



# Summary of the USOS VIIP Findings

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# The Numbers



- Completed 42 ISS missions
- Sentinel case occurred in 2005 – optic disc edema and a cotton wool spot
- Initiated *some* VIIP related testing in 2008 (Exp 18)
  - Inconsistent testing until Feb 2010 (Exp 23) when Eye MED B 1.10 came into effect
  - Improved imaging hardware (Fundoscope & OCT) flew in 2013
- Clinical Practice Guideline (CPG) approved in 2010
  - Case definition included a classification scheme (0-4)
  - Many issues with this CPG
- New Clinical Care Algorithm in April 2014
  - Case definition no longer classifies – focusses on findings
  - Expands treatment options



# USOS Crewmembers



- Individuals that have completed ISS missions
  - 48 US of which 30 have been evaluated for VIIP
  - 13 Int'l's of which 9 have had complete testing
- Repeat 6 (8 if you count previous MIR missions)
- Of crewmembers tested, only 5 had no prior space flight experience.



# Findings To Date (ISS/USOS)



- Elevated Intracranial Pressure
  - <20 cm H<sub>2</sub>O: 2
  - >20 cm H<sub>2</sub>O: 2
  - >25 cm H<sub>2</sub>O: 3
- Optic disc edema/papilledema
  - Frisen Grade 1 or higher: 9
  - Subclinical: 5
- Choroidal folds
  - OCT or Fundoscopy: 12
- Cotton wool spot
  - 5\*

\*1 Roth Spot appeared 193 days post-flight

- Globe flattening

	U/S	MRI
Pre-flight	7	10
Post-flight	14	22

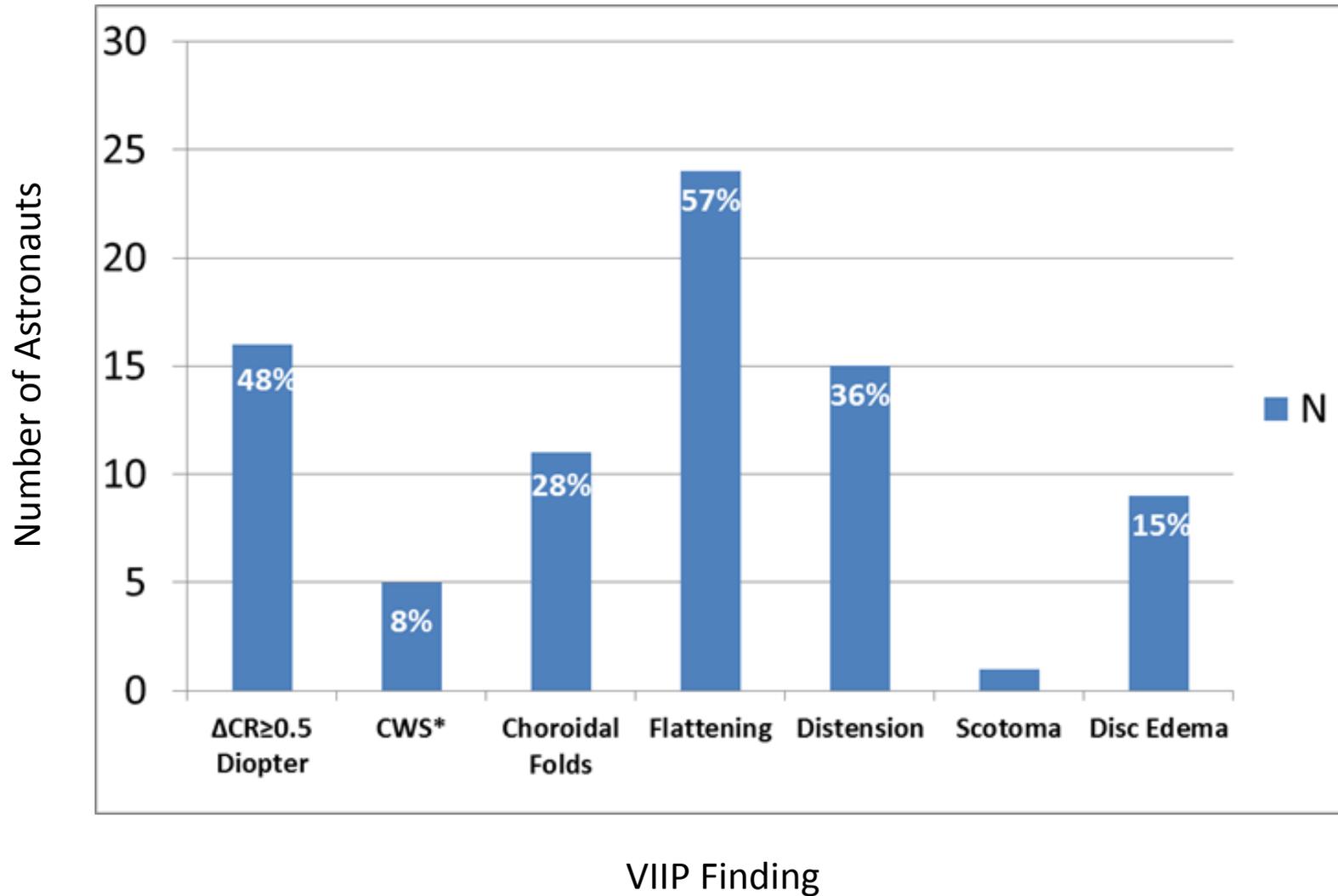
- Optic Nerve Sheath Distention (Diameter):

