# Schedule Factors Associated with the Use of Controlled Rest in a Long-Haul Airline

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# Fatigue on the Flight Deck

- Pilots often suffer from fatigue due to work schedules
- Severe fatigue can lead to unintentional sleep on the flight deck (Marqueze et al., 2017; Rosekind et al., 1994; NTSB, 2009)

CBS NEWS

Aug 3, 2009

**NTSB: Both Pilots Asleep on Hawaii Flight**

# What is Controlled Rest?

- Controlled Rest (CR) is a "*mitigation strategy to be used as needed in response to unanticipated fatigue experienced during flight operations*" (ICAO, 2015)

www.nasa.gov

# How is CR used in practice?

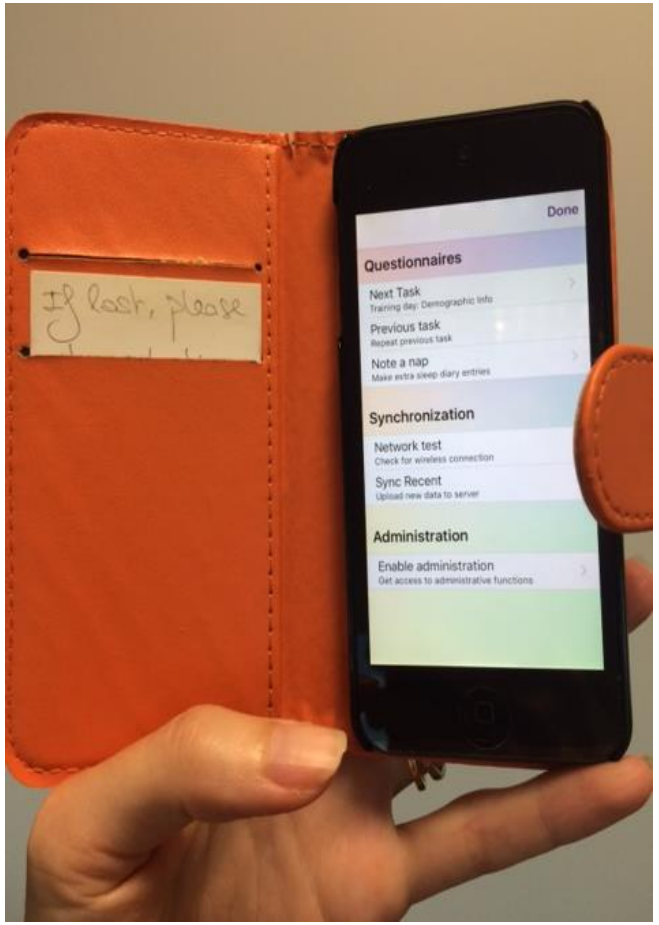
- >50% of Air NZ pilots surveyed used CR in the past 12 months (Petrie et al., 2004; total N=251)

- **How is CR used operationally?**
- **What schedule factors are associated with CR use?**

# Methods

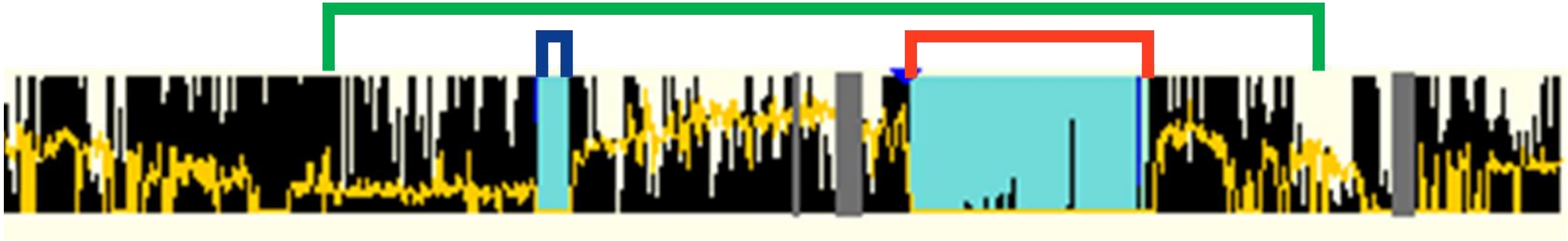

Personal photo

- N=44 pilots
- ~2-week data collection
- 239 long-haul flights
- App-based sleep diary
- Actiwatch
- Schedule info from operator



