Presenting Author

Tiffany Hamilton, MD

Thamilton2@phoenixchildrens.com

22034 N 55th St, Phoenix, AZ 85054

763-639-8598

Co-authors

Andrew Papez, MD, Center for Heart Care, Phoenix Children's Hospital, Phoenix, Arizona, United States

Bethany Sussman, PhD, Barrow Neurological Institute, Phoenix Children's Hospital, Phoenix, Arizona, United States

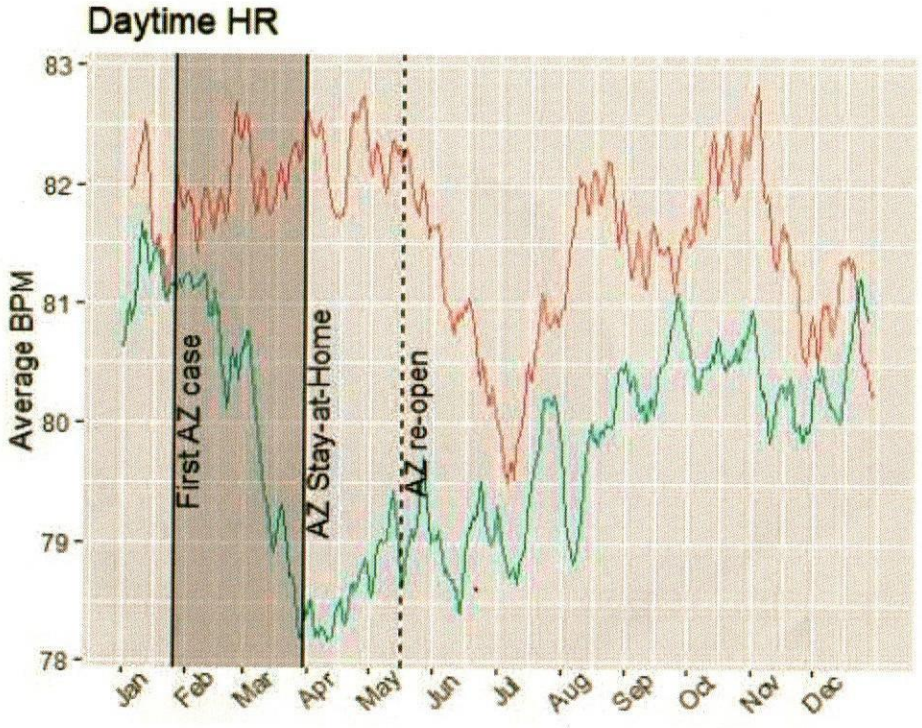
Title: READING THE TEA LEAVES: USING METADATA TO DETERMINE THE PHYSICAL EFFECT OF COVID LOCKDOWN IN PATIENTS WITH IMPLANTED CARDIAC DEVICES

