


**Area disadvantage and intimate partner homicide:
An ecological analysis of North Carolina counties, 2004-06**

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Presenter Disclosures

Aubrey Spriggs Madkour

The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

No relationships to disclose.

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I. Background

- 2005: 329 males & 1,181 females killed by partner
- Number and rates of IPV homicide have been **declining** since 1976
- Numerous **individual and couple-level** risk factors for IPV homicide
- Also documented differences in IPV homicide across **communities**

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I. Background

```
graph LR; A[Area disadvantage] -- - --> B[Victims' services availability]; B -- - --> C[Intimate partner homicide]; A -- "+ / ns" --> C;
```

- **Positive association** in three ecological studies (Chicago community areas; NYC Census tracts; U.S. States)
- **No association** in one multilevel study (NYC female IPV homicide victims vs. other female homicide victims)

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I. Background

```
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```

- **29 cities:** Availability of IPV victims' services associated with decline in female-perpetrated IPH

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I. Background

```
graph LR; A[Area disadvantage] -- - --> B[Victims' services availability]; B -- - --> C[Intimate partner homicide]; A -- "+" --> C;
```

- **Across the U.S.:** County disadvantage negatively associated with victim services availability

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II. Hypotheses

The diagram illustrates a conceptual model with the following components and relationships:

- County demographic characteristics** (bottom left) has a positive arrow pointing to **Concentrated disadvantage**.
- Concentrated disadvantage** (middle left) has a negative arrow pointing to **IPV Services / Funding** (top center).
- IPV Services / Funding** has a positive arrow pointing to **County partner homicide rate** (middle right).
- Rurality** (bottom center) has a positive arrow pointing to **County partner homicide rate**.
- County demographic characteristics** has a direct positive arrow pointing to **County partner homicide rate**.
- There are also negative arrows from **Concentrated disadvantage** and **IPV Services / Funding** pointing to **County partner homicide rate**.

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II. Hypotheses

