



# Probabilistic decompression models with work-induced changes in compartment gas kinetic time constants

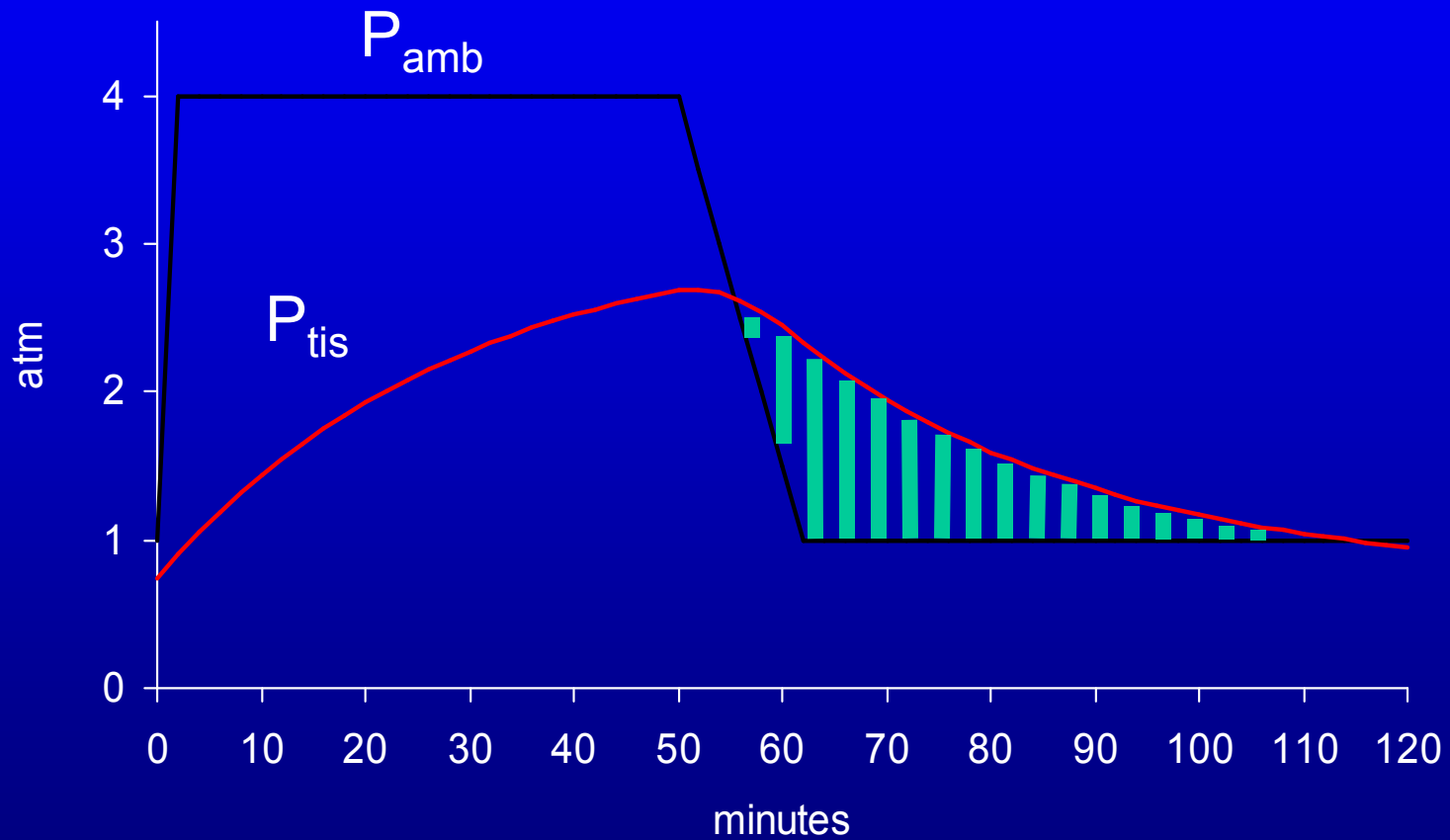
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Navy Experimental Diving Unit, Panama City (FL)

