

A summary of:
**Collecting Sleep, Circadian, Fatigue, and
Performance Data in Complex
Operational Environments**

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Arsintescu, L., Kato, K. H., Hilditch, C. J., Gregory, K. B., Flynn-Evans, E. Collecting Sleep, Circadian, Fatigue, and Performance Data in Complex Operational Environments. *J. Vis. Exp.* (150), e59851, doi:10.3791/59851 (2019).

What is JoVE?

- Journal of Visualized Experiments
- Peer-reviewed
- Experimental methods in video format (and text)
- A LOT of wet lab articles

In-lab sleep & circadian studies

- Carefully screened participants
- Strictly controlled environment
 - Light
 - Posture
 - Energy intake
 - Ambient temperature
 - Distraction-free
- Investigate influence of sleep and circadian rhythms on novel measures
 - COBRA (eye tracking)
- Validate measures to use in the field
 - PVT touchscreen app



Personal photo

Aim: Describe fatigue field work methods

Unique challenges



- Tips for collecting robust, complete data
 - Prevent common pitfalls
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- Help industry collect data in-house
- Confidence in data
- Assess effectiveness of fatigue mngt strategies

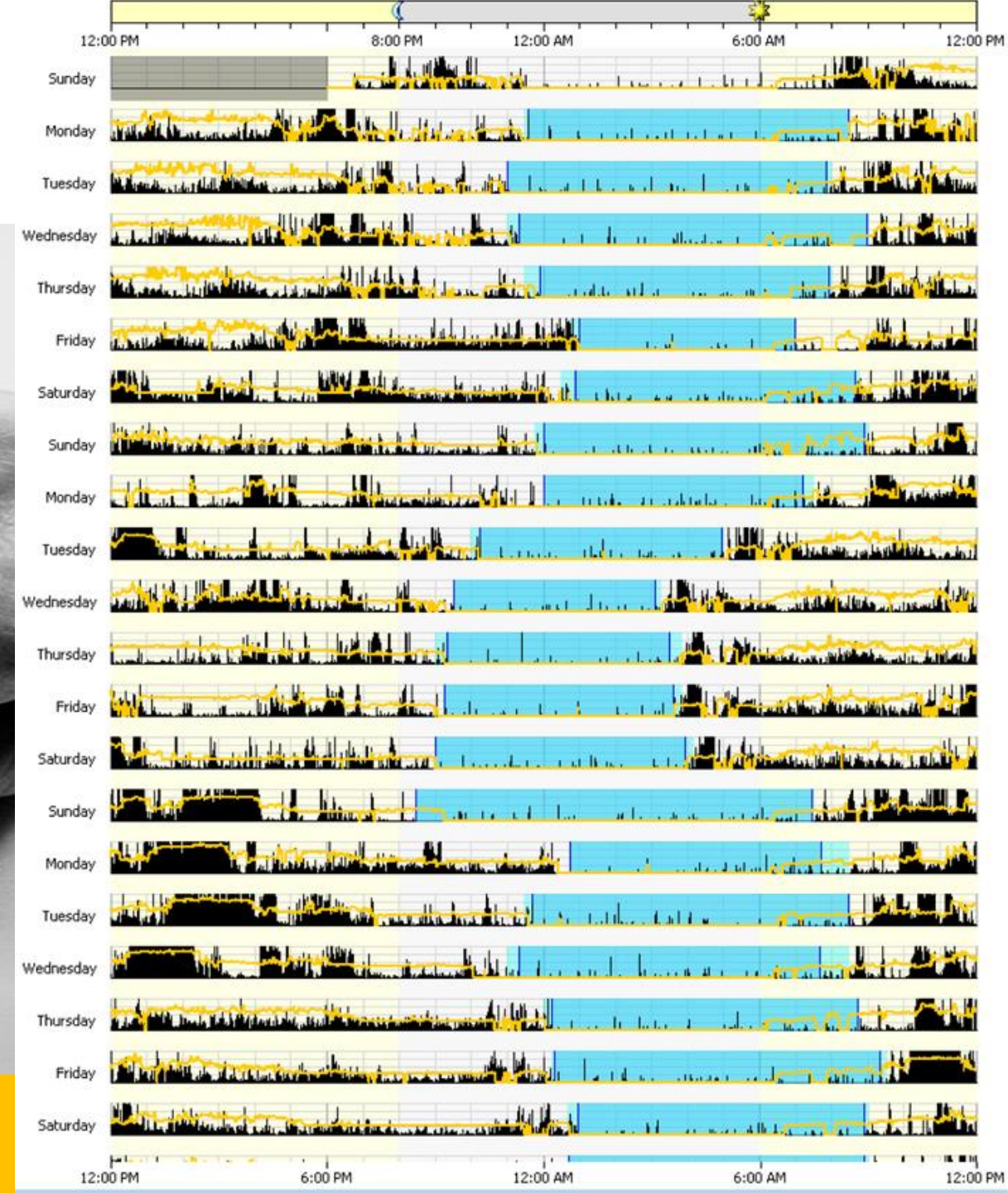
Collecting sleep data in complex environments

