



Attending to Heat Illness & Pesticide Exposure among Farmworkers: Results from an Attention Placebo-Controlled Design

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SCCAHS Heat Related Illness State of the Science Meeting: October 25-26, 2018



PESTICIDE AND HEAT STRESS EDUCATION FOR LATINO WORKERS



The PISCA Team





Presentation Goal & Aims

- Goal: Illustrate the state of the science in preventing heat-related illness among farmworkers
- Aims
 - Clarify misconceptions about farmworkers and describe the farmworker workforce in the U.S.
 - Review heat-related illness prevention recommendations and research within the agricultural sector
 - Describe the PISCA project: a community-academic partnership for protecting farmworker health
 - Share emerging evidence of PISCA's effectiveness



Farmworker are not Farmers



SOC=11-9013
Med Earning: \$31.91/hr,
\$66,360/yr



SOC=45-2092, 45-2093
Med Earning: \$10.50/hr,
\$22,00/yr



Farmworkers, A Basic Overview

- Farmworkers are individuals involved in agricultural production including planting, cultivating, harvesting, and processing crops for sale, and caring for animals (Arcury & Quandt, 2009)
 - Migrant – individuals whose principal employment is agriculture on a seasonal basis, and who establishes a temporary home.
 - Seasonal – individuals who principal employment is agriculture on a seasonal basis, and does not change residence

State	Adjusted MSFW Estimates	Migrant FWs	Seasonal FWs	Non-FWs In Migrant Households	Non-FWs In Seasonal Households	MSFWs & Non-FWs
California	731,745	338,798	392,947	124,508	445,897	1,302,150
Florida	194,817	120,430	74,387	44,556	43,914	283,287
N. Carolina	100,316	62,697	37,618	24,724	30,851	155,891
Texas	196,704	131,638	65,066	77,844	86,863	361,411
Washington	185,088	64,411	120,677	16,531	84,696	286,315



A National Profile of Farmworkers (NAWS 2009-16)

	Mean	95% Confidence Level
Age	37.70	37.17 – 38.23
Sex (Female=1)	0.28	0.26 – 0.30
Race/Ethnicity		
Latino	0.81	0.79– 0.83
White (not Latino)	0.15	0.14 – 0.17
Other Race/Ethnicity	0.04	0.03 – 0.05
Education		
< 9 years	0.61	0.59 – 0.63
10-12 years	0.28	0.26 – 0.29
> 12 years	0.11	0.10 – 0.12
Foreign Born	0.74	0.72 – 0.76