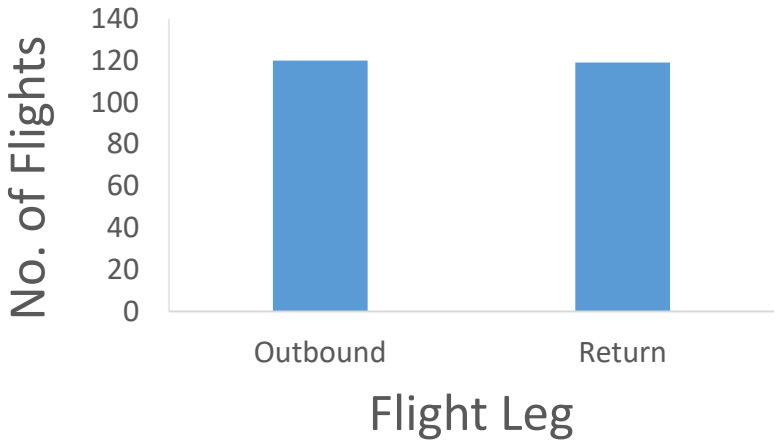

Personal photo

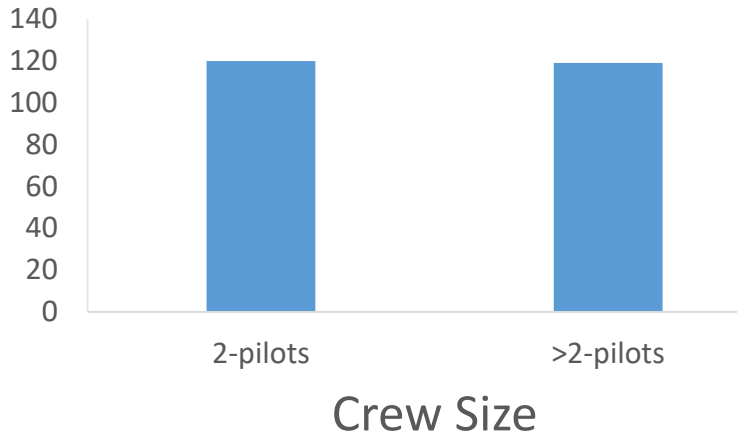
# Methods

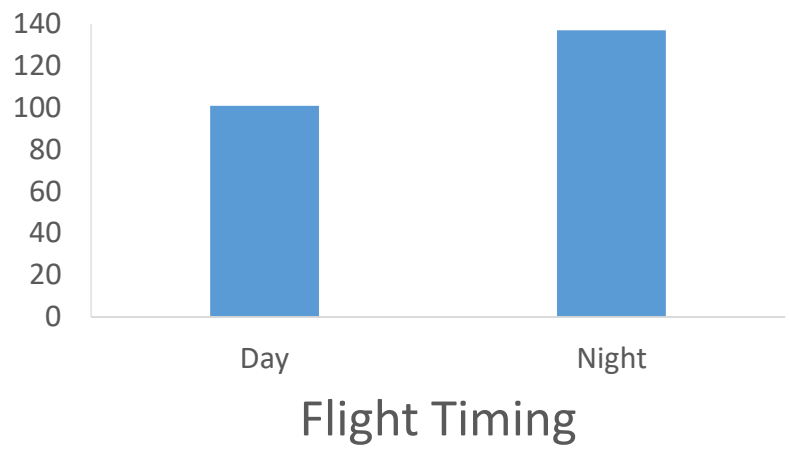


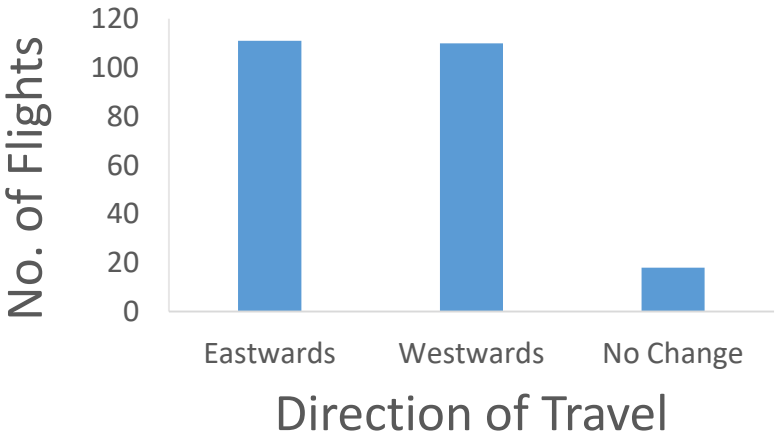
- Rest Periods based on sleep diary entry
- Sleep estimated using Actiware (Medium Wake Threshold)

