Project 0
Final Presentation

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BIOS 6624

Research Questions

- Q1 - What is the agreement between the subject's recordings of sampling times compared to the times recorded by an electronic monitoring cap?
- Q2 - Are subjects adhering accurately to the +30min and +600min sampling times required by a study protocol?
- Q3 - What are the changes of cortisol and DHEA over time?

Data Overview

- Samples were initially excluded based on implausible values of outcomes
- Additional samples were excluded based on missingness of booklet/cap time

Characteristic	Overall N = 360[1]	Wake N = 89[1]	+30 min N = 90[1]	Lunch N = 91[1]	+600 min N = 90[1]
Cortisol (nmol/L)	5.7 (5.4)	7.3 (6.0)	9.0 (5.0)	3.2 (2.3)	3.2 (5.0)
DHEA (nmol/L)	0.91 (0.88)	1.63 (1.06)	1.02 (0.69)	0.51 (0.46)	0.50 (0.65)
Booklet Time (min)	656 (274)	415 (88)	446 (85)	737 (72)	1,058 (117)
Missing	31	5	5	10	11
Cap Time (min)	685 (281)	415 (88)	461 (90)	735 (69)	1,069 (127)
Missing	55	14	22	11	8

[1] Mean (SD)

Analysis

Q1 - LMM with random intercepts for subjects

- Outcome - Cap Time, Predictor - Booklet Time
- Focused on slope and intercept being close to 1 and 0, respectively

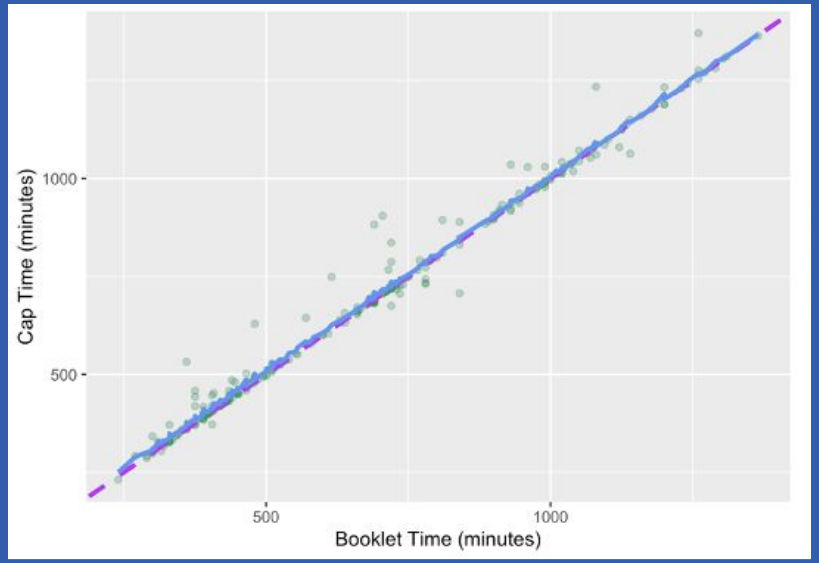
Q2 - Frequency Table of Adherence Categories

- 3 Classifications: Good (< 7.5 min), Adequate (7.5 to 15 min), Poor (>15 min)
- Only Evaluated Samples 2 and 4 from each day

Q3 - Piecewise LMMs with random intercepts for subjects

- One model for each outcome of interest
- Knot at 30 minutes after wake up

Results - Q1 & Q2



Characteristic	Beta	95% CI[1]	p-value
Intercept	13.22	2.87, 23.56	0.013
Slope	0.99	0.98, 1.01	<0.001

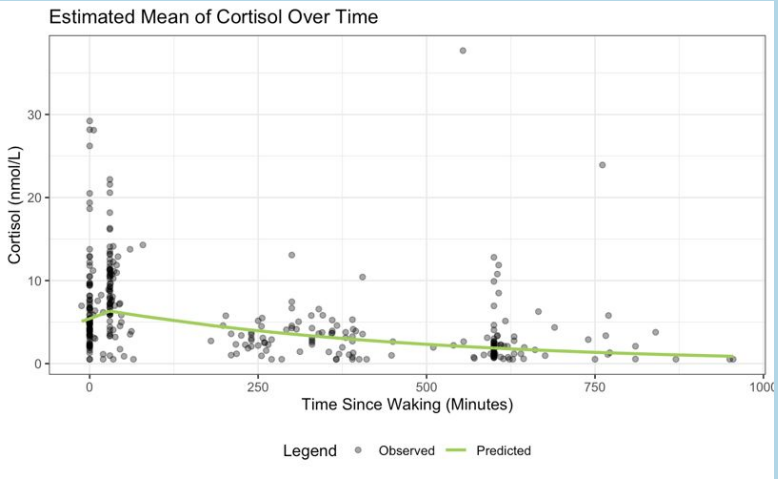
[1] CI = Confidence Interval

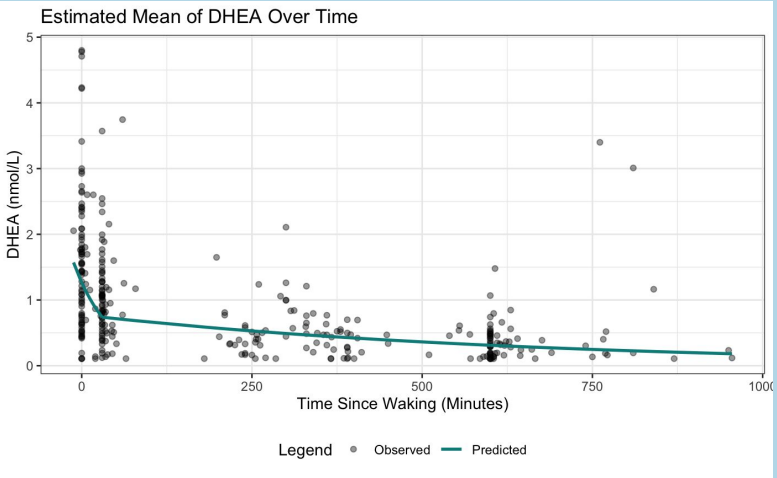
Legend
- Data Points
- Ideal Fit
- LMM Fit

	30-Minute Sample (N=82)[1]	600-Minute Sample (N=76)[1]
Adherence Classification		
Good	64 (78%)	37 (49%)
Adequate	10 (12%)	6 (8%)
Poor	8 (10%)	33 (43%)

[1] n (%)

Results - Q3





Characteristic	Cortisol Model			DHEA Model		
	Beta	95% CI[1]	p-value	Beta	95% CI[1]	p-value
Intercept	1.6894	1.4840, 1.8948	<0.001	0.23630	0.00483, 0.46777	0.046
Waking to 30 minutes	0.0052	-0.0023, 0.0127	0.2	-0.01798	-0.02408, -0.01188	<0.001
After 30 minutes	-0.0021	-0.0025, -0.0018	<0.001	-0.00152	-0.00183, -0.00121	<0.001

[1] CI = Confidence Interval

Discussion

- A slope of 0.99 indicates strong agreement between cap and booklet times, while the intercept of 13.22 suggests a systematic offset, with cap times approximately 13 minutes later
- Adherence to the collection time protocol was highest for the +30-min samples and much lower for the +600-min samples, highlighting the difficulty of longer self-sampling studies
- Cortisol and DHEA exhibited distinct diurnal patterns consistent with stress physiology, indicating that the sampling protocol and piecewise modeling approach effectively captured time-dependent hormonal changes
- Potential Limitations: missing data, assay-related measurement error, and unrecorded variability in self-sampled collection timing

Questions?