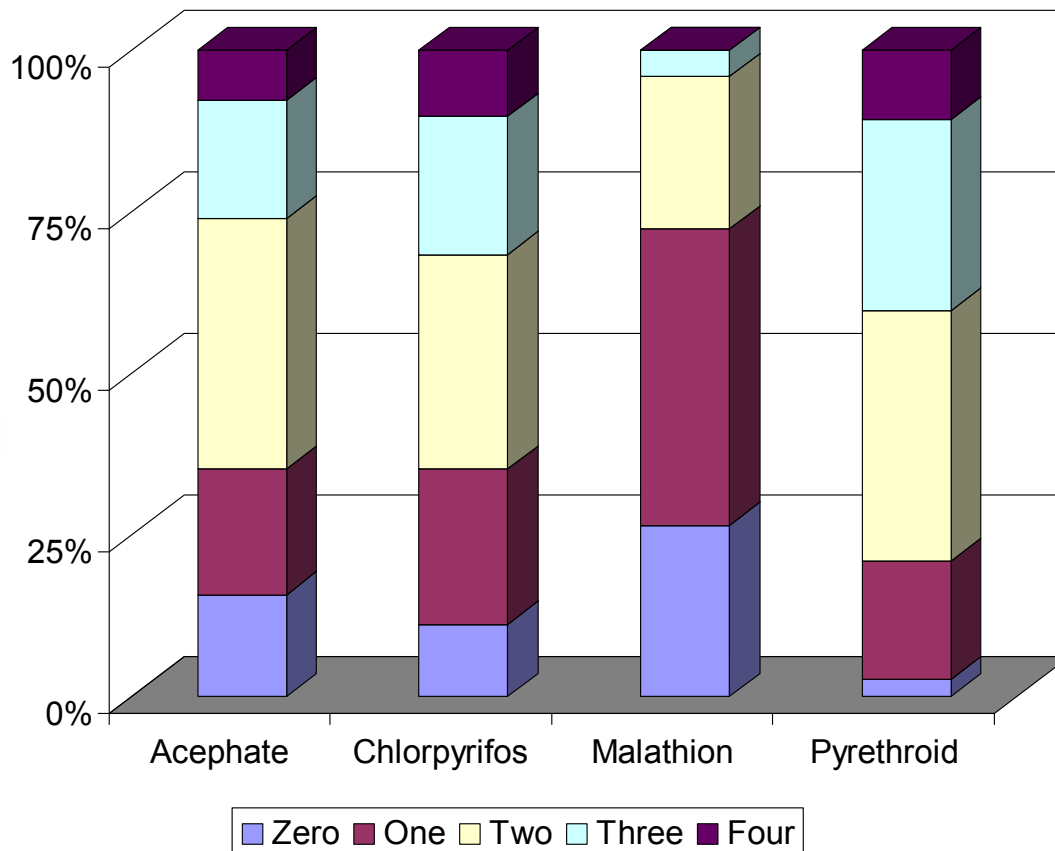


A glimpse into a day....





Occupational Health Threats: Chronic Pesticide Exposure



Source: Arcury et al., 2009



Occupational Health Threats: Extreme Heat & Humidity

NOAA's National Weather Service

Heat Index

Temperature (°F)

	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110
40	80	81	83	85	88	91	94	97	101	105	109	114	119	124	130	136
45	80	82	84	87	89	93	96	100	104	109	114	119	124	130	137	
50	81	83	85	88	91	95	99	103	108	113	118	124	131	137		
55	81	84	86	89	93	97	101	106	112	117	124	130	137			
60	82	84	88	91	95	100	105	110	116	123	129	137				
65	82	85	89	93	98	103	108	114	121	128	136					
70	83	86	90	95	100	105	112	119	126	134						
75	84	88	92	97	103	109	116	124	132							
80	84	89	94	100	106	113	121	129								
85	85	90	96	102	110	117	126	135								
90	86	91	98	105	113	122	131									
95	86	93	100	108	117	127										
100	87	95	103	112	121	132										

Likelihood of Heat Disorders with Prolonged Exposure or Strenuous Activity

Caution

Extreme Caution

Danger

Extreme Danger

Los trabajadores agricolas tienen

20 veces mas chances de morir por el calor que otros trabajadores.





State of Heat Illness, Prevention Research in Agriculture

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US National Library of Medicine
National Institutes of Health

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[Recruitment, Methods, and Descriptive Results of a Physiologic Assessment of Latino Farmworkers: The California Heat Illness Prevention Study.](#)
1. Mitchell DC, Castro J, Armitage TL, Vega-Arroyo AJ, Moyce SC, Tancredi DJ, Bennett DH, Jones JH, Kjellstrom T, Schenker MB.
J Occup Environ Med. 2017 Jul;59(7):649-658. doi: 10.1097/JOM.0000000000000988.
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[Work-attributed illness arising from excess heat exposure in Ontario, 2004-2010.](#)
2. Fortune MK, Mustard CA, Etches JJ, Chambers AG.
Can J Public Health. 2013 Sep 12;104(5):e420-6.
PMID: 24183186
[Similar articles](#)

[Heat-related illness knowledge and practices among California hired farm workers in The MICASA Study.](#)
3. Stoecklin-Marois M, Hennessy-Burt T, Mitchell D, Schenker M.
Ind Health. 2013;51(1):47-55.
PMID: 23411756 [Free Article](#)
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[Workers need training to avoid heat illness and recognize the symptoms in themselves and coworkers.](#)
4. Wiwanitkit V.
J Agromedicine. 2010 Oct;15(4):427. doi: 10.1080/1059924X.2010.518539. No abstract available.
PMID: 20954038
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[Preventing heat-related illness among agricultural workers.](#)
5. Jackson LL, Rosenberg HR.
J Agromedicine. 2010 Jul;15(3):200-15. doi: 10.1080/1059924X.2010.487021. Review.
PMID: 20665306
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PISCA