	U/S	MRI
Pre-flight	0.61	0.64
Post-flight	0.62	0.65

- Refractive error change – post flight
  - >0.5 Diopter: 9
- Scotoma – in flight
  - 1



# Summary Graph





# ONSD – MRI Guidelines Document

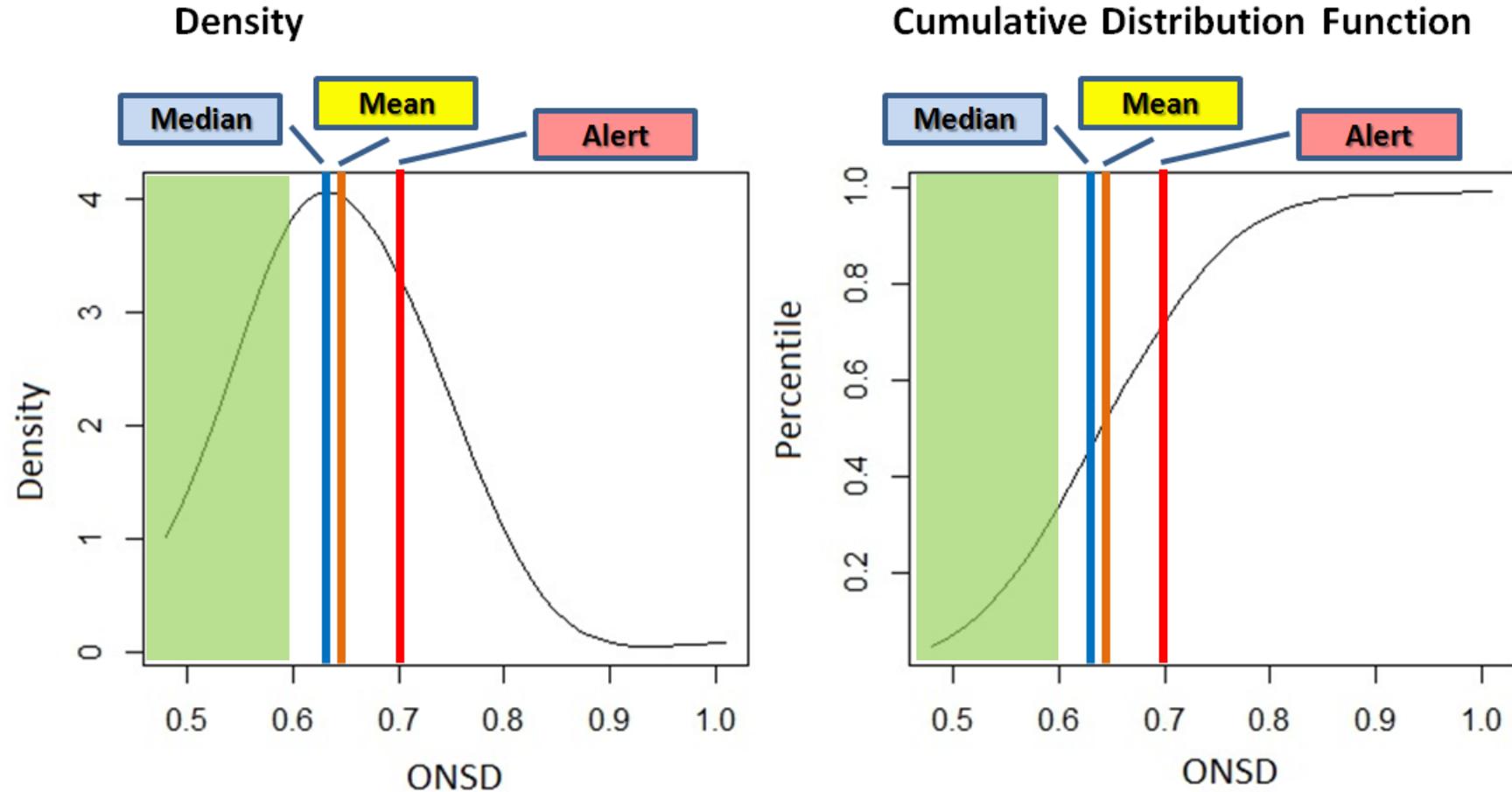
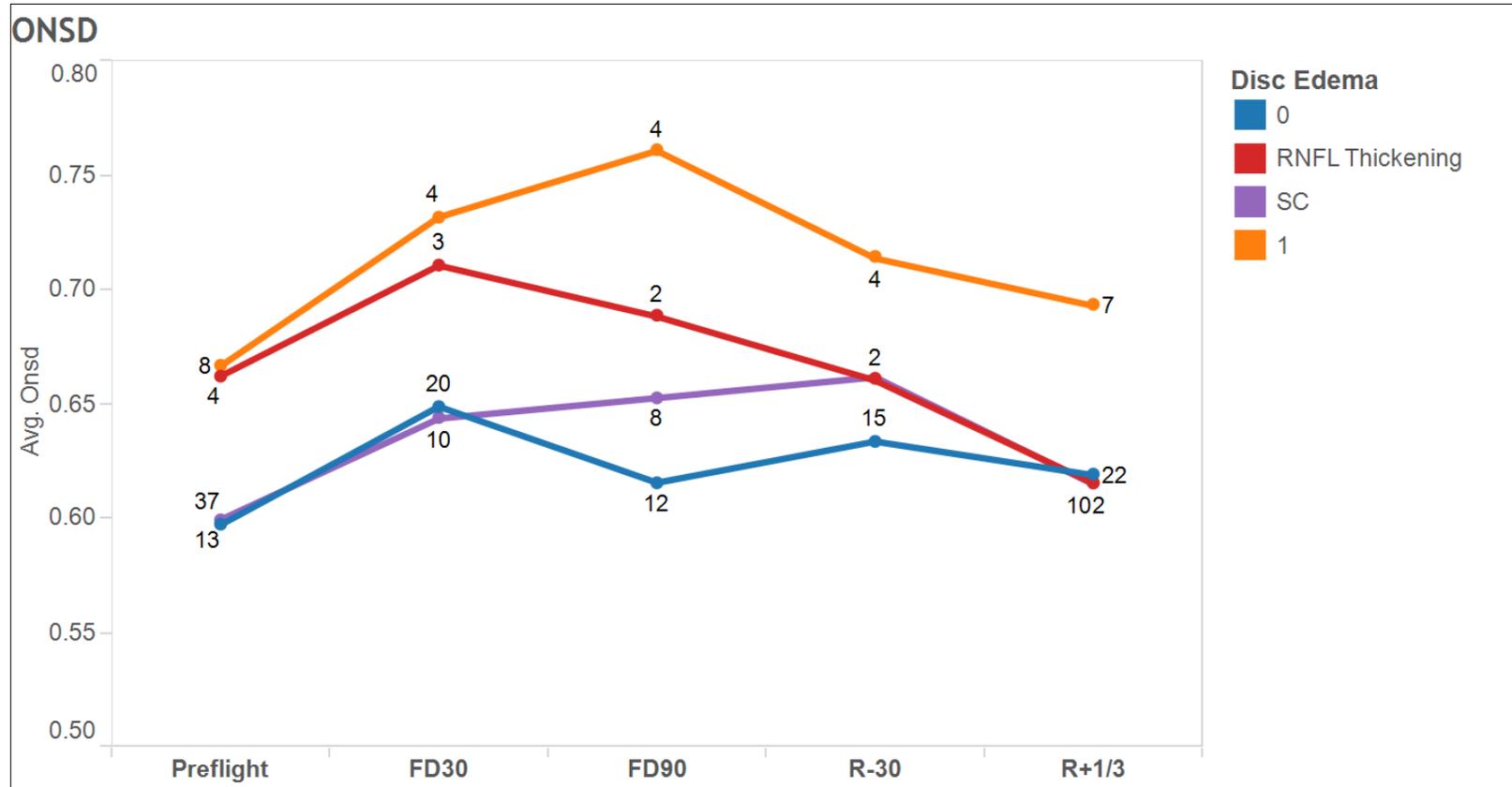