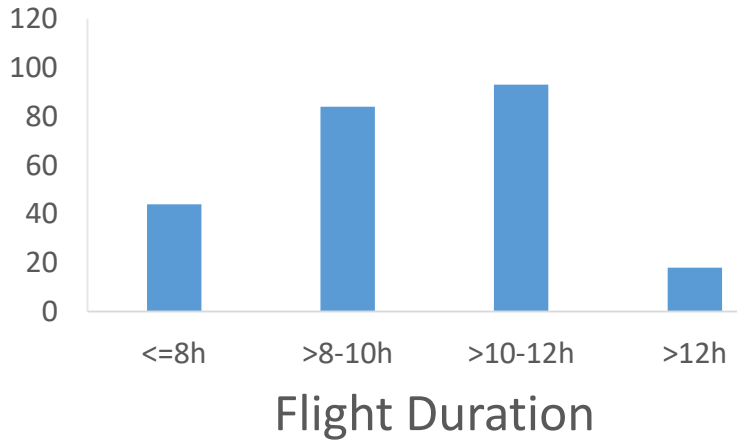
# Flight Summary

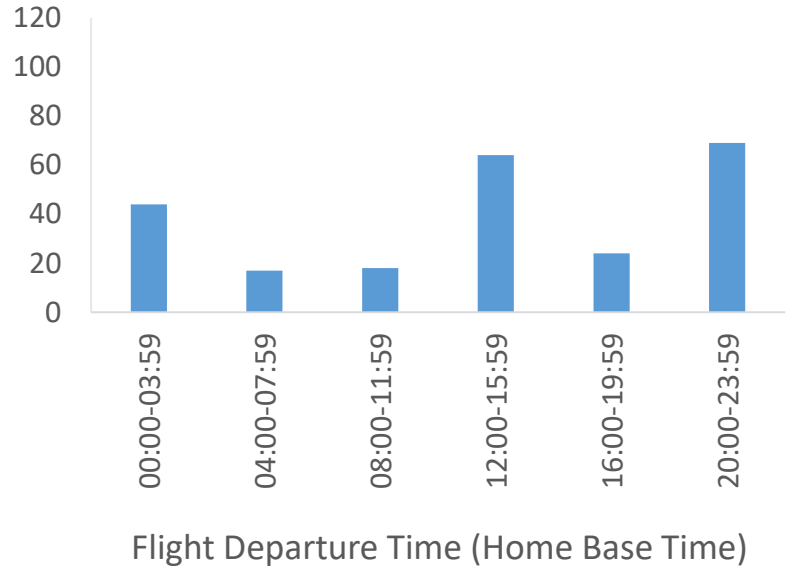


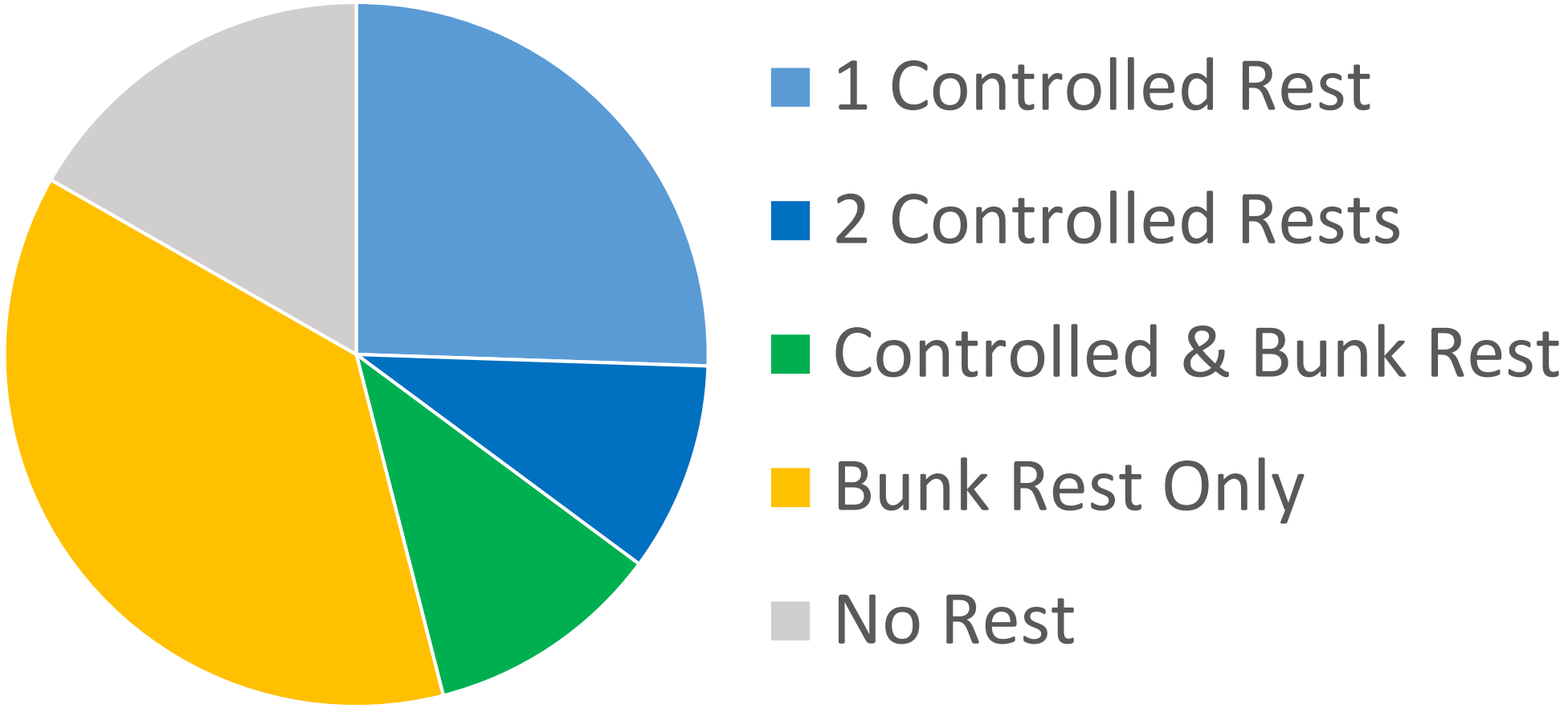



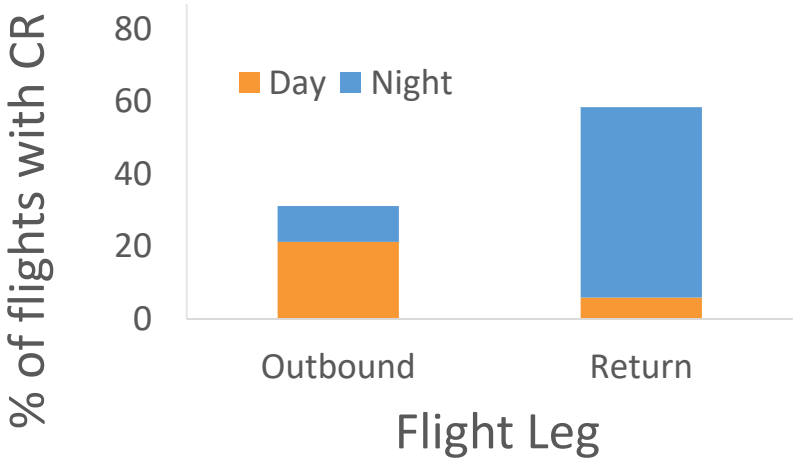