PESTICIDE AND HEAT STRESS EDUCATION FOR LATINO WORKERS

- Develop culturally- and contextually appropriate occupational safety training targeting pesticide exposure and health illness
- Determine the effectiveness of curricula in promoting advocated behaviors for minimizing pesticide exposure and heat illness
- Determine the comparative effectiveness of "professional" and *promotora*-based delivery of curricula



Design Features: Community-Advocate-Academic Partnership

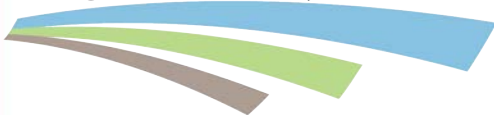


The Farmworker Association
of Florida, Inc.

MIGRANT CLINICIANS NETWORK



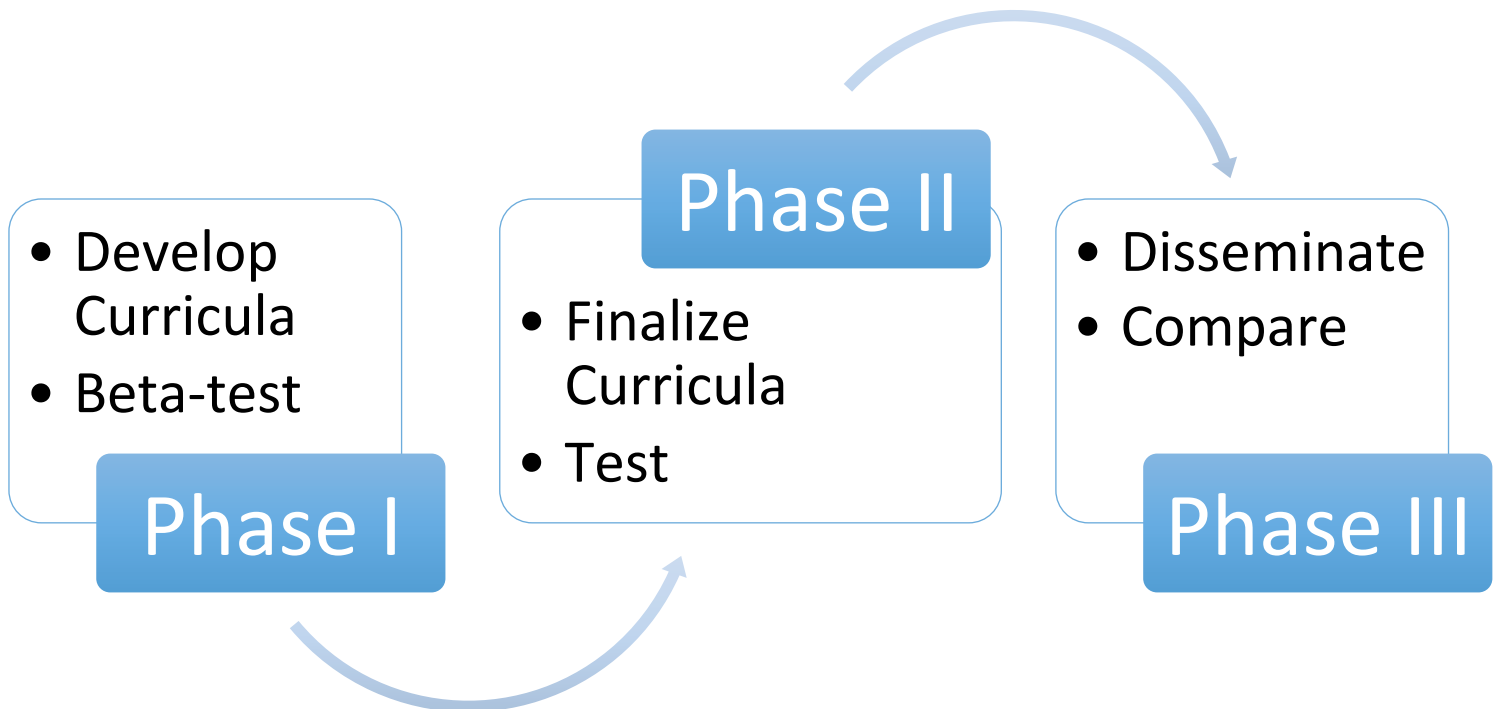
Southeastern
& Coastal Center
for Agricultural Safety and Health



This curriculum was made possible by a grant from the National Institute for Occupational Safety and Health (U54-OH011230). The Curriculum follows the requirements of the revised Worker Protection Standards of the United States Environmental Protection Agency, but the content, images, and facilitators' guide are the authors'.