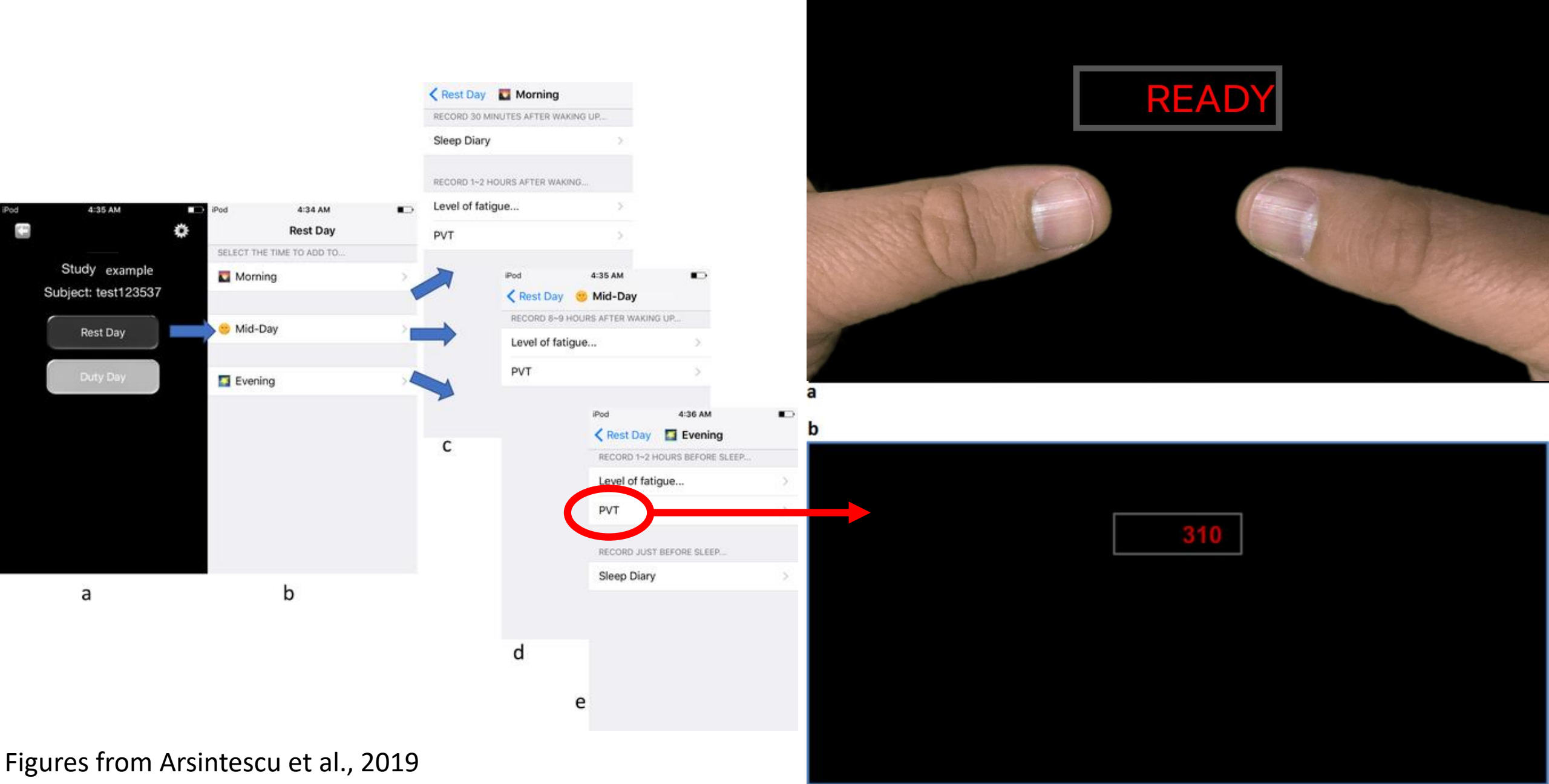
- Operational example: commercial aviation
- Methods:
 - “Tips”
 - Actigraphy
 - App-based Sleep Diary and Questionnaires
 - PVT
 - Urine collection
- Results: example results using these techniques