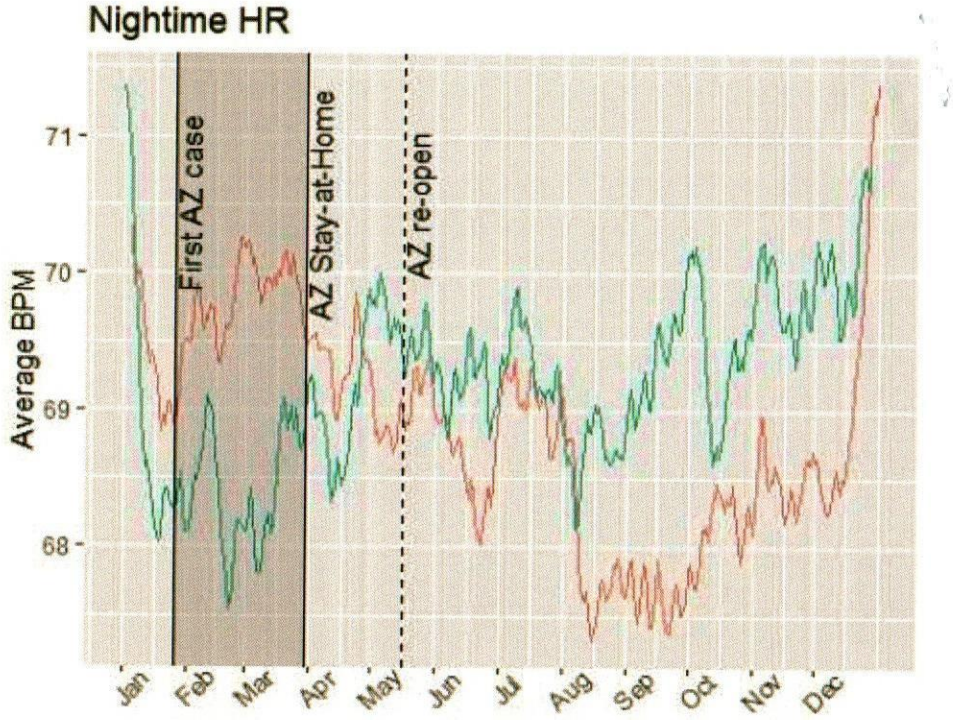
Objective: To evaluate the effect of a statewide lockdown on activities of daily living by evaluating changes in recorded cardiac parameters as measured by implantable cardiac devices for a period of time prior to and following implementation of lockdowns in Arizona.

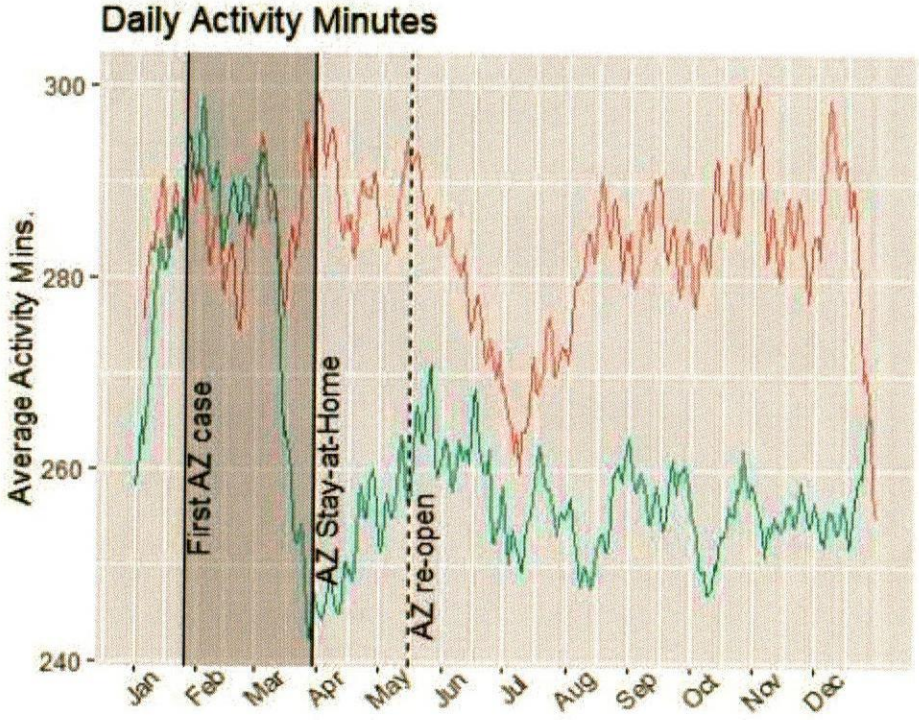
Methods: This is a retrospective cohort study using cardiac device interrogations from January 1, 2019 – March 13, 2021. The patient population included males and females aged 3 months through 70 years old with an implanted Medtronic cardiac device at least 3 months prior to the start of the study. Device information included daily activity minutes, day and night average heart rates and heart rate variability. Patients were excluded if they did not have the device in place 3 months prior to January 1, 2019, if they did not have a complete data set, if they were prescribed a new antiarrhythmic medication during the study period, and if they underwent a significant surgical procedure that required more than 2 days of hospitalization postoperative or postoperative rehabilitation.