A Three-Phase Strategy

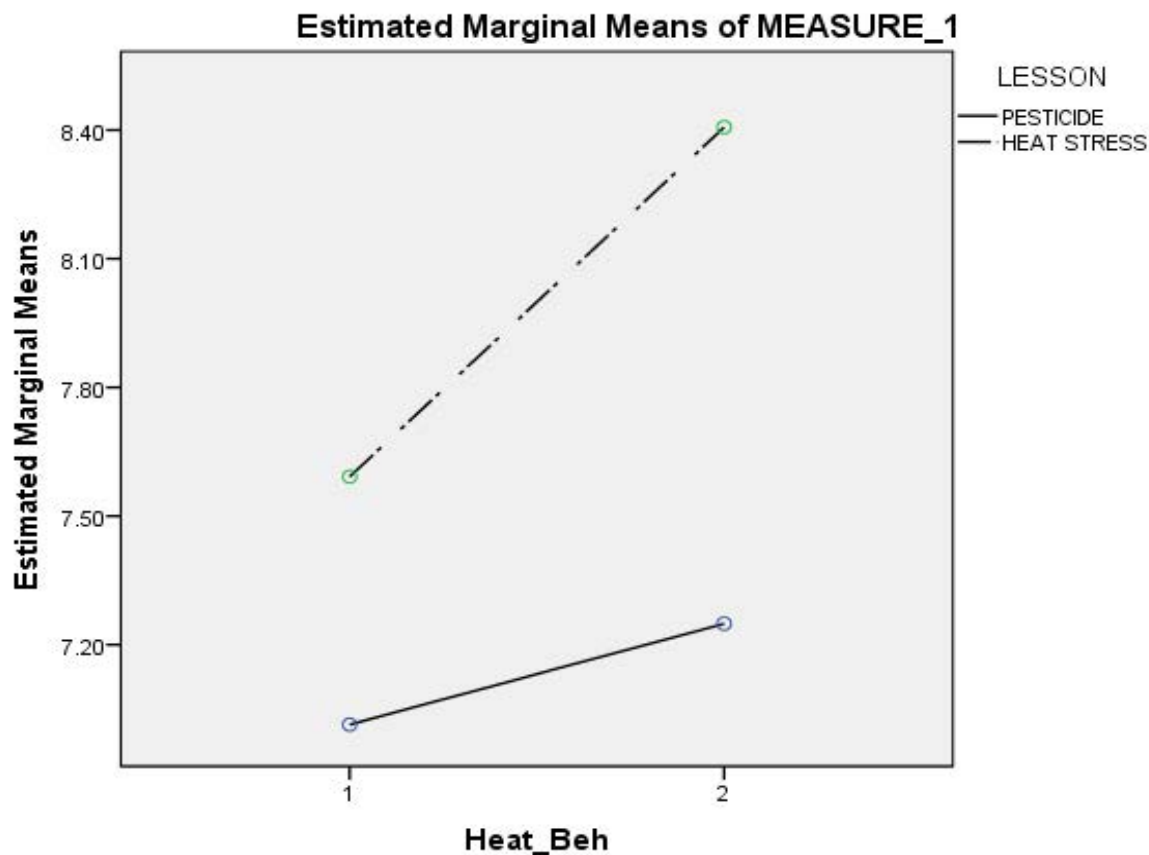




Phase 1 Results



PESTICIDE AND HEAT STRESS EDUCATION FOR LATINO WORKERS



Covariates appearing in the model are evaluated at the following values: 2. ¿Es usted hombre o mujer? = .68, 11. ¿Cuántos años lleva trabajando en la agricultura en los Estados Unidos? = 6.09



*Enfermedades causadas
por el calor*





Cultural Relevance: Examples



¡El calor nos
afecta a TODOS!



¿Cómo puede
protegerse
mientras está
trabajando?