Figure 1. Distribution of ONSD values in the astronaut cohort (Pre-flight, in 42 pairs). The green area corresponds to the terrestrial published evidence with a “cut-off” value for elevated ICP at 0.59 cm. This value cannot be directly used for the astronaut cohort and is provided as part of background information.

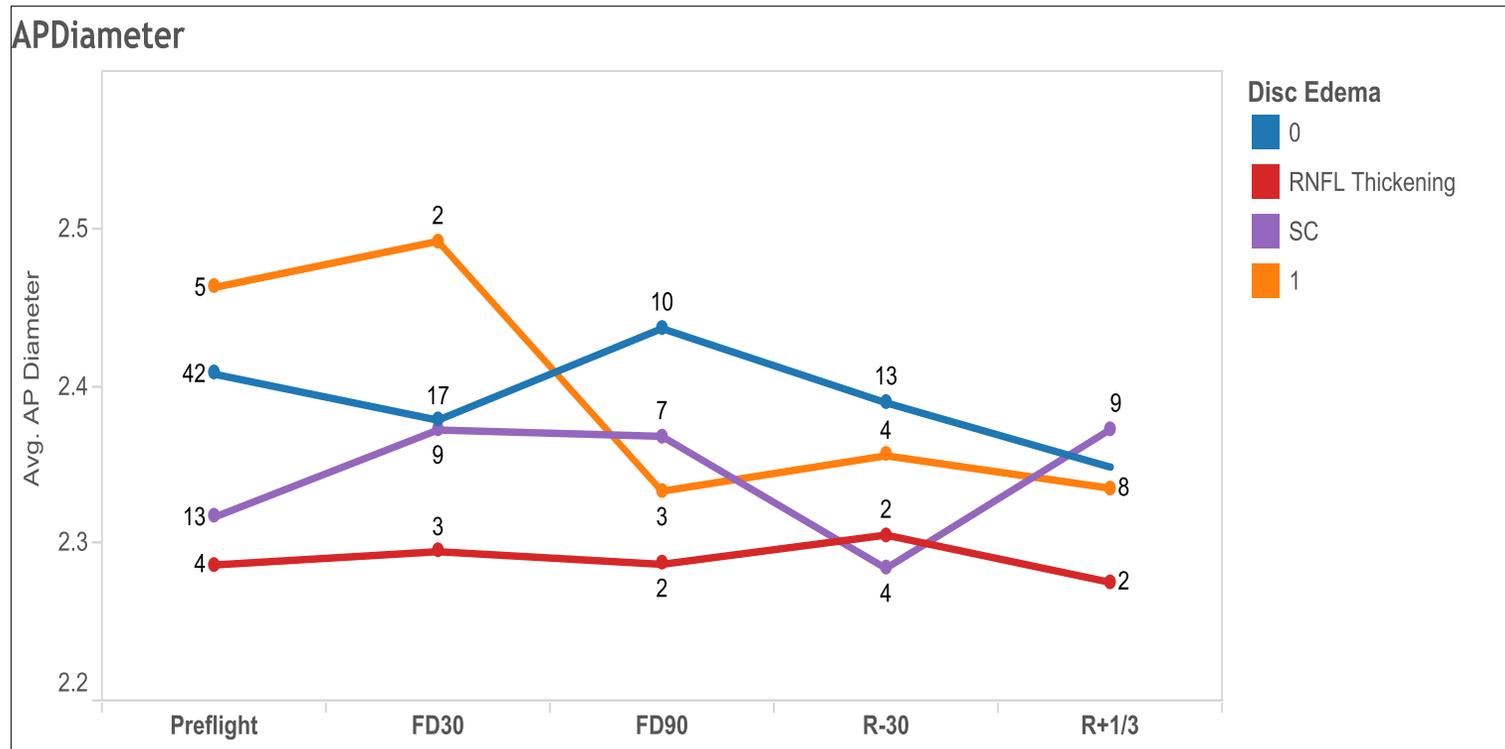


# ONSD(U/S) vs Post-flight Disc Edema