```

    graph TD
      A[County demographic characteristics] --> B[Concentrated disadvantage]
      A --> C[Rurality]
      B --> D[IPV Services / Funding]
      B --> E[County partner homicide rate]
      C --> D
      C --> E
      D --> E
      D --> B
  
```

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III. Methods

North Carolina Violent Death Reporting System (NC-VDRS)

- Registry of all violent deaths in North Carolina, 2004-2006
- Data from medical examiners, law enforcement, and the DOH

Census (2000)

IPV Services and Funding Data (NC Council for Women)

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III. Methods

OUTCOME: Average annual gender-specific county intimate partner homicide rate, 2004-06

IPH = death where victim-to-suspect relationship is coded as 1—Spouse or other intimate partner (current or ex)

$$AvgAnnualRate = \frac{IPH_{2004} + IPH_{2005} + IPH_{2006}}{MidYearPop_{2004} + MidYearPop_{2005} + MidYearPop_{2006}}$$

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III. Methods

PREDICTOR: County concentrated disadvantage

- PCA of following county-level variables:
 - % HH which are below poverty
 - % HH which are female-headed
 - % HH receiving public assistance
 - % adults (≥25) <high school diploma
 - unemployment rate

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III. Methods

MODERATOR: County Rurality

- Urban-rural continuum codes from USDA (2003)
 - Metropolitan counties distinguished by size of population (3 levels)
 - Non-metro counties distinguished by degree of urbanization & adjacency to metro area (6 levels)
 - Recategorize to:
 - 0 = Metropolitan counties
 - 1 = Non-metro with urban core
 - 2 = Non-metro without urban core

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III. Methods

MEDIATORS

- **IPV Service Availability**
 - Any shelter in county
 - Average number of days shelter was full, 2004-06
 - Average number of referrals made due to shelter being full, 2004-06
- **IPV Funding**
 - Per capita IPV funding from all Federal and State sources, 2004-05

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III. Methods

CONTROLS: Demographic characteristics

- Percent of population between ages 20-40
- Female-to-male sex ratio ages 15+

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III. Methods

- Stata 9.2
- Start with univariate and bivariate analyses
- Poisson regression models, with population offsets, stratified by gender
- Mediation tested using Baron & Kenny logical criteria & Sobel tests

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IV. Results - Descriptive

Decedent Characteristics, 2004-06 (n=247)

Gender

| | |
|--------|-----|
| Female | 30% |
| Male | 70% |

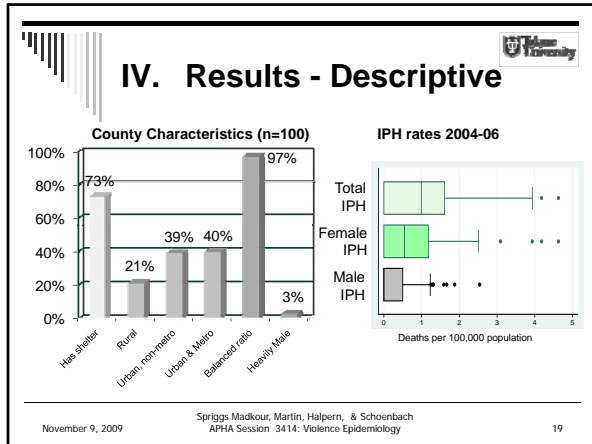
Race

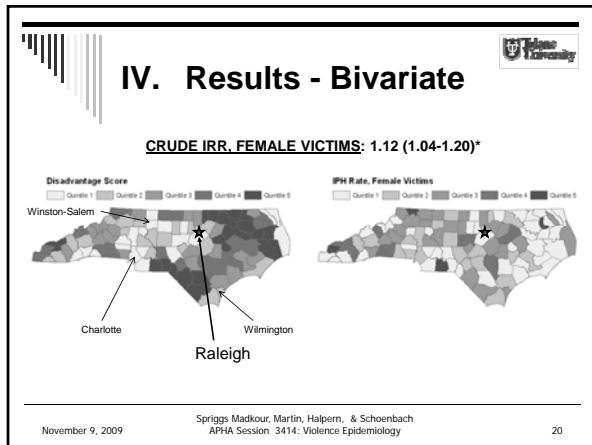
| | |
|-------|-----|
| White | 43% |
| Black | 53% |
| Other | 4% |