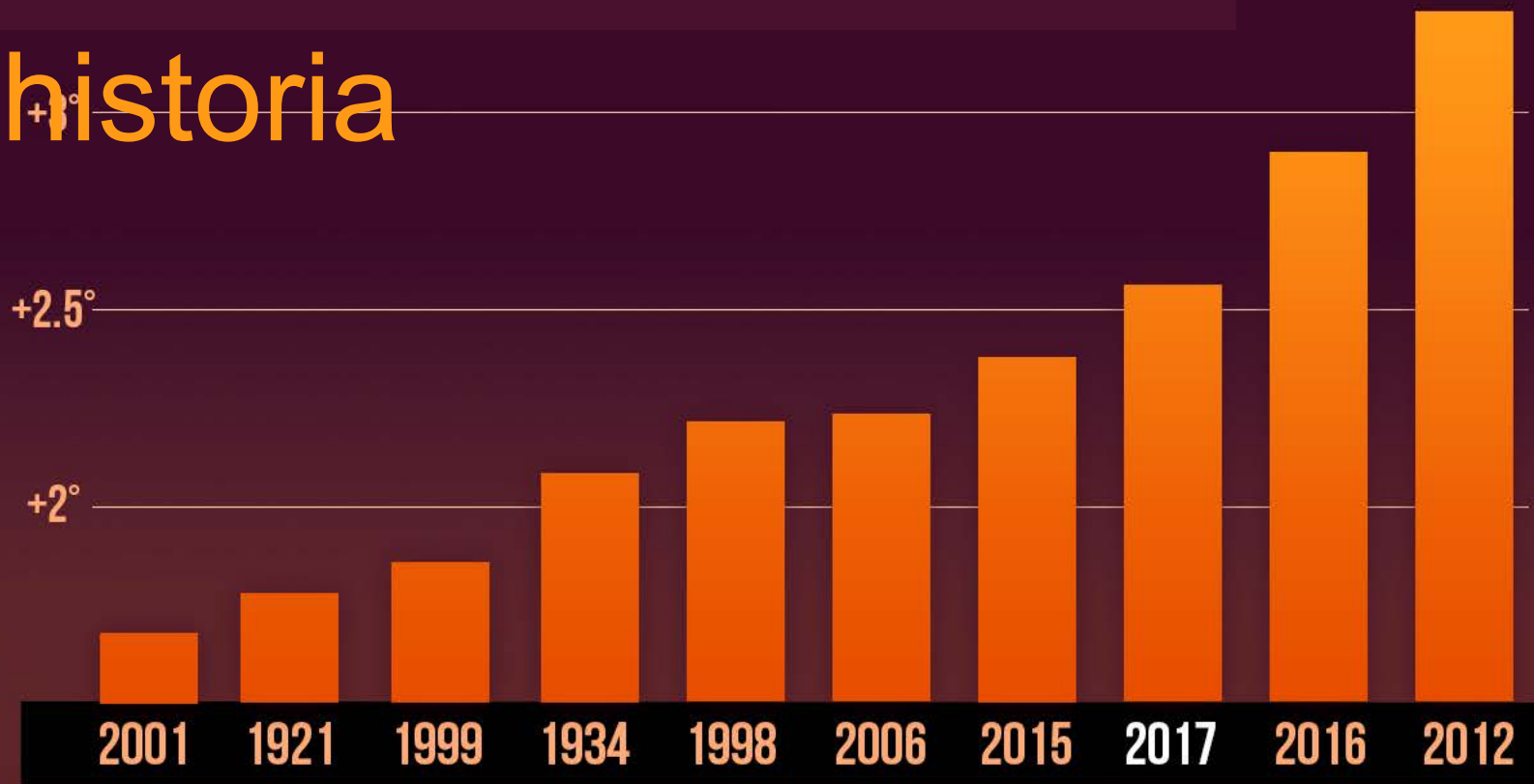


Contextual Relevance: Examples



El cuerpo no puede enfriarse, sufre un sobre- calentamiento.