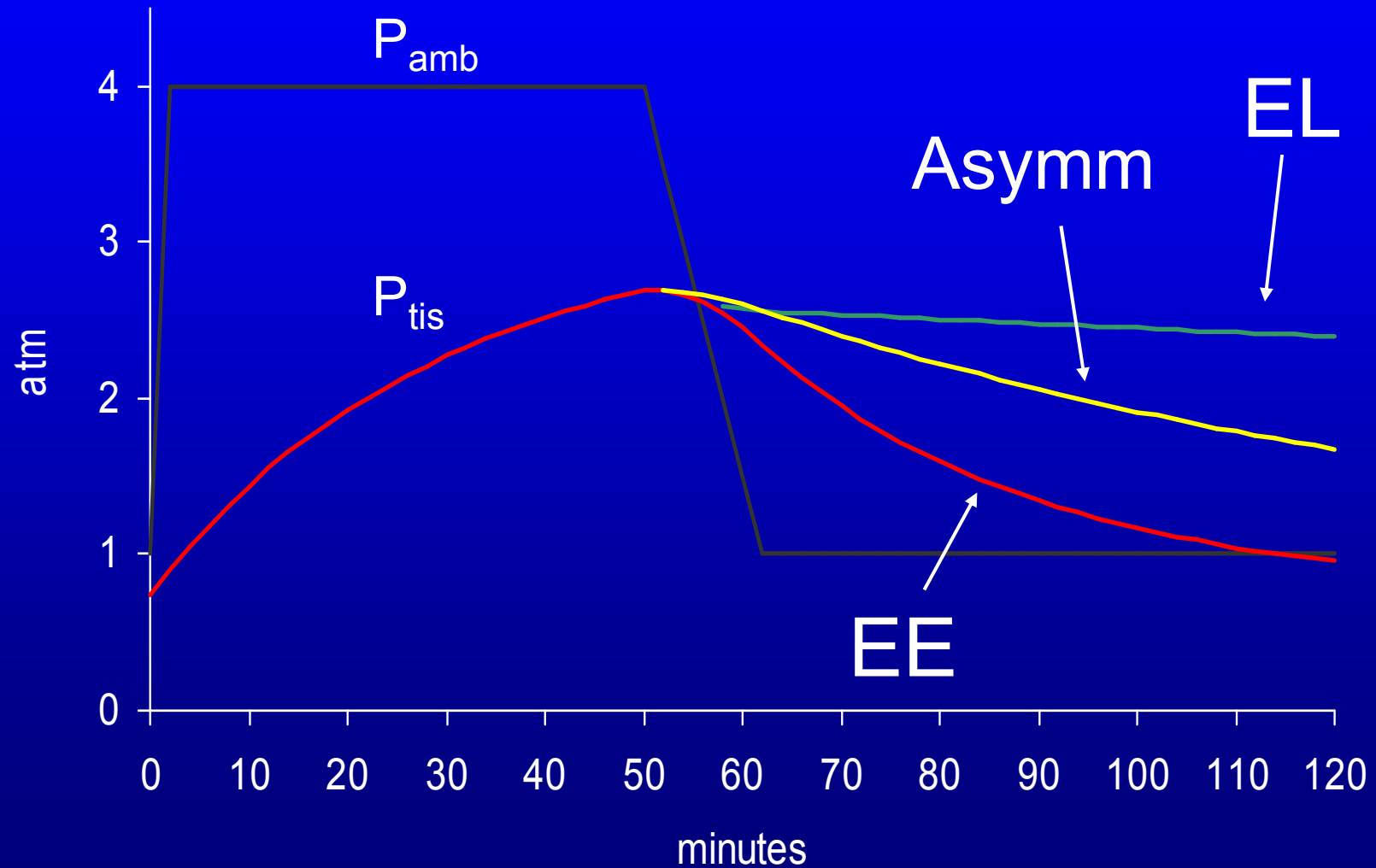
# Decompression Models

- Risk of DCS proportional to tissue gas supersaturation or bubble formation
- Underlying model of tissue inert gas uptake and washout
- Work-induced changes in inert gas kinetics in relevant tissues?
  - Schedule jumping
  - Oxygen “pre-breath” protocols