“Tips”

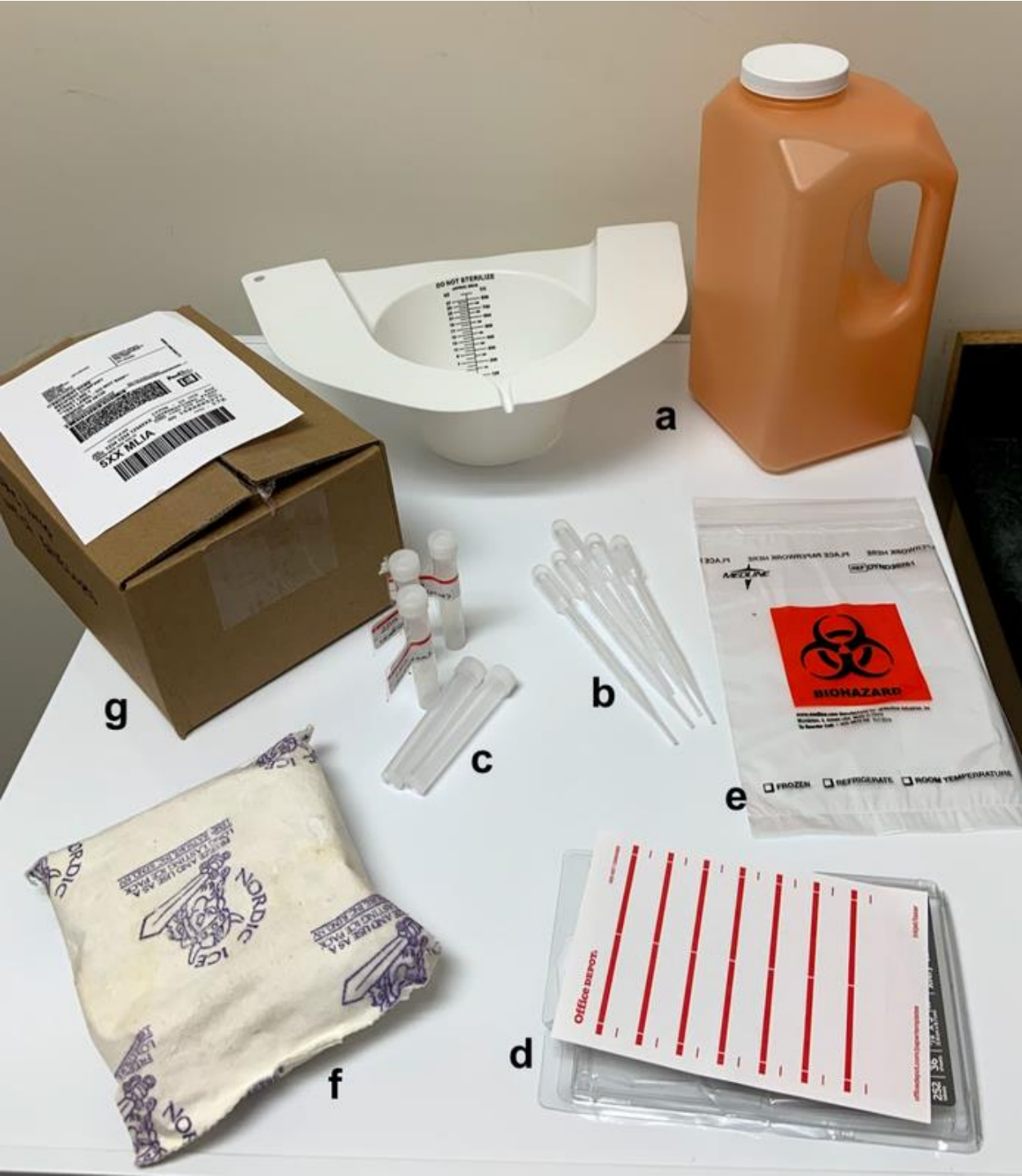
- Participants
 - Representative of population
 - Training session
- Experimental Design
 - Identical or balanced schedules
 - Include baseline or control
- Suggested scripts