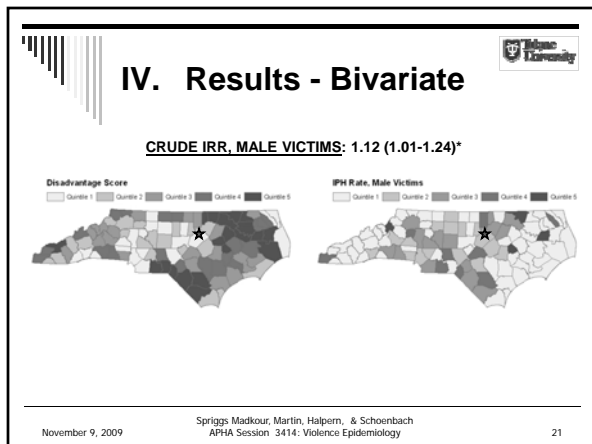
Perpetrator

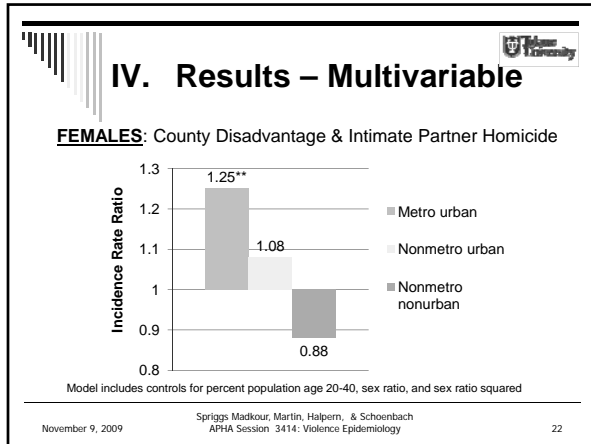
| | |
|-----------------------|-----|
| Boyfriend/ girlfriend | 45% |
| Spouse | 55% |

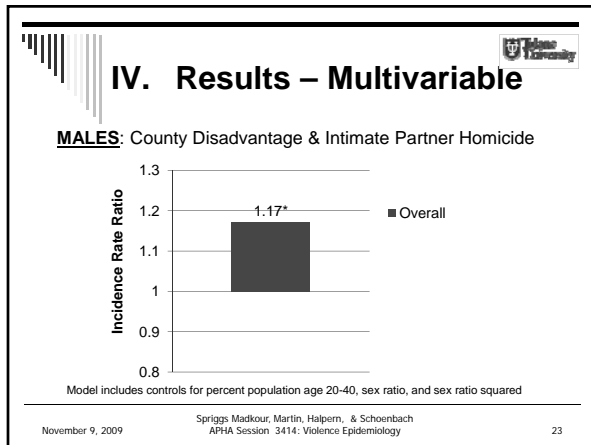
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- ### IV. Results - Mediation
1. Baron & Kenney
 - Some service/funding variables related to Disadvantage
 - None related to IPH
 - **Mediation not supported**
 2. Sobel
 - Adding mediators to model did not substantially alter effect estimates
 - Tests of effect estimate changes nonsignificant
 - **Mediation not supported**
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V. Conclusions

1. **Disadvantage and IPH:**
 - Female victims: positive but metro only
 - Male victims: positive regardless of urbanicity
2. **IPV services' availability and funding not supported as mediators**
 - Possible issues of service accessibility
 - Other factors that mediate (e.g., law enforcement responses)

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V. Conclusions

Limitations / Next Steps

- 1) Ecological Study – weak causal inference
 - Multilevel data
- 2) Cross-sectional data – limitations for assessing mediation
- 3) County level – appropriate geographic unit?
 - Utilize smaller geographic units
- 4) Event rarity - possible estimate instability
 - Repeat analysis with more years / other states

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APPENDIX 1

FEMALES: County Disadvantage & Intimate Partner Homicide

| | Model 1 IRR (95% CI) | Model 2 ^a IRR (95% CI) |
|---------------------|--------------------------|---------------------------------------|
| Disadvantage | 1.12 (1.04-1.20)* | 1.25 (1.10-1.42)** |
| Urbanicity | -- | |
| Metro urban | | Ref. |
| Nonmetro urban | | 0.78 (0.51 – 1.13) |
| Nonmetro nonurban | | 0.98 (0.39 – 2.48) |
| Interactions | -- | |
| D*NU | | 0.86 (0.72 – 1.04)[§] |
| D*NN | | 0.68 (0.43 – 1.14)[§] |

^aModel includes controls for percent population age 20-40, sex ratio, and sex ratio squared

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APPENDIX 2

MALES: County Disadvantage & Intimate Partner Homicide

| | Model 1 IRR (95% CI) | Model 2 ^a IRR (95% CI) | Model 3 ^a IRR (95% CI) |
|---------------------|--------------------------|--------------------------------------|--------------------------------------|
| Disadvantage | 1.12 (1.01-1.24)* | 1.09 (0.89-1.35) | 1.17 (1.02 – 1.35)* |
| Urbanicity | -- | | |
| Metro urban | | Ref. | Ref. |
| Nonmetro urban | | 1.41 (0.74 – 2.68) | 1.32 (0.72 – 2.43) |
| Nonmetro nonurban | | 0.76 (0.11 – 5.36) | 1.12 (0.30 – 4.27) |
| Interactions | -- | | |
| D*NU | | 1.13 (0.85 – 1.49) | -- |
| D*NN | | 1.38 (0.63 – 3.02) | -- |

^aModels include controls for percent population age 20-40, sex ratio, and sex ratio squared

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