

# Survival in Patients Coinfected With HIV and Hepatitis C: A CD4 Threshold Effect

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Veterans Aging Cohort Study

