

Work and Residential Characteristics Related to Pesticide Exposure among Latino Farmworkers

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Background 1

- ❑ Migrant and seasonal farmworkers experience numerous occupation hazards.
- ❑ Pesticide exposure is a major occupational hazard experienced by farmworkers.
- ❑ Pesticide exposure has been linked to immediate and long-term illnesses.



Background 2

- ❑ Organophosphorus (OP) pesticides are the most commonly used insecticides for agriculture.
- ❑ OPs are neurotoxins that are associated with neurobehavioral deficits, cancer, and infertility.
- ❑ Farmworkers are also exposed to other insecticides (e.g., pyrethroids, carbamates), and to herbicides.



Background 3

- Little research has measured the prevalence of pesticide exposure among farmworkers.
 - Small samples
 - Usually cross-sectional design
 - No research has documented a direct association between direct measures of farmworker pesticide exposure (biomarkers) and farmworker health outcomes.
 - Difficult to get biomarkers
 - Difficult to follow farmworkers for sufficient time
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PACE3 Specific Aims

- ❑ Document pesticide exposure levels among farmworkers in North Carolina using urinary biomarkers.
- ❑ Delineate the predictors of pesticide exposure levels among these farmworkers.
- ❑ Develop and implement a plan for disseminating risk information in culturally and educationally appropriate formats.



Presentation Objectives

- Document the prevalence of the biomarkers for 7 specific OP insecticides among migrant and seasonal farmworkers in North Carolina
 - Delineate the predictors for OP biomarkers among these farmworkers
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PACE3 Community-based Participatory Research: Activities

- ❑ 288 Latino farmworkers were recruited from 44 camps in eastern North Carolina in 2007.
- ❑ Participants were interviewed and provided urine samples up to 4 times at 1 month intervals from May to September.
- ❑ 939 data points at which an interview and urine sample were collected.



Interview Data

- Interviews included indicators of exposure.
 - Personal characteristics, such as
 - Age
 - Speaking an indigenous language
 - Work characteristics, such as
 - Crop worked in the previous 3 days
 - Total hours worked in the previous 3 days
 - Pesticide safety characteristics, such as
 - Pesticide safety training
 - People per showerhead in camp
 - Average times washed hands per day
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Urinary Metabolite Data

- Urine samples were analyzed for 7 OP pesticide urinary metabolites:
 - TCPy (chlorpyrifos; chlorpyrifos methyl)
 - CMHC (coumaphos)
 - IMPY (diazinon)
 - CIT (isazaphos)
 - MDA (malathion)
 - PNP (parathion; methyl parathion)
 - DEAMPY (primiphos methyl)



Participant Characteristics

- ❑ Largely male (90.9%)
 - ❑ From Mexico (94.8%)
 - ❑ Young (40% <30 years of age)
 - ❑ Limited education (51% <7 years)
 - ❑ Migratory
 - 51% migrants with H2A visas
 - 37% migrants without H2A visas
 - 12% seasonal
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Work and Safety Characteristics

- ❑ 32% to 84% worked in tobacco
 - ❑ About half worked more than 20 hours in previous 3
 - ❑ About half received pesticide safety training and understood this training
 - ❑ 25% lived in camps with 8 or more people per shower head
 - ❑ About half washed their hands 2 or more times per day
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Prevalence of Metabolites

- Across the 939 data points
 - Some OP urinary metabolites were infrequent
 - CMHC in 3.3% of samples
 - IMPY in 3.4% of samples
 - CIT in 0.9% of samples
 - DEAMPY in 6.0% of samples
 - One OP urinary metabolite was ubiquitous
 - PNP in 97.4% of samples
 - Two OP urinary metabolites were frequent
 - TCPy in 46.2% of samples
 - MDA in 27.7% of samples
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Prevalence Varies Across Agricultural Season