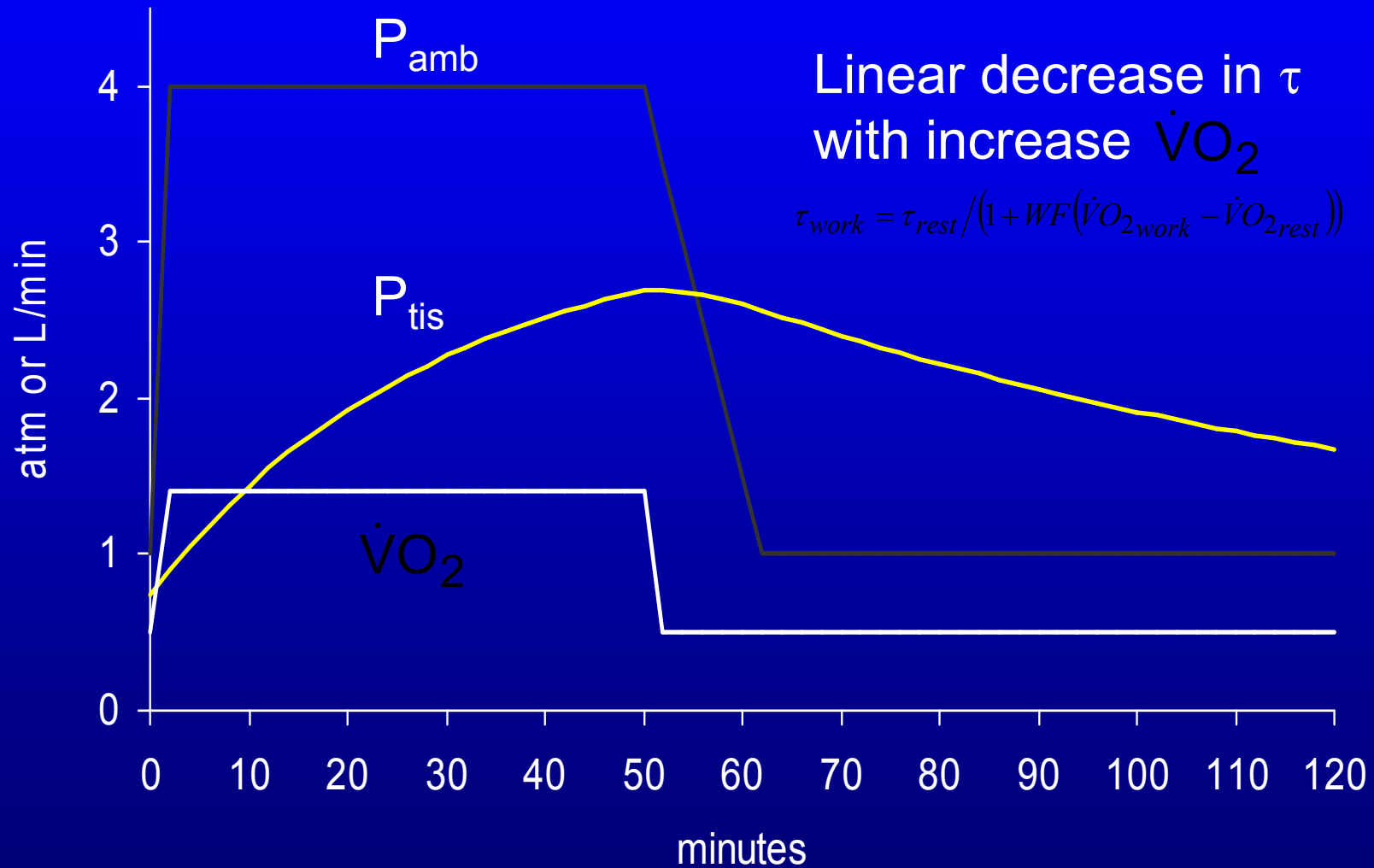
# Probabilistic gas content model



# Alternative Gas Kinetics



# Work/Rest Gas Kinetics



# big292w

Data set	Work
<b>Single Air</b>	
EDU885A	bottom
DC4W	bottom
NMRNSW2	bottom
PASA	bottom
SUBX87	none
<b>Single Non-Air</b>	
NMR8697	bottom
EDU1180S	bottom
EDU885M	bottom
<b>Repetitive &amp; Multilevel Air</b>	
PAMLA	bottom
EDU885AR	bottom
PARA	bottom
DC4WR	bottom

Data set	Work
<b>Repetitive &amp; Multilevel Non-Air</b>	
EDU184	bottom and SI
PAMLAOS	bottom
PAMLAOD	bottom
EDU885S	bottom
<b>Saturation &amp; Sub-saturation</b>	
ASATARE	none
ASATNSM	none
ASATEDU	none
ASATNMR	none
NSM6HR	bottom

3322 man-dives, 190 DCS, 110 Marginal

## Big292w Parameters: Compartment 2

Kinetics	Work factor	$\tau_{\text{rest}}$	E-L thrshld	Log Likelihood
EE	<u>0</u>	162	<u><math>10^{10}</math></u>	-1014
EL	<u>0</u>	60.1	.0296	-998
<i>Work Models</i>				
EE(w)	1.11	182	<u><math>10^{10}</math></u>	-1011
EL(w)	$10^{-11}$	60.3	.0297	-998