# In-Flight Rest Summary

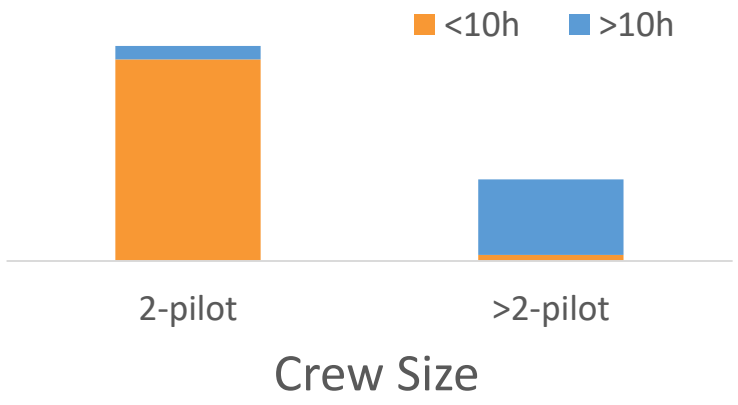


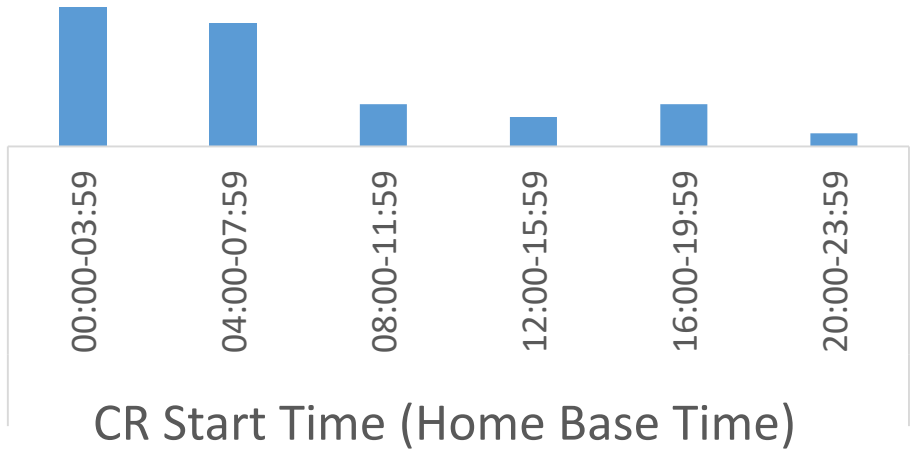
# Controlled Rest Sleep Duration