□ TCPy

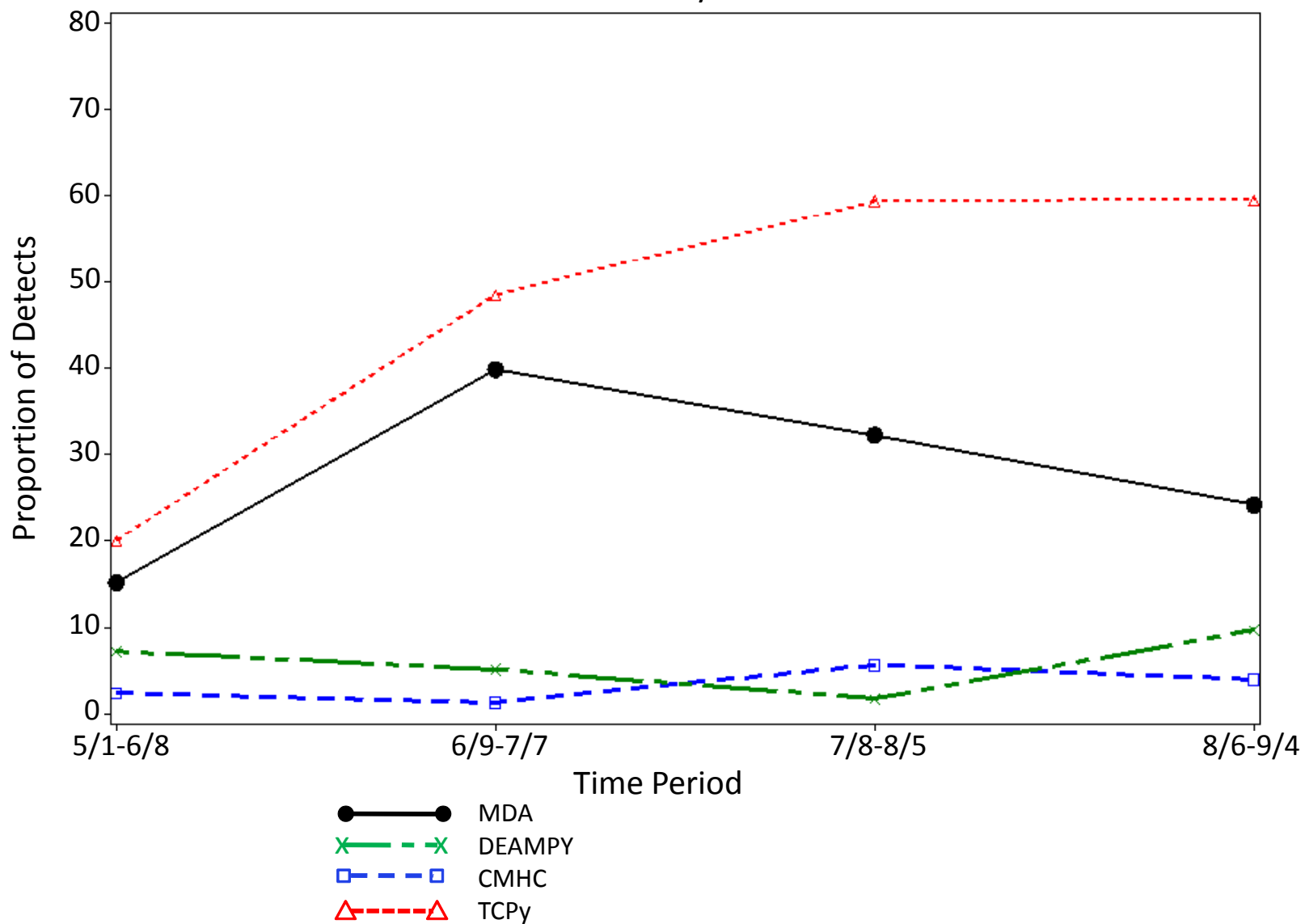
- 5/1 – 6/8: 20.0% of samples
- 6/9 – 7/7: 44.7% of samples
- 7/8 – 8/5: 59.4% of samples
- 8/6 – 9/4: 59.5% of samples

□ MDA

- 5/1 – 6/8: 15.2% of samples
 - 6/9 – 7/7: 39.9% of samples
 - 7/8 – 8/5: 32.3% of samples
 - 8/6 – 9/4: 24.2% of samples
-