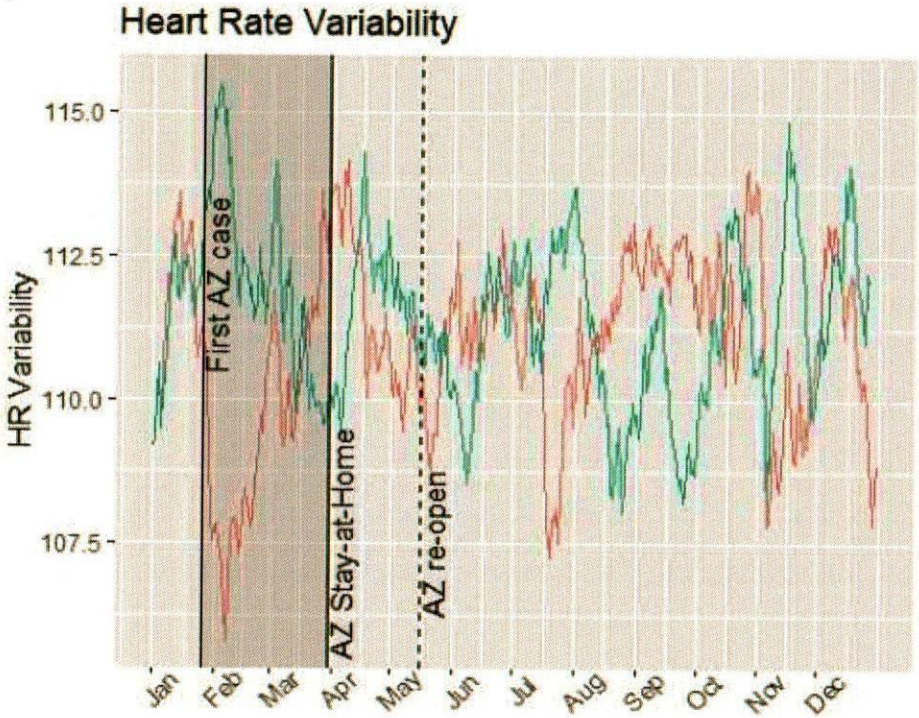
Results: Initial data collection revealed 282 devices that were in place 3 months prior to January 1, 2019. Only 112 of those devices included the intended data information and only 62 of those devices included a complete set of data. Using linear mixed effects models with restricted maximum likelihood estimation to test for the fixed effects of Year, day, and the interaction between them we found a significant decrease in daytime heart rates and daily activity minutes at the time of lockdown that persisted. We also found an increase in nighttime heart rates with the initiation of lockdown. Heart rate variability also decreased through the year after lockdown where it increased throughout the year prior.

Conclusions: As it was revealed in our study, there is significant objective data showing that a statewide lockdown has immediate and long-term effects on heart rates and activity levels in patients with implanted cardiac devices. Lawmakers and physicians should use this information when considering the overall impact of a lockdown and measures should be undertaken to potentially mitigate these physical effects.


Daytime HR
Average BPM
83
82
81
80
79
78
First AZ case
AZ Stay-at-Home
AZ re-open
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Nightime HR
Average BPM
71
70
69
68
First AZ case
AZ Stay-at-Home
AZ re-open
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Daily Activity Minutes
Average Activity Mins.
300
280
260
240
First AZ case
AZ Stay-at-Home
AZ re-open
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec


Heart Rate Variability
HR Variability
115.0
112.5
110.0
107.5
First AZ case
AZ Stay-at-Home
AZ re-open
Jan
Feb
Mar
Apr
May
Jun
Jul
Aug
Sep
Oct
Nov
Dec