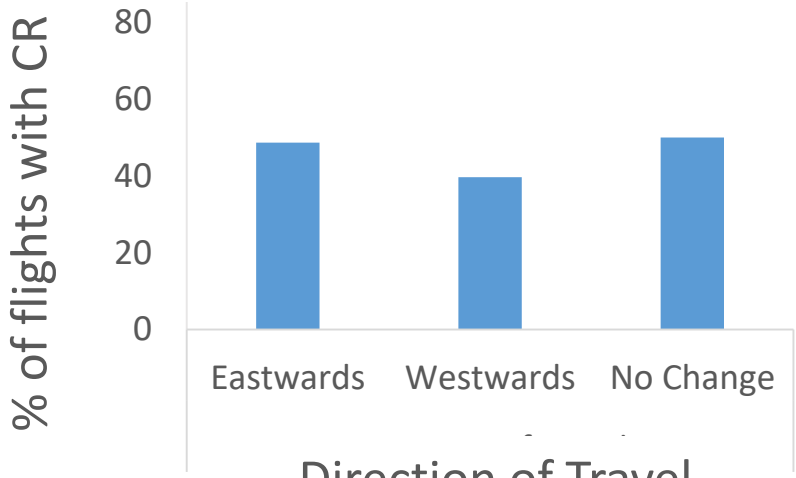
| Controlled Rest | Mean Duration in Minutes (SD) |
|---|---|
| All attempts (n=133) | 25.3 (16.8) |
| Successful only (n=106) | 31.7 (12.2) |