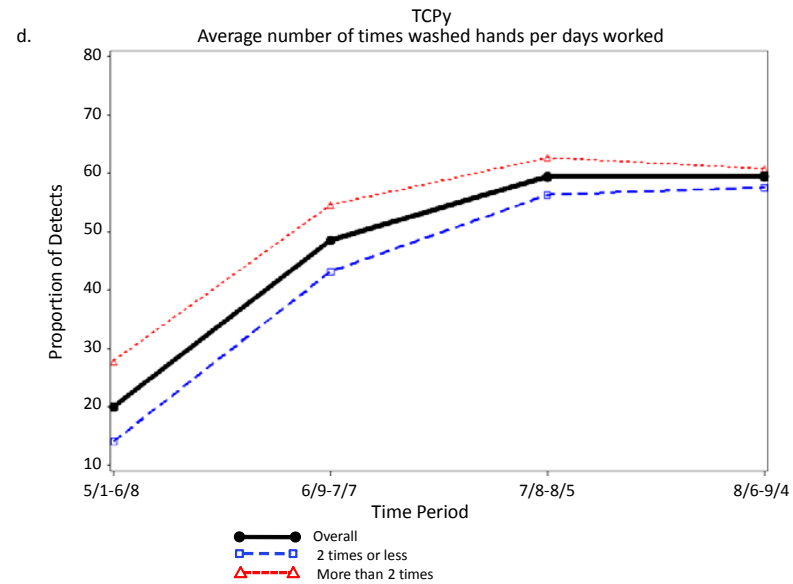
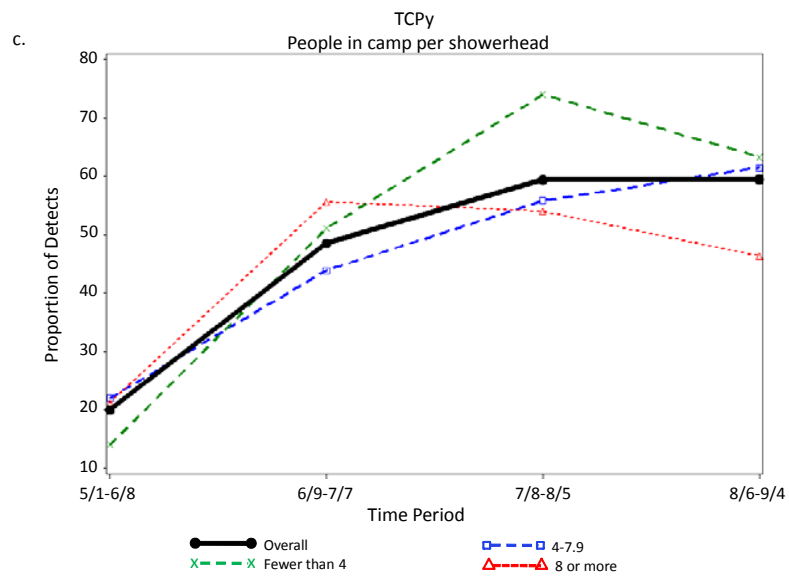
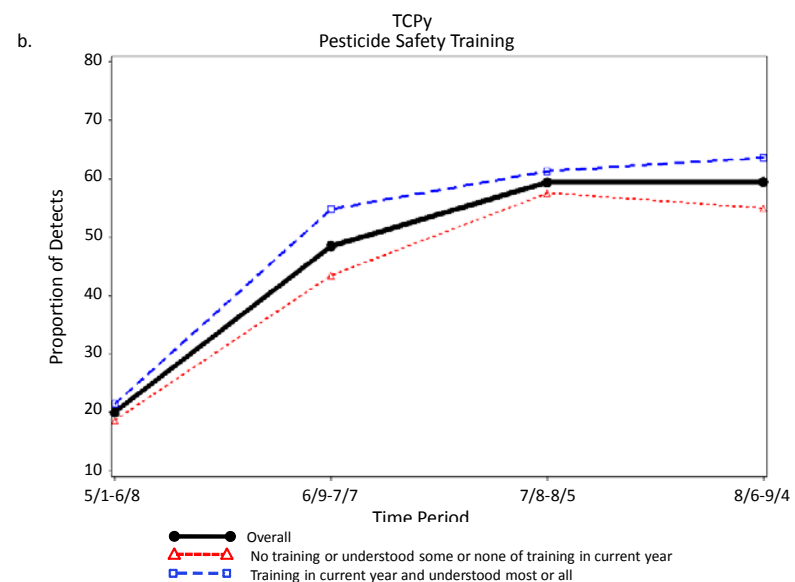
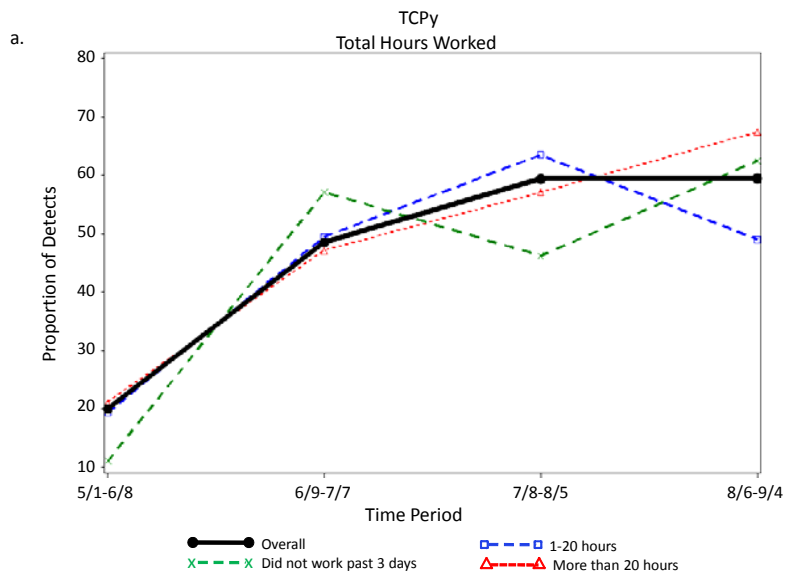
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