Photo Examples



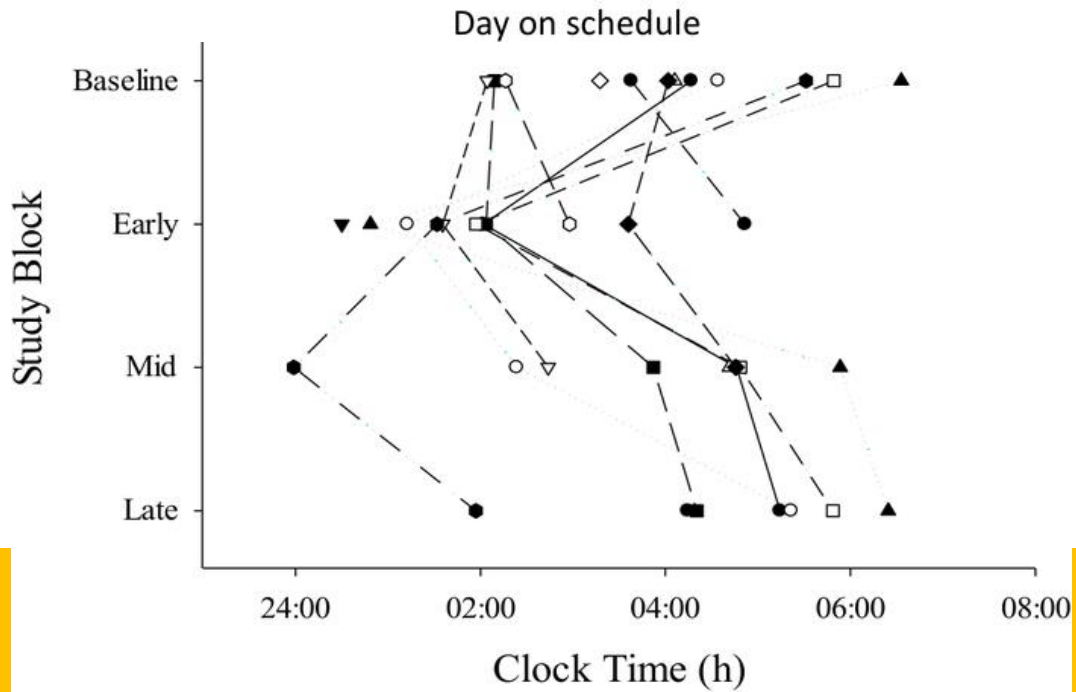
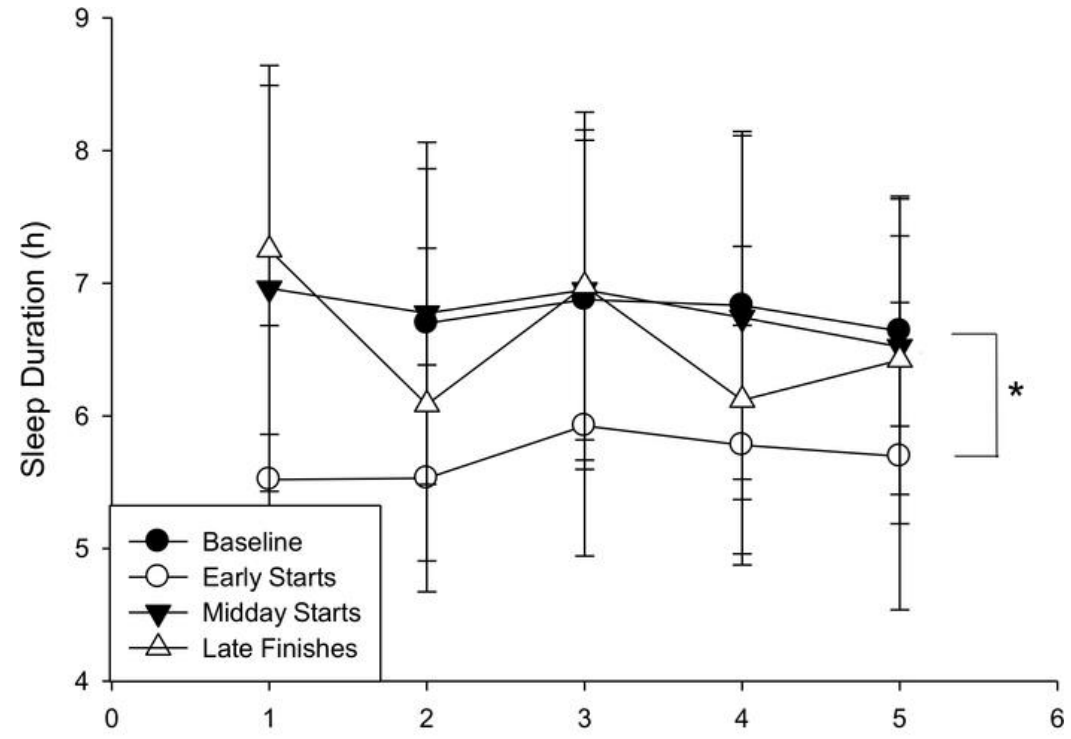