Los 10 años más calientes de la historia

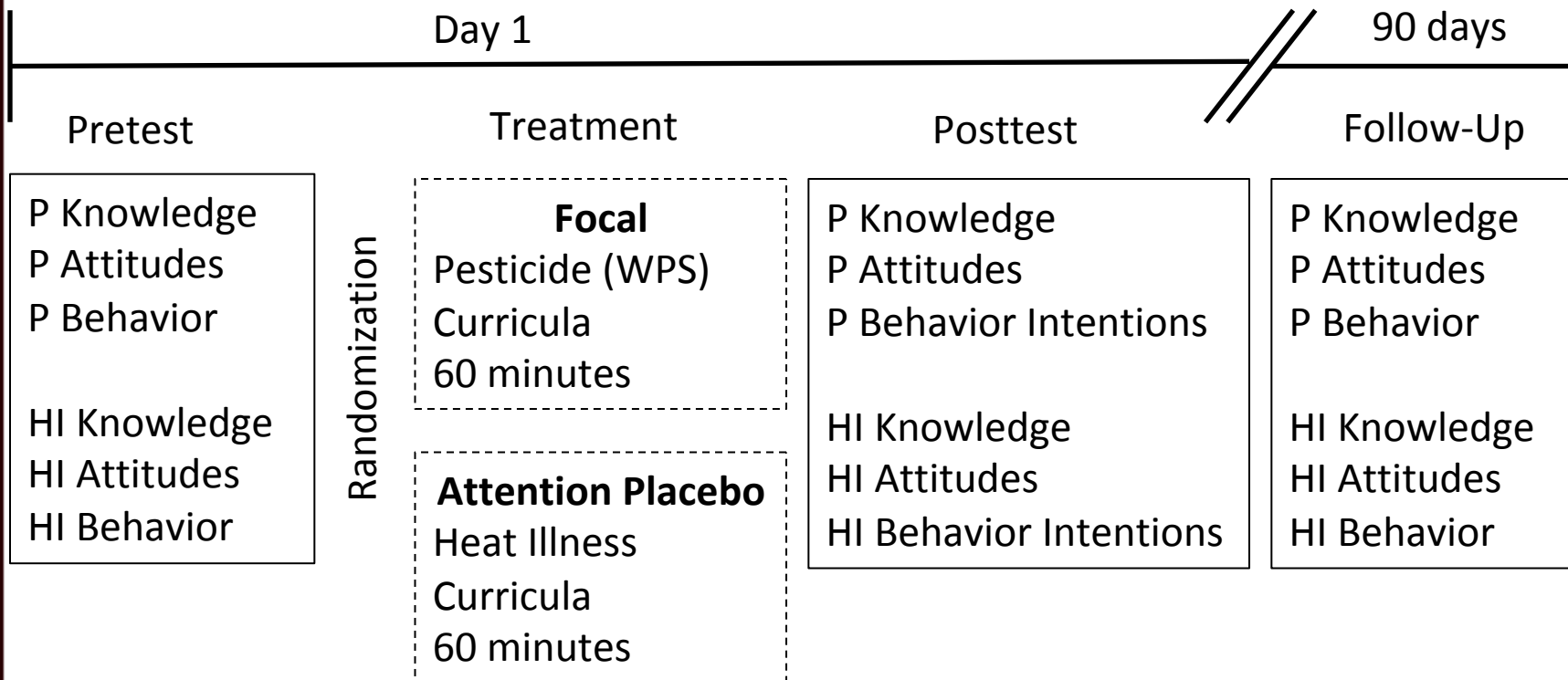


Source: NOAA/NCEI Climate at a Glance
Difference from 20th century average temperature (°F). Data as of 1/8/2017





An Attention-Placebo Study Design





Phase II Progress

	Phase 2 (Year-1)
Pre-test	235/115
Post-test	235/115
3-month follow-up	/69
Lost to follow-up	/27

Phase 2 (Year-1)	
Gender	$\Delta = 29.19$ years; Range 17-61 years
Age	Male = 113 Female = 31
Country of birth	Mexico = 128 Guatemala = 15
H2A Visa	Yes = 110 No = 31

N = 147 total surveys (randomized and non-randomized) that have been entered



Summary of Key Points

- Farmworkers are health disparate and vulnerable population
- Heat illness-related prevention/intervention research in Agriculture is underdeveloped
- Culturally- and contextually-relevant curricula appear to change knowledge and behavioral intentions related to heat illness prevention
- Partnerships among community groups, advocacy organizations and academics are useful tools for heat-related illness prevention in Agriculture