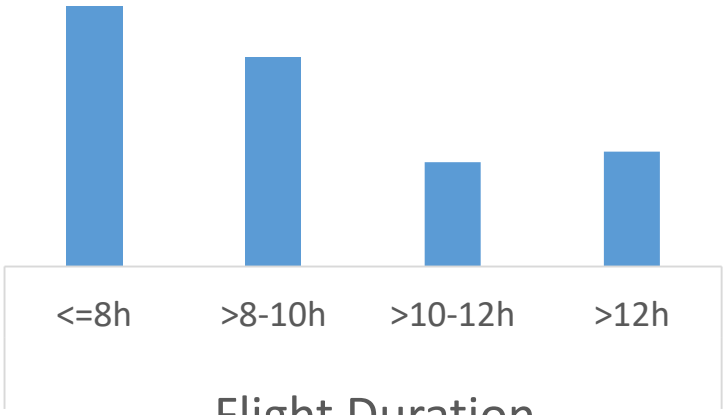
80% success rate

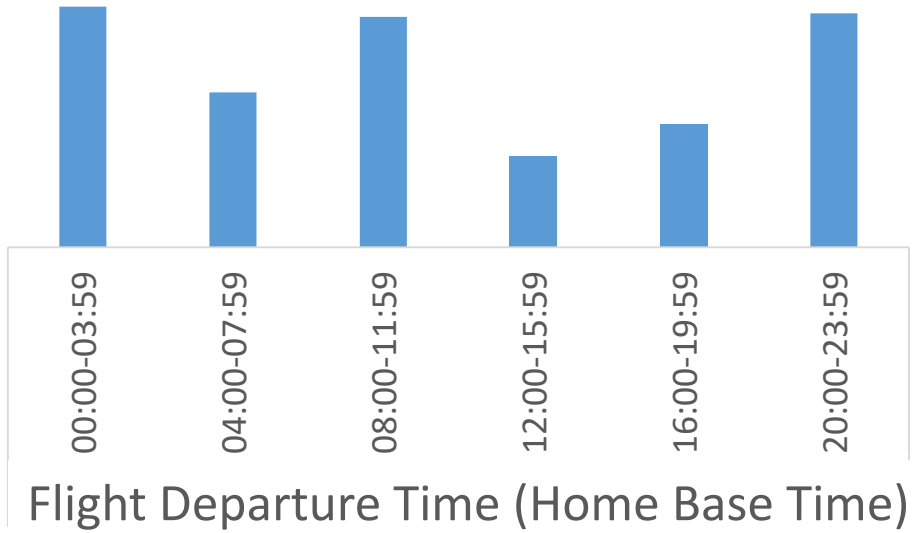

% of flights with CR
80
60
40
20
0
Day
Night
Outbound
Return
Flight Leg


<10h
>10h
2-pilot
>2-pilot
Crew Size


00:00-03:59
04:00-07:59
08:00-11:59
12:00-15:59
16:00-19:59
20:00-23:59
CR Start Time (Home Base Time)


% of flights with CR
80
60
40
20
0
Eastwards
Westwards
No Change
Direction of Travel


<=8h
>8-10h
>10-12h
>12h
Flight Duration


00:00-03:59
04:00-07:59
08:00-11:59
12:00-15:59
16:00-19:59
20:00-23:59
Flight Departure Time (Home Base Time)

# Summary

- CR was used on 46% of observed flights
- CR was most commonly used on:
  - return flights / night flights
  - <10h flights / un-augmented flights
- CR was sometimes used:
  - twice
  - with Bunk Rest