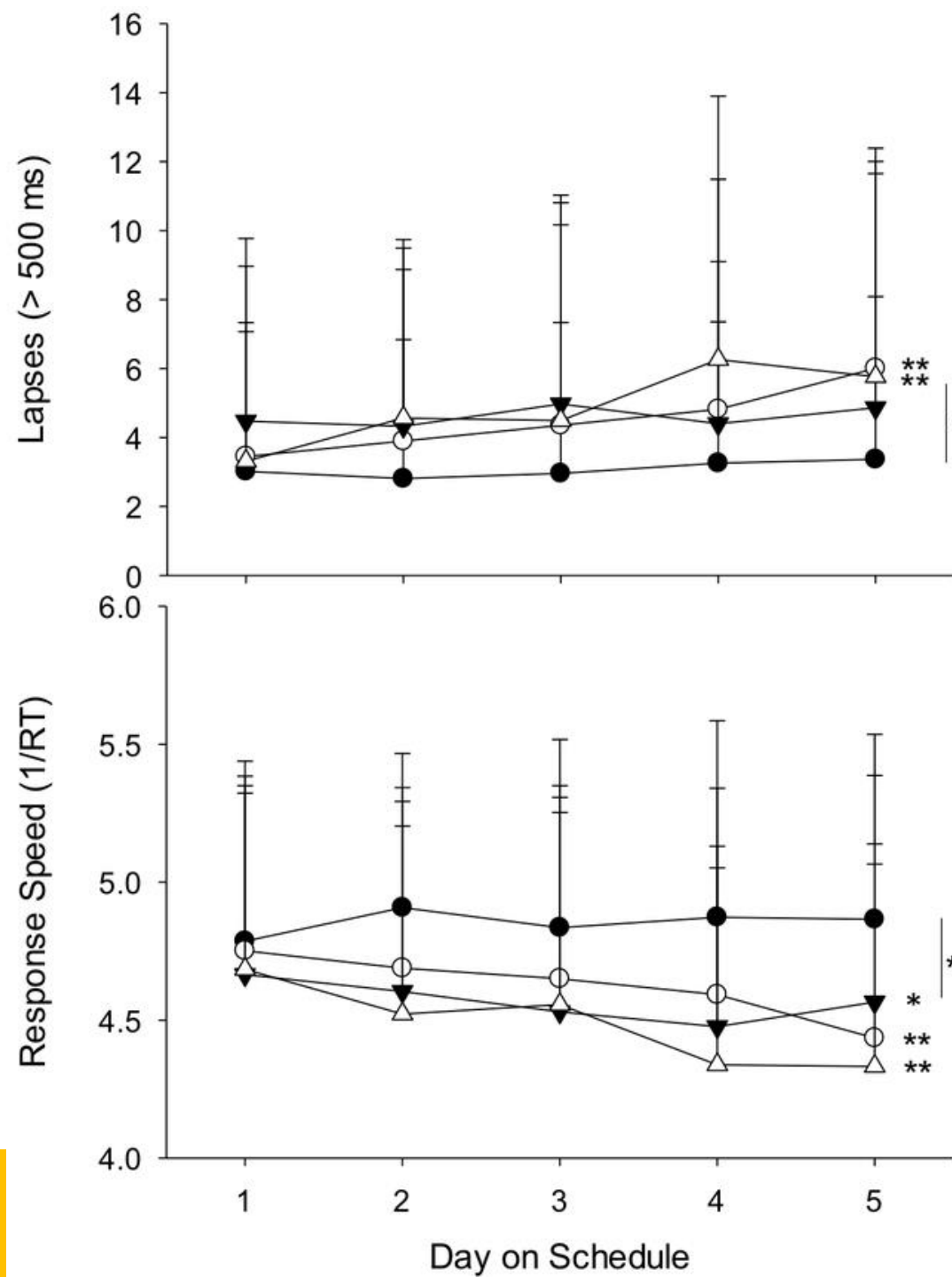