Diagnosis



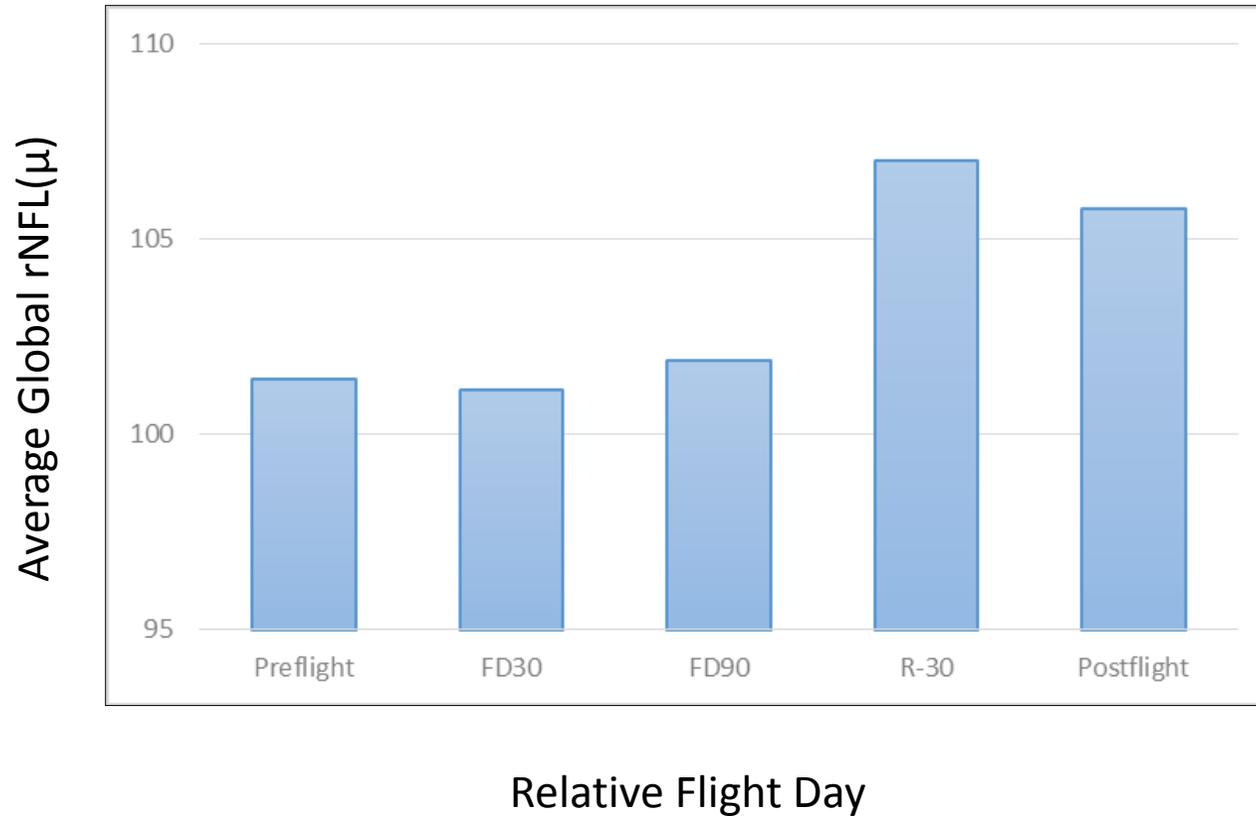


# AP Diameter(U/S) vs Post-flight Disc Edema Diagnosis



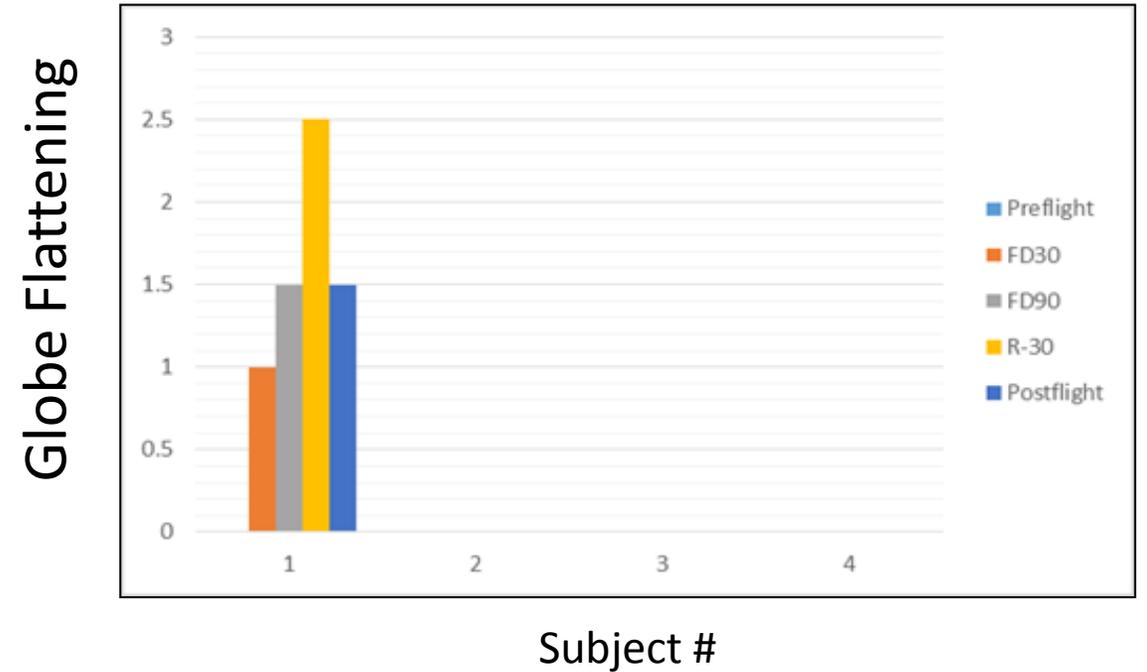
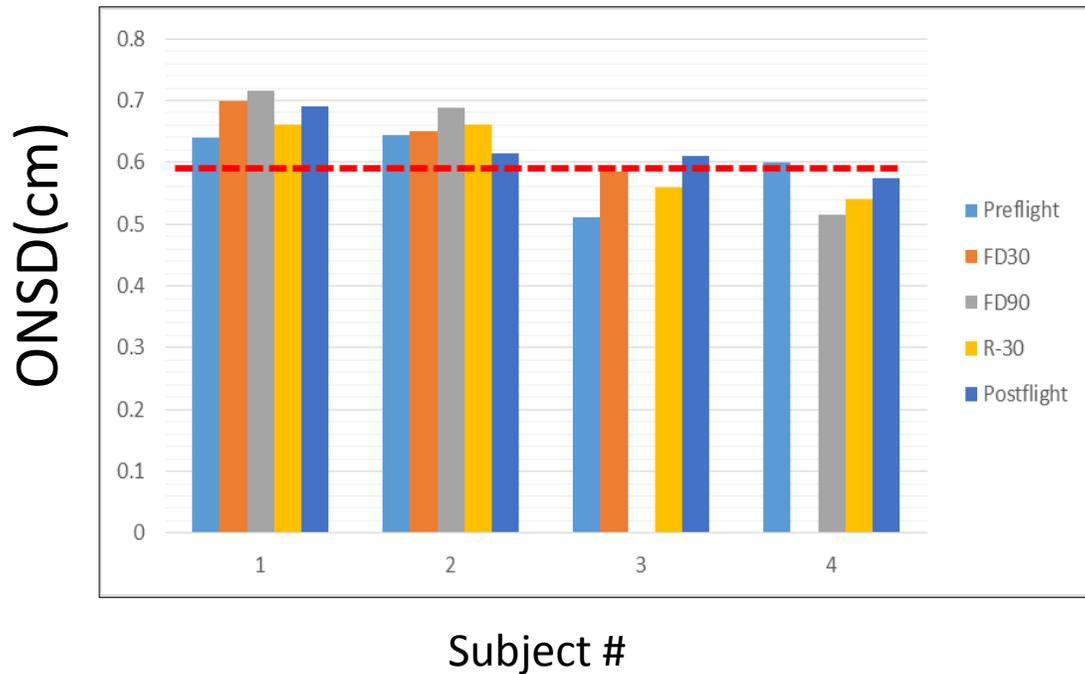