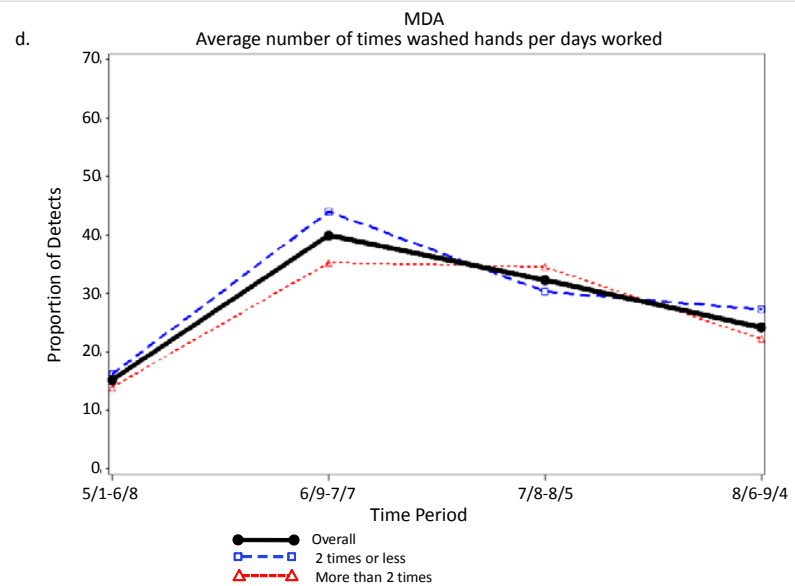
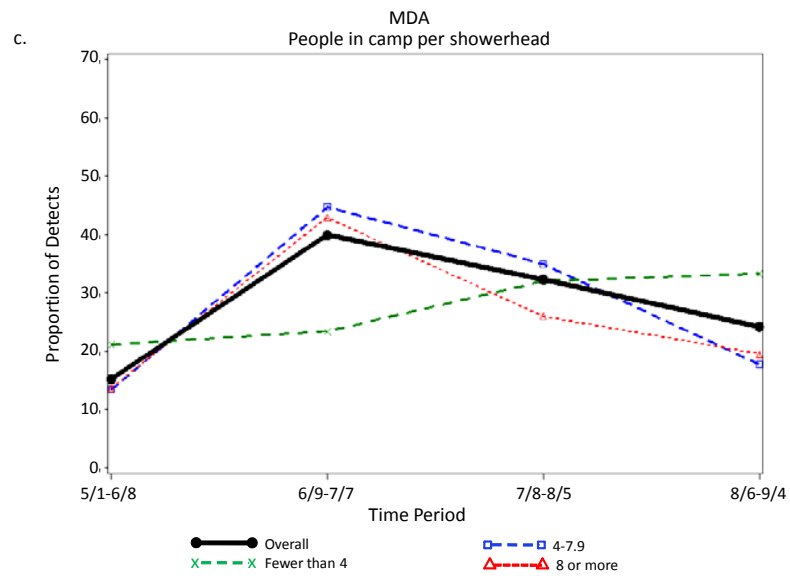
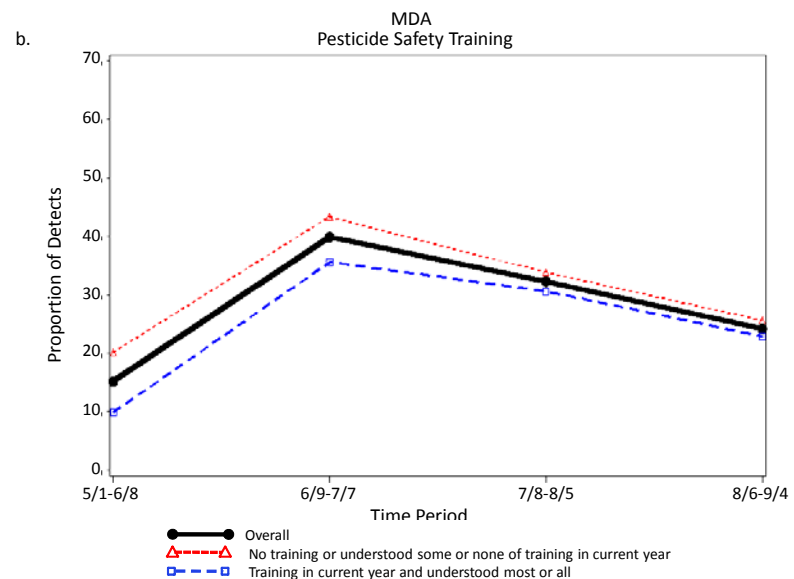
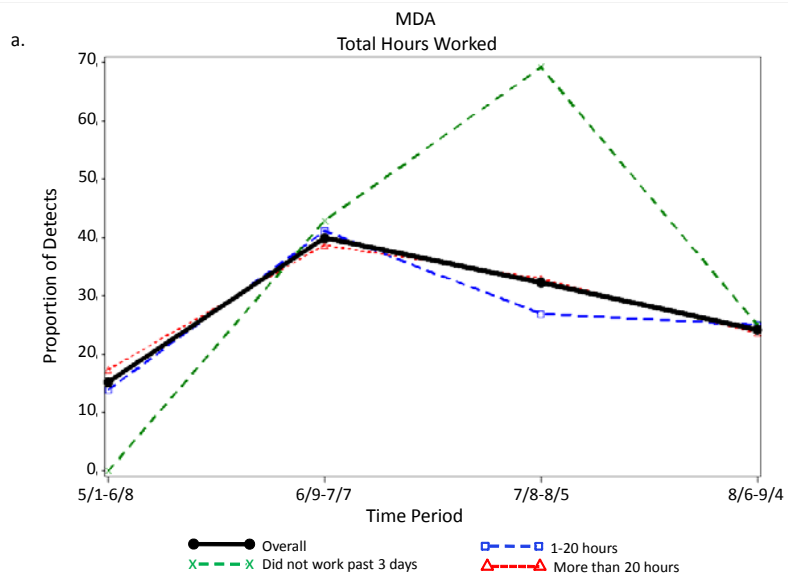
OP Pesticide Urinary Metabolites