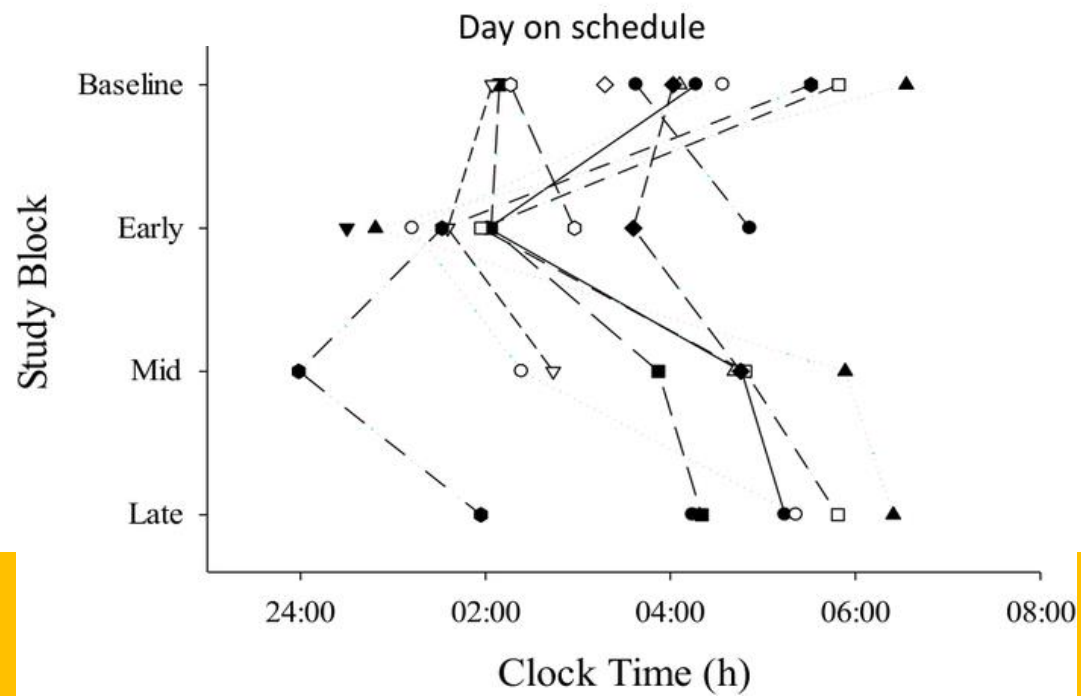
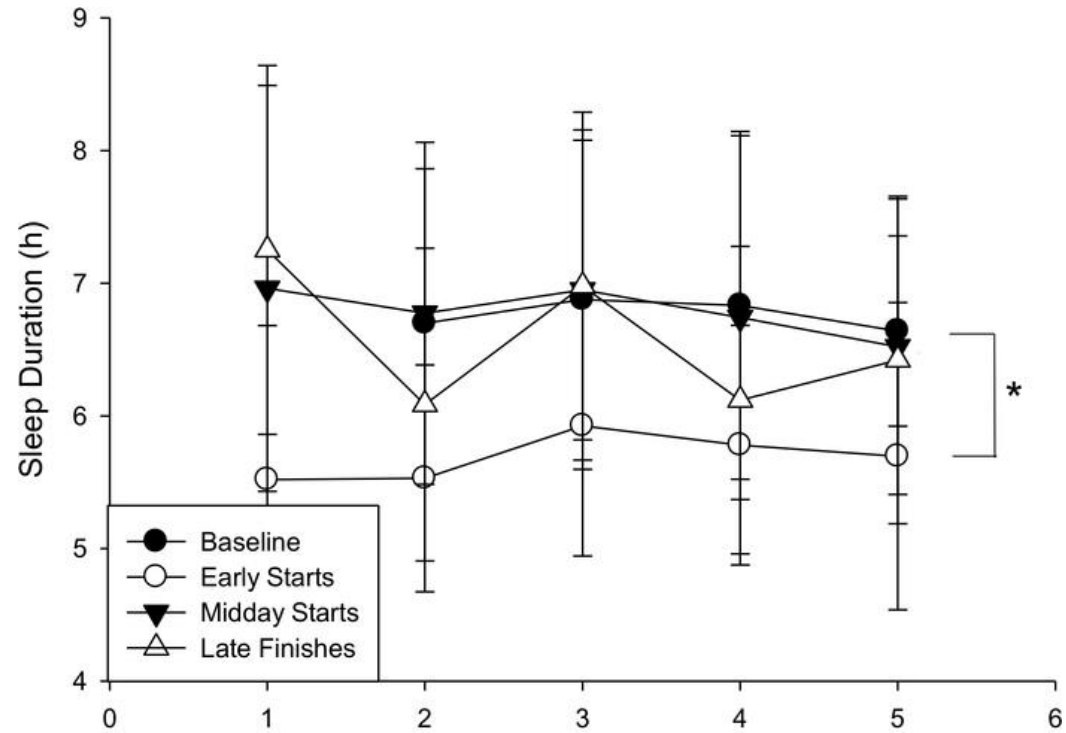
Figures from Arsintescu et al., 2019