# In-flight OCT (n=6)





# Space-flight Naïve: Ultrasound



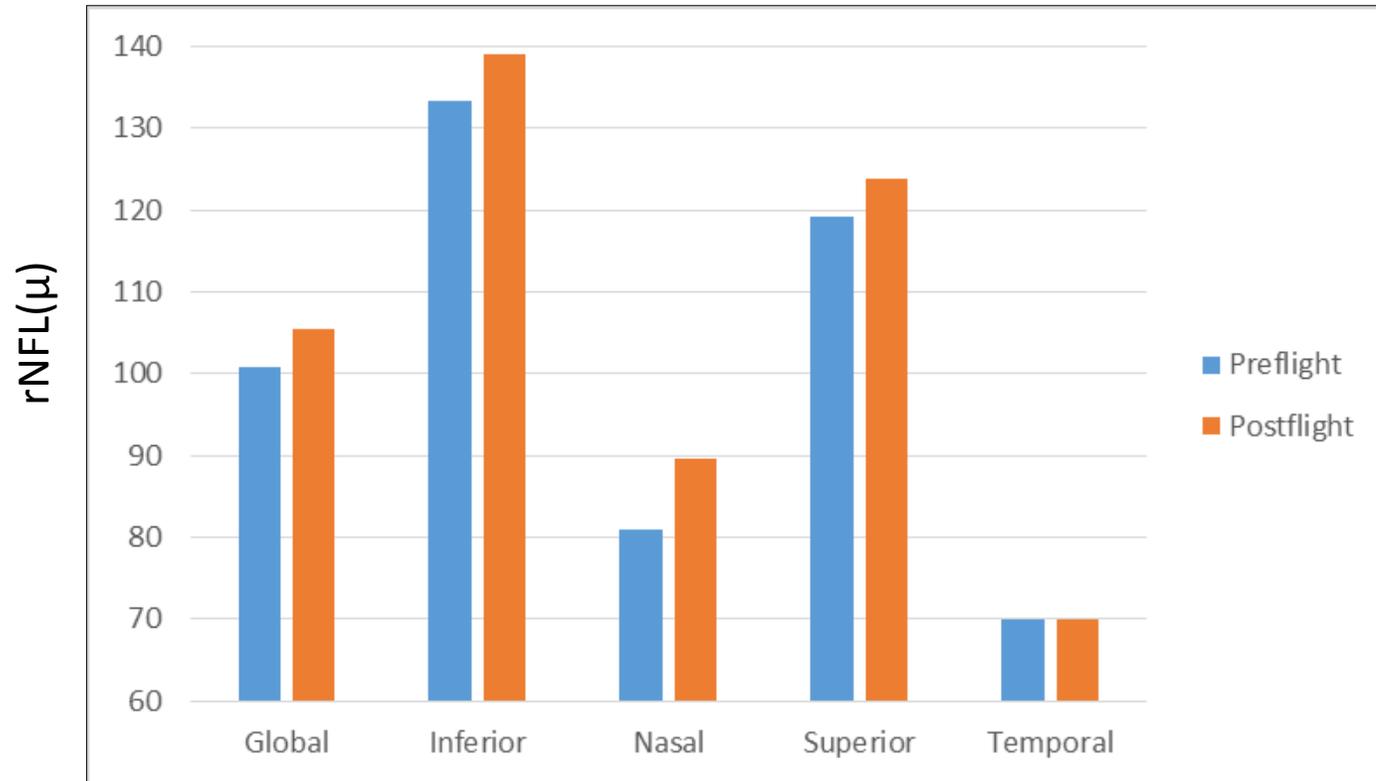
Note: Scale from 0 to 3 is used (None, Mild, Moderate, Severe) corresponds to vertical axis



