

# Are Altitude Tables Needed?: A Retrospective Longitudinal Analysis of Hypobaric Exposures and Incidence of DCS

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## Introduction

- The risk of a decompression illness (DCS) in hypobaric exposures is a frequent concern for researchers, yet the circumstances that give rise to the incidence and prevalence of these cases are controversial.
- No commercially available tables exist to define ascent rate limits, altitude exposure, and oxygen pre-breathe time unlike what is current operating procedure in hyperbaric research (i.e. US Navy/DCIEM tables)
- Defining parameters that limit risk for DCS will ensure safety for those working in hypobaric/hyperbaric environments, and retrospective data may be very useful in setting these criteria.

## Method

- Retrospective analyses of all flights conducted between 1985 and 2011 were conducted using standard descriptive statistical procedures.
- The means and minimum/ maximum values were computed for the factors Total Time at 20,000', 25,000', and 17,000' after 25,000' exposure ASL, Oxygen Pre-Breathe Time, and Elapsed Ascent Rate Time.
- The total numbers of DCS cases were also recorded.

Table 1: Descriptive Statistics for Variables of Interest

	# of Flights	20k'	25k'	17k' after 25k'	O2 Pre-Breathe for 25k'	Ascent to 20k'	Ascent to 25k'
# of Flights (# of Ss)	97(483)	46(183)	51(300)	34(210)	39(238)	46(183)	51(300)
Min Time	-	2:09	1:00	6:59*	25	2:00	6:53
Max Time	-	14:36	15:30	28:50*	53	12:05	15:24
Mean Time (SD)	-	5:06(2:40)	11:20(3:48)	20:38(5:15)*	32.87(6.01)	4:04(1:52)	8:59(2:01)

\*: Data obtained from 23 flights

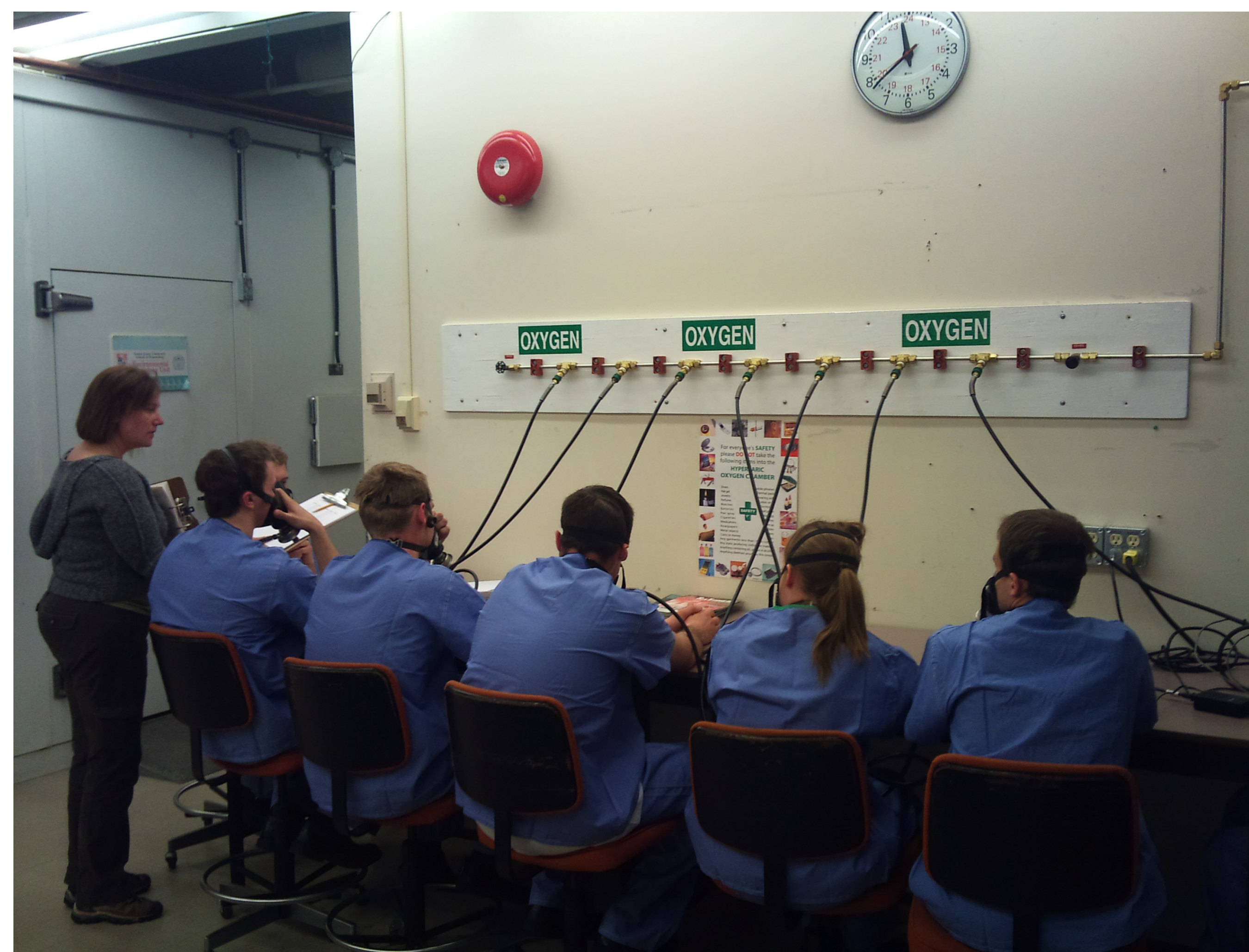


Figure 1: Pilots at Oxygen Pre-Breathe Station



Figure 2: Pilots in chamber during HAI Exposure

## Results

- There was not a single DCS case reported during the entire span between 1985 and 2011 despite the fact that 97 flights took place with a total N=483.

## Summary/Conclusion

- Our findings are not consistent with some reported rates of DCS from other sources.
- Comparisons made with the Altitude Decompression Risk Analysis Computer (ADRAC) developed by the US Air force Research Laboratory support our decision to continue with high altitude hypoxia training
- Further investigation into the comparison of Normobaric Hypoxia vs Hypobaric Hypoxia is currently underway.
- Ultimately, this information could be used to create commercial tables that define acceptable altitude exposure and the further development or improvements to current high altitude hypoxia training.
- Future studies using doppler at altitude during training may be useful.