EXAMPLE Urine Collection Log Sheet

Date (dd/mm/yy)	Collection Block	Clock Time of Collection Block	Clock Time When Your Urinated	Total Urine Volume (ml)	Clock Time Sample Taken From Collection Container, Added to Sample Tube	Sample tube #
Please do not collect your first void when you wake on the first day. Urinate in the toilet and begin collection the next time you						
09/15/2019	#1	Start:	0745	550	1055	21501
		End:	1050			
09/15/2019	#2	Start:	1230	600	1500	21502
		End:	1330			
			1455			
09/15/2019	#3	Start:	1855	400	1900	21503
		End:				
09/15/2019	#4	Start:	2115	500	2305	21504
		End:	2300			
09/16/2019	#5	Start:	0300	850	705	21505
		End:	0700			



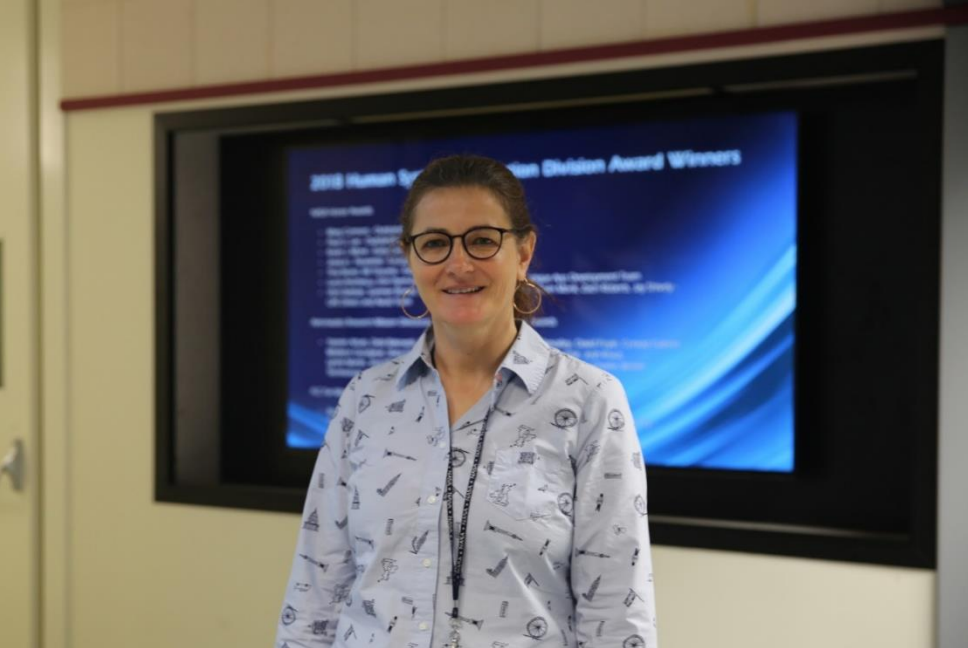


Video

- <https://www.jove.com/video/59851/collecting-sleep-circadian-fatigue-performance-data-complex>

Highlights

- Important to train participants on all procedures and equipment; follow-up during data collection
- Combination of actigraphy, sleep diaries, urine collection, fatigue ratings, and PVT provides adequate data for evaluating the effectiveness of interventions, comparing duties, etc.
- Methods have translational potential for other complex operational environments
- Visual aids allow for deep dive into the specifics of data collection



Thank you