# Space-flight Naïve: OCT



## Total RNFL

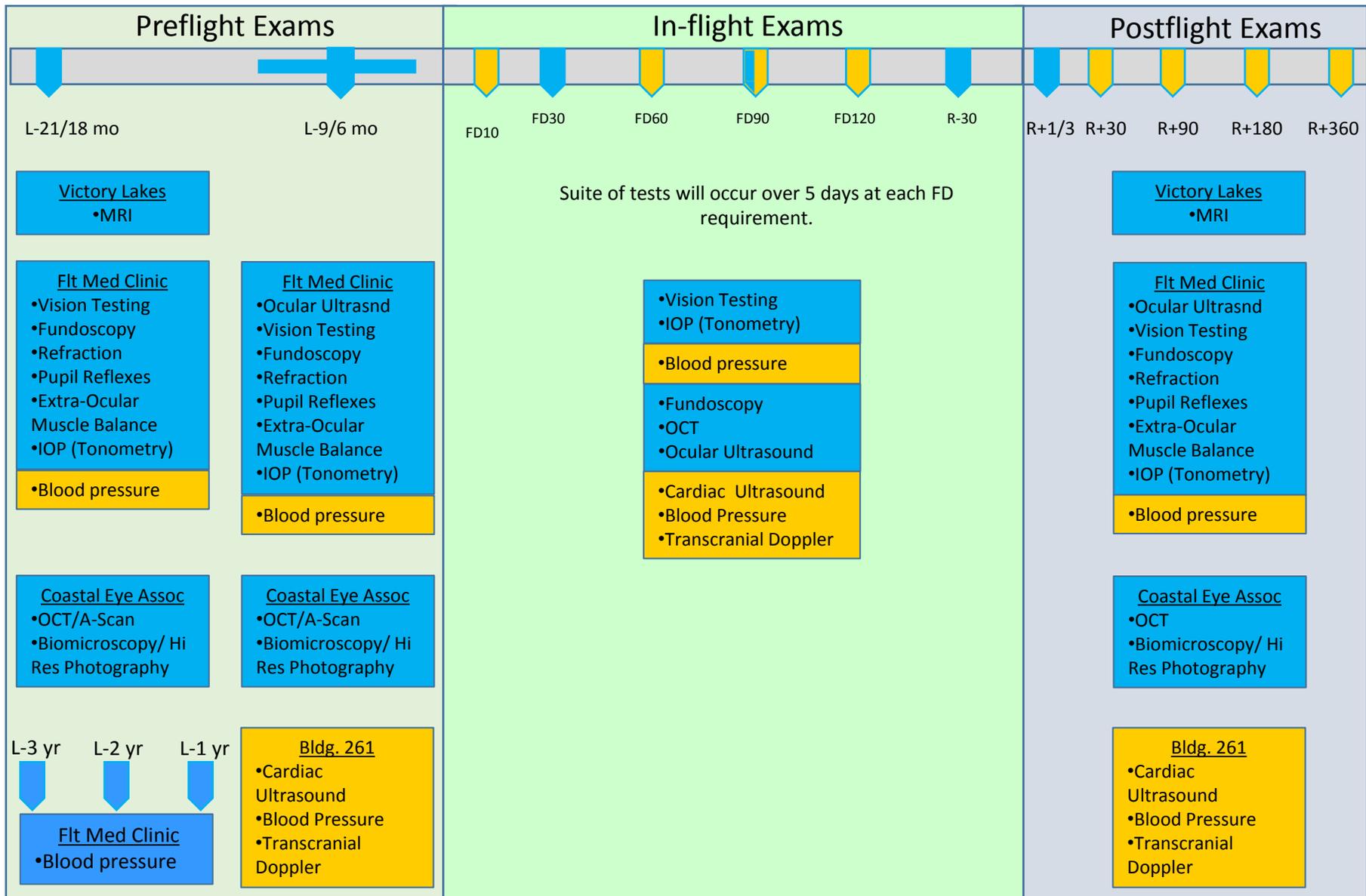




# Forward Work



- Continue to update these graphs
- Updates to the MRI/US distributions
- Develop evidence base
- NASA's Ocular Health Study – PI Christian Otto



Medical Activity      Research Additional Activity

Medical Session      Research Additional Session