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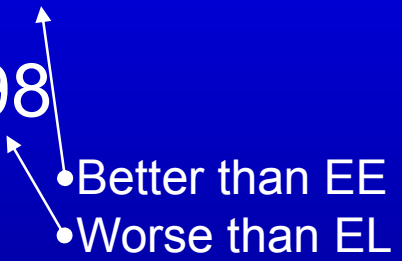


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 • Better than EE  
 • Worse than EL

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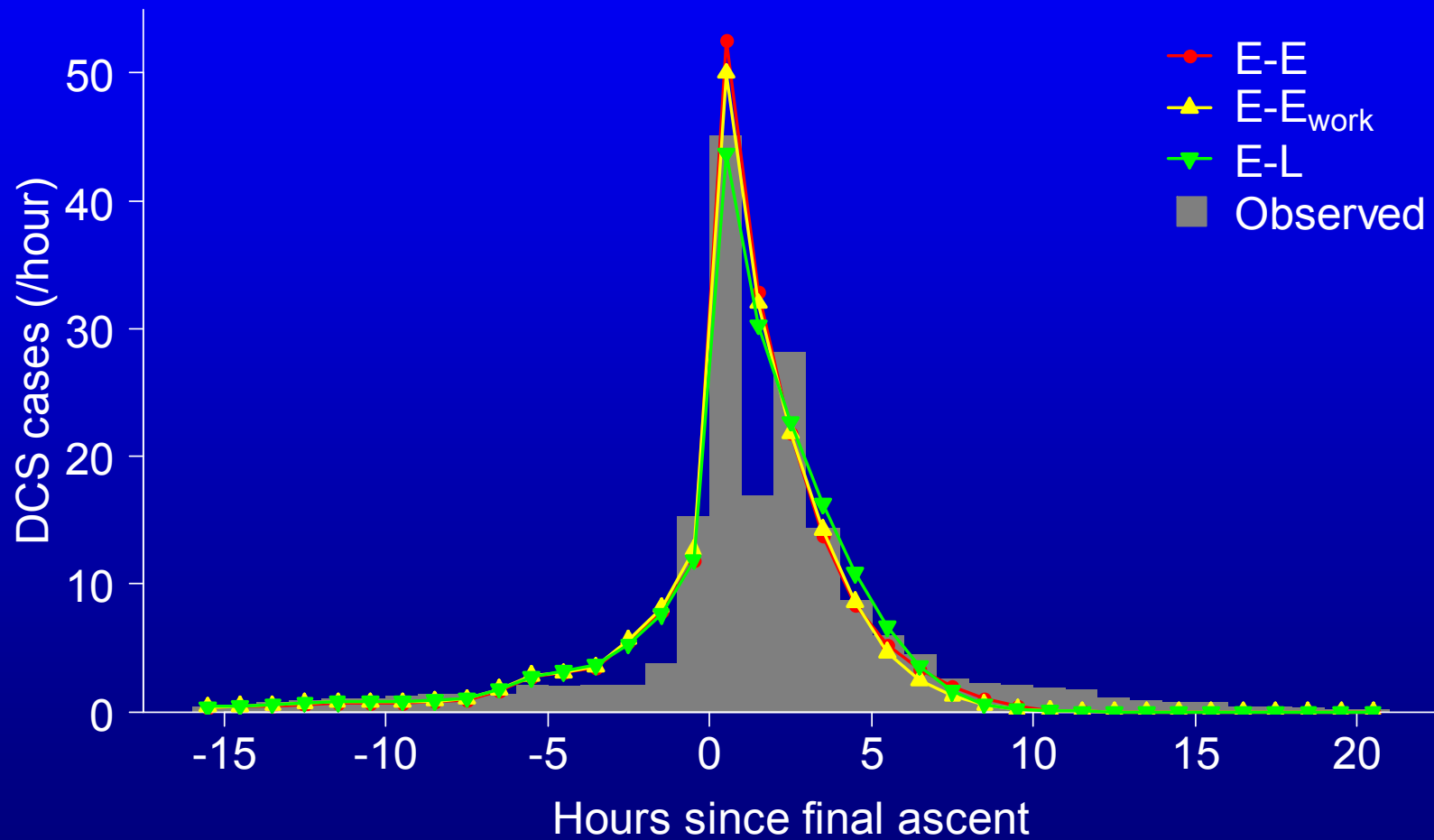
$\tau_{\text{work}} \sim 2$  fold faster than  $\tau_{\text{rest}}$  in big292w