Predictors of Metabolites

- ❑ No personal, work, or pesticide safety characteristic had a consistent, statistically significant relationship with the detection of TCPy and MDA.
 - ❑ Time in the agricultural season had a systematic relationship with the detection of TCPy and MDA.
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Summary and Conclusions

- ❑ Farmworkers in North Carolina show evidence of frequent exposure to OP insecticides.
 - ❑ Seasonality in the detections of pesticide urinary metabolites overrides the effects of any personal, work, or safety characteristics measured.
 - ❑ Future research needs to collect multiple exposure measures at frequent intervals over an extended period to characterize the factors associated with exposure.
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Latino Farmworkers in the Eastern United States
Health, Safety, and Justice

Edited by Thomas A. Arcury and Sara A. Quandt, *Wake Forest University School of Medicine, Winston-Salem, NC, USA*

They work at some of America's most hazardous jobs, have few protections, and receive some of the lowest wages. *Latino Farmworkers in the Eastern United States* describes this understudied and underserved population. Taking a social justice stance, this volume examines the health and living conditions of workers in agriculture, while advocating for equality. Contributors cover all major areas of illness and injury (including occupational, environmental, infections, and pesticides), while also focusing on systemic social conditions, from lax industry regulations to lack of basic services—problems that are exacerbated by workers' status as recent immigrants. Mental health burdens from the effects of discrimination to substance use, as well as the cumulative impact of workers' separation from families are discussed for a comprehensive, meticulously documented resource.

Keeping its findings grounded in agricultural, farm-labor, cultural, and geographic contexts, the book:

- Highlights the unique characteristics of the farmworker population in the eastern United States.
- Discusses occupational health problems among farmworkers, both general (e.g., musculoskeletal disorders) and job-specific (e.g., green tobacco sickness).
- Includes in-depth chapters on pesticide exposure, infectious diseases, and mental health.
- Reports on health issues specific to women and children.
- Reviews the current state of advocacy programs.
- Offers strategies to prevent injuries related to specific types of jobs.
- Proposes a social justice agenda for occupational and environmental policy for farmworkers.

PUBLIC HEALTH

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› springer.com

Written to serve both the seasoned professional and the newcomer, *Latino Farmworkers in the Eastern United States* is a bedrock source of information for those providing health and social services in the community, for researchers investigating health and safety disparities, and for advocates and policymakers working to correct them.

Arcury • Quandt
EDITORS



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