

# Heat-related Illness State of the Science Meeting Recap



Dr. Thomas Bernard  
Professor of Environmental and Occupational Health  
Sunshine Education and Research Center (ERC)  
University of South Florida

# State of the Science: Heat Related Illness 26 October 2018 Recap

Thomas E. Bernard

University of South Florida

Sunshine Education and Research Center



Southeastern  
Coastal Center

for Agricultural Health and Safety

# Thanks to the Presenters

- Linda McCauley, Emory University
- Michael Sawka, Georgia Tech
- Vasu Misra, FSU
- Joseph G. Grzywacz, FSU
- Candi Ashley, USF
- Eric Coris, USF
- Rebecca Lopez, USF

# Basic Themes

- Current and Future Climates
- Outdoor (including farmworkers) experience high levels of heat strain and heat related illness
- Implications of Exposure Assessments
- Acclimatization
- Management, Training and Emergency Response
- Directions for Future Efforts

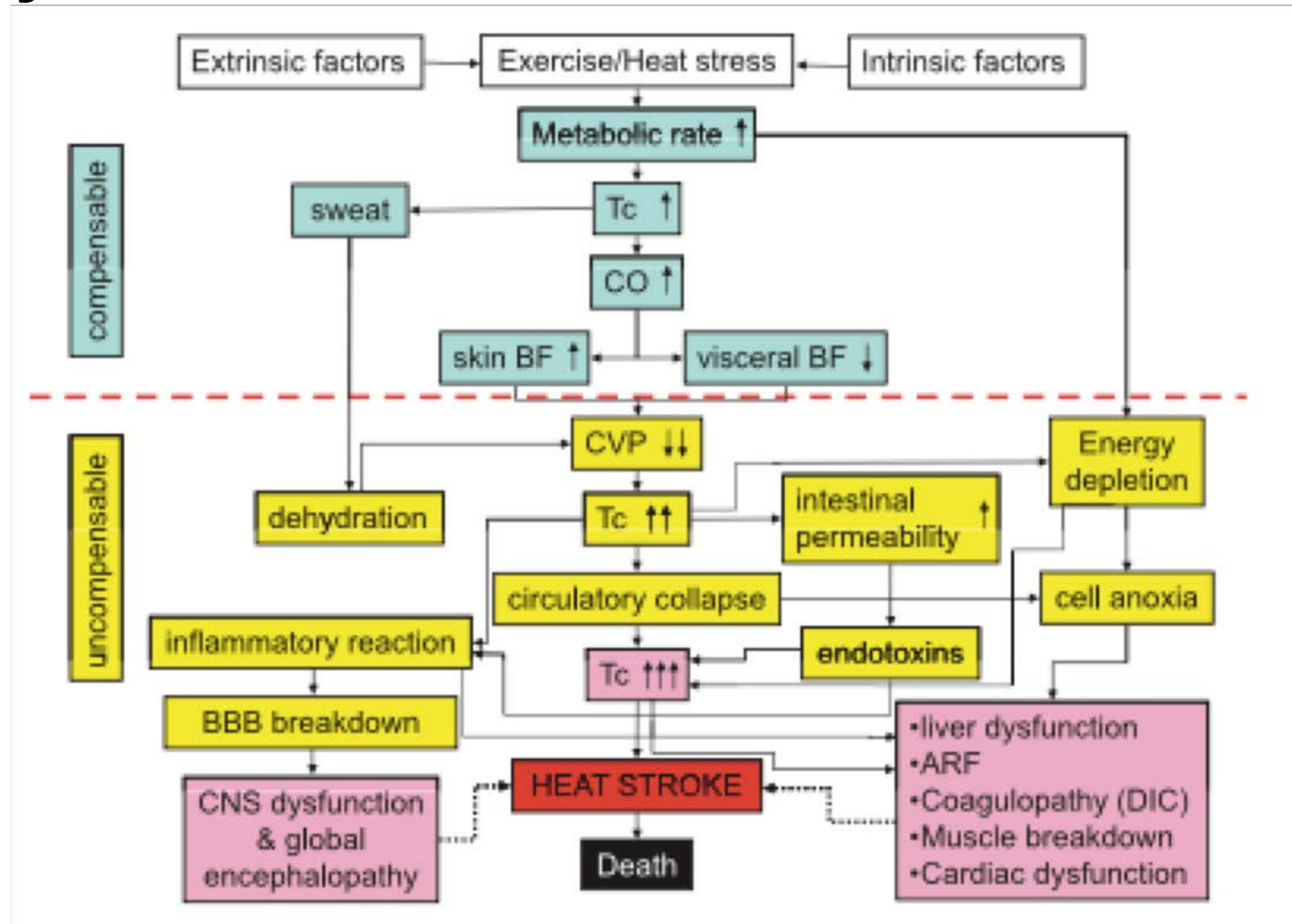
# Observations among Outdoor Workers

- Clear evidence for the increase in heat illness related to ambient conditions of temperature and humidity
  - True over the range of outcomes from first aid to hospital treatments to fatalities
  - Among farmworkers in Florida, repeated observations of high and excessive heat strain
- Very good evidence for a carry-over effect from previous days (or exposures)
  - Heat waves have added impact
- Good evidence for an increase in acute injuries; and with implications for accidents in general

