel trends criteria (Miami-Dade vs. Collier and St. Lucie)
- Findings extend prior U.S. based research by demonstrating population-level effects in Florida using the DID method
- Other Florida counties should consider implementing SSPs, using this research and successful models like IDEA Miami to adapt programs to local contexts

Limitations & Future Steps

Limitations

- Palm Beach and Broward County SSP Implementation
- Visual Inspection of Parallel Trends

Future Steps

- Differing Time Periods and Treatment Groups
- Analyze Other Blood-Borne Infections and STIs

Conclusion

- This study is the first to apply a difference-in-difference approach to SSP evaluation in Florida
- The results support the population-level effectiveness of SSPs in reducing HIV and provide important evidence for counties considering implementation
- Statewide SSP expansion could improve community health outcomes and reduce the public health burden of HIV
- Future studies should address this study's limitations and evaluate SSPs across diverse settings, including their impact on other STBBIs such as syphilis and HCV, to strengthen the evidence base

THANK YOU

bedis.elkamel@ucf.edu