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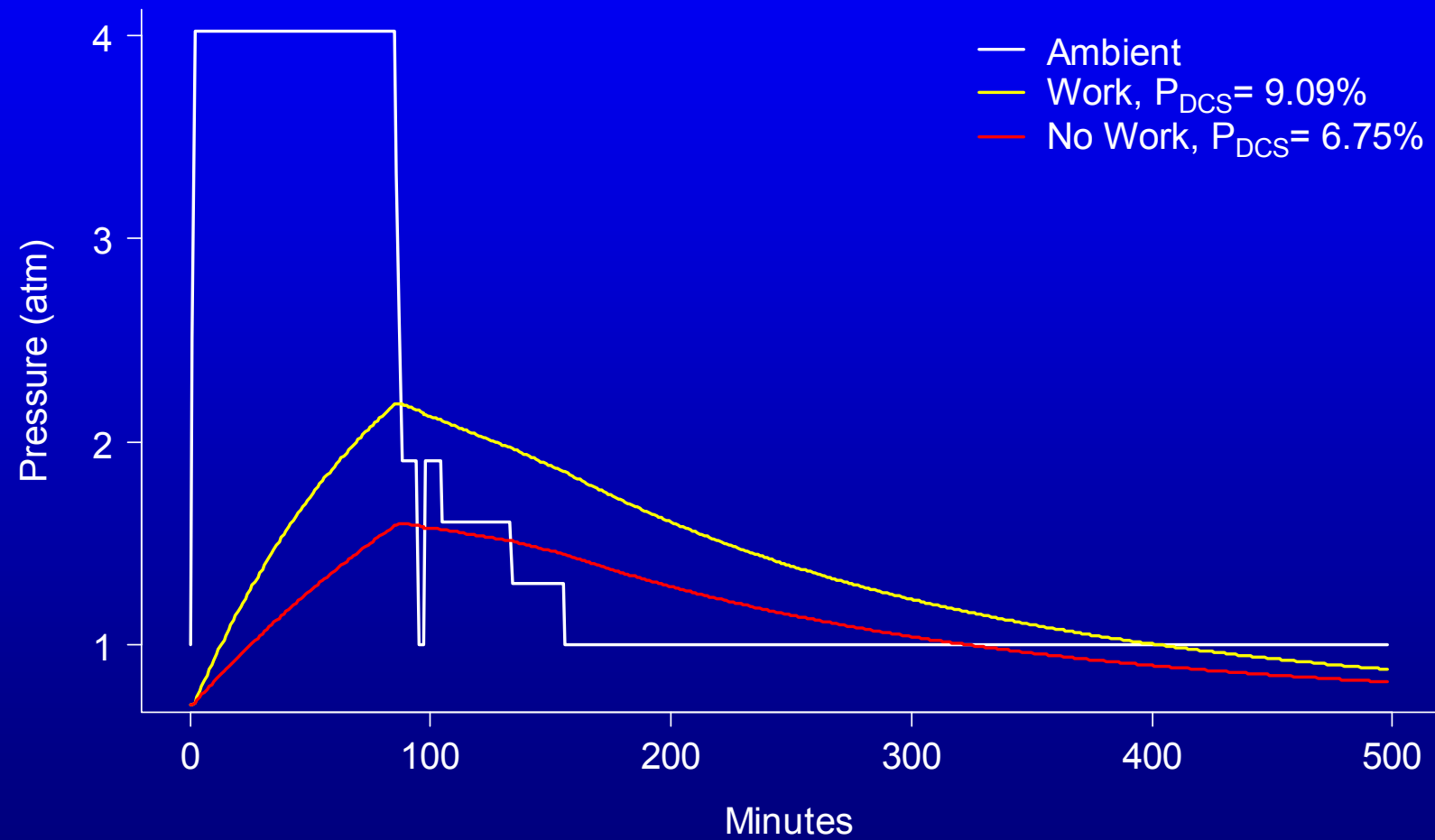
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↑ No work effect  
 Same as EL

# DCS Onset Time Distributions



# Modeled Work Effect



# Conclusions

- **Work models do not fit big292 substantially better than non-work models**
- **Work models may have advantages for data with more variation in the timing and rate of work**