# Heat Strain among Farmworkers

- Progressive dehydration over a day
- Half the workers in study reported symptoms of heat disorder
- Quarter of the workers had body core temperatures over 38.5°C for 22 min and many much longer.
- Fifth of workers had high sustained heart rates indicating high work demands plus heat stress
  
- All of these related to ambient heat

# Pathway to Disaster



# Current and Future Climates

- Florida is coastal
  - Increasing population growth
  - Increasing odds for extreme weather events (e.g., storms)
  - More and greater impacts on the population
- More rain along the coasts and less rain in the rural areas
- Florida and the Southeast are warm and humid
  - Models predict that the temperatures will increase and be higher longer
  - Potential for heat stress exposures increase



# Implications of Exposure Assessments

- Risk Factors
  - Job risk factors: Environment, Work Demands and Clothing
    - Exposure limits based on job factors only
  - Personal risk factors: Acclimatization state, fitness, health status
  - Incentive pay is an important job/personal risk factor
- Exposure limits are protective of most health workers
  - Many can sustain exposures above the limits; but ...
  - Margin of safety for an individual is very narrow; it does not take much to tip the scales toward a heat related illness

# Acclimatization

- Notable changes in the ability to tolerate heat stress

<b>Recommendations for Heat Acclimatization for Warm Conditions</b>						
<b>WBGT °F</b>	<b>Light Work (125 - 275 W)</b>		<b>Moderate Work (275 - 375 W)</b>		<b>Hard Work (375 - 475 W)</b>	
	<b>Time Spent working in hot environment</b>	<b>Heat Acclimatization Days</b>	<b>Time Spent working in hot environment</b>	<b>Heat Acclimatization Days</b>	<b>Time Spent working in hot environment</b>	<b>Heat Acclimatization Days</b>
78-81.9	90-100%	2 - 3	70-100%	3 - 5	50-100%	6
82-84.9	80-100%	2 - 4	70-100%	3 - 5	50-100%	6
85-87.9	70-100%	3 - 5	60-100%	4 - 6	50-100%	6
88-89.9	60-100%	4 - 6	50-100%	6	50-100%	6
90+	50-100%	6	50-100%	6	50-100%	6

# Re-Acclimatization Guidelines

According to Temperature and Work rate

Recommendations for Re-Acclimatization for Warm Conditions						
Routine Absence	Absence Due to Illness	GREEN				
		Day 1	Day 2	Day 3	Day 4	Day 5
< 4	--	100				
4-5	1-3	90	100			
6-12	4-5	80	90	100		
12-20	6-8	60	80	90	100	
>20	>8	50	60	80	90	100

Routine Absence	Absence Due to Illness	YELLOW				
		Day 1	Day 2	Day 3	Day 4	Day 5
< 4	--	90	100			
4-5	1-3	80	90	100		
6-12	4-5	70	80	90	100	
12-20	6-8	60	70	80	90	100
>20	>8	50	60	70	80	90

Routine Absence	Absence Due to Illness	RED				
		Day 1	Day 2	Day 3	Day 4	Day 5
< 4	--	80	90	100		
4-5	1-3	60	80	90	100	
6-12	4-5	50	60	80	90	100
12-20	6-8	50	60	70	80	90
>20	>8	50	60	70	80	90

# Training

- Training Needs
  - Defining content
  - Culturally relevant
  - Partnerships
- Can change knowledge AND behavior

# Lessons from Athletics

- Early Recognition and Treatment of Heat Related Illness
  - Need people trained in recognition and treatment
  - Heat exhaustion is a circulatory failure
  - Heat stroke is a central nervous system dysfunction
- For heat stroke, immediate response to a medical emergency is necessary.
- Return to work requires care and attention
- See crib sheet

# Two Recommendations

- Provide training on signs and symptoms of heat disorders, and on protective practices
- Have an emergency response plan
  - Early recognition of heat stroke
  - Immediate, Rapid, Aggressive Cooling
  - Emergency transport to emergency room

# Directions for Future Efforts

- There are interesting scientific questions on mechanisms and evaluation (environment or personal)
- Farmworkers present an important population where interventions developed for other occupations, military and sports are not easily translated
- Training may be the lowest hanging fruit