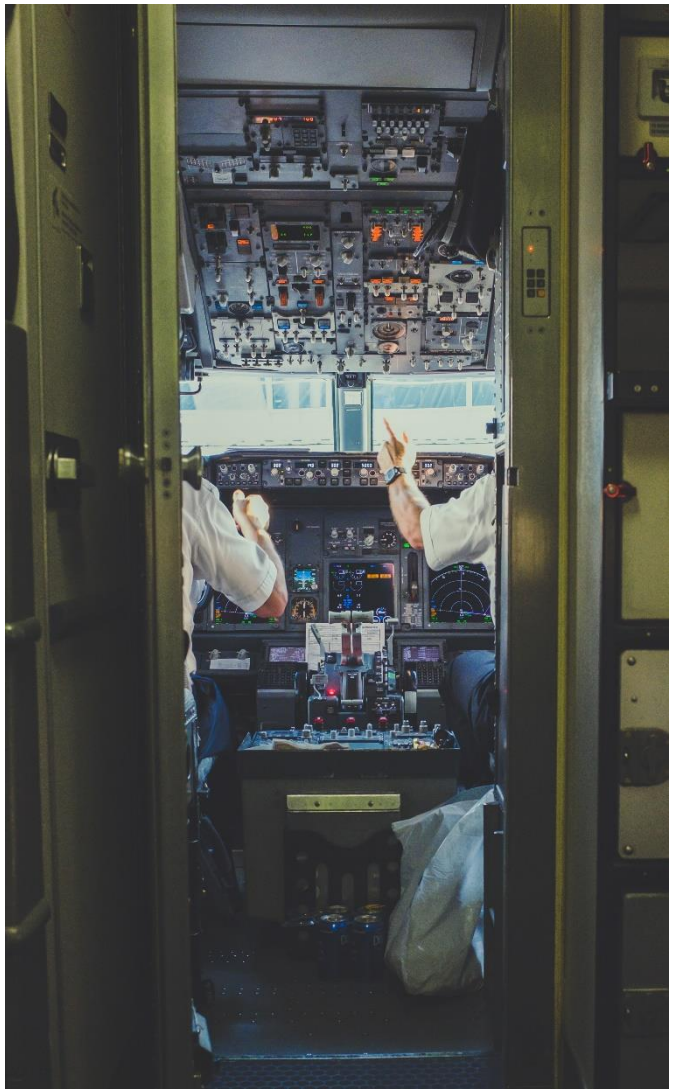


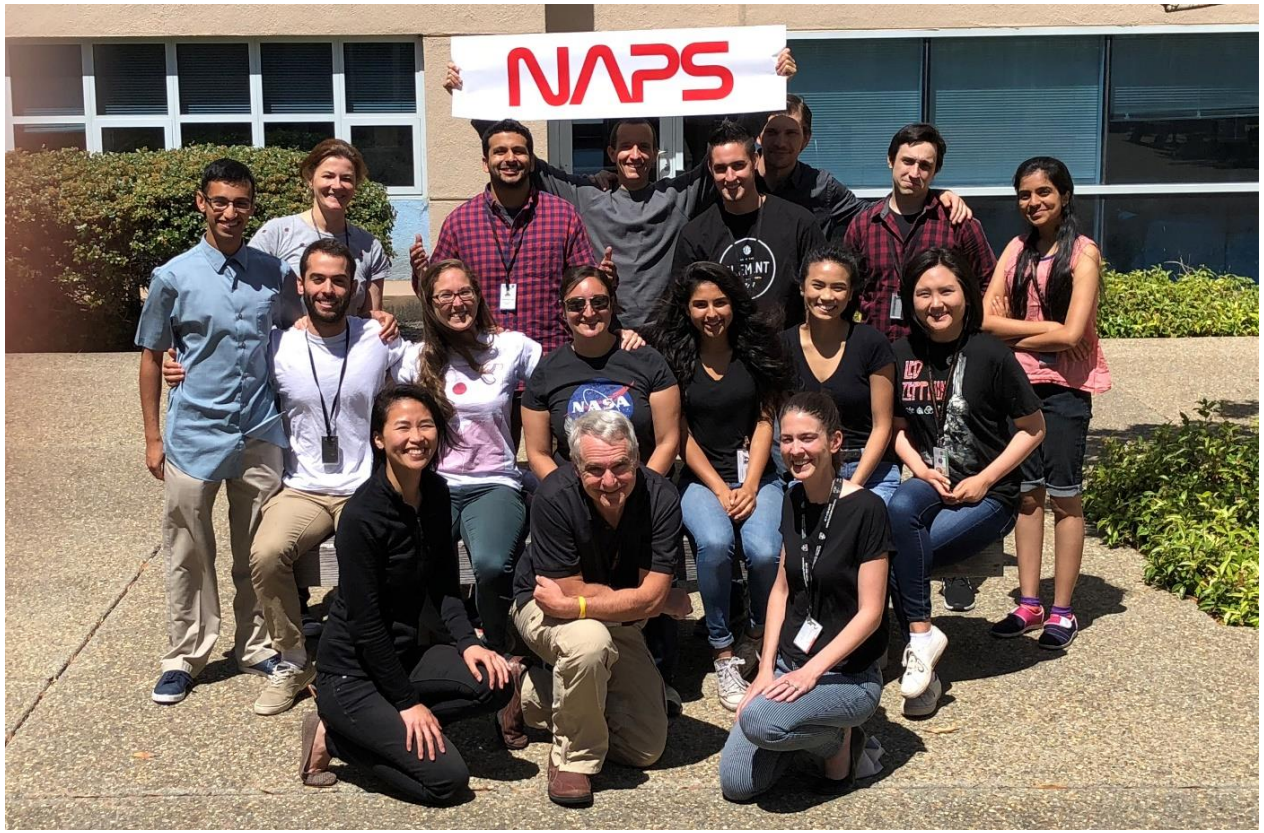
Photo by NeONBRAND on Unsplash

# Next steps

- Analyze sleep and performance data
- Encourage airlines to collect data on CR to increase knowledge of use, attitudes, and effectiveness
- Survey of larger pilot population

# Thank you

- Fatigue Countermeasures Lab (NAPS)
- Fatigue Countermeasures Working Group
- Erin Flynn-Evans
- Lucia Arsintescu
- Kevin Gregory




Personal photo

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Support

- NASA Airspace Operations and Safety Program, System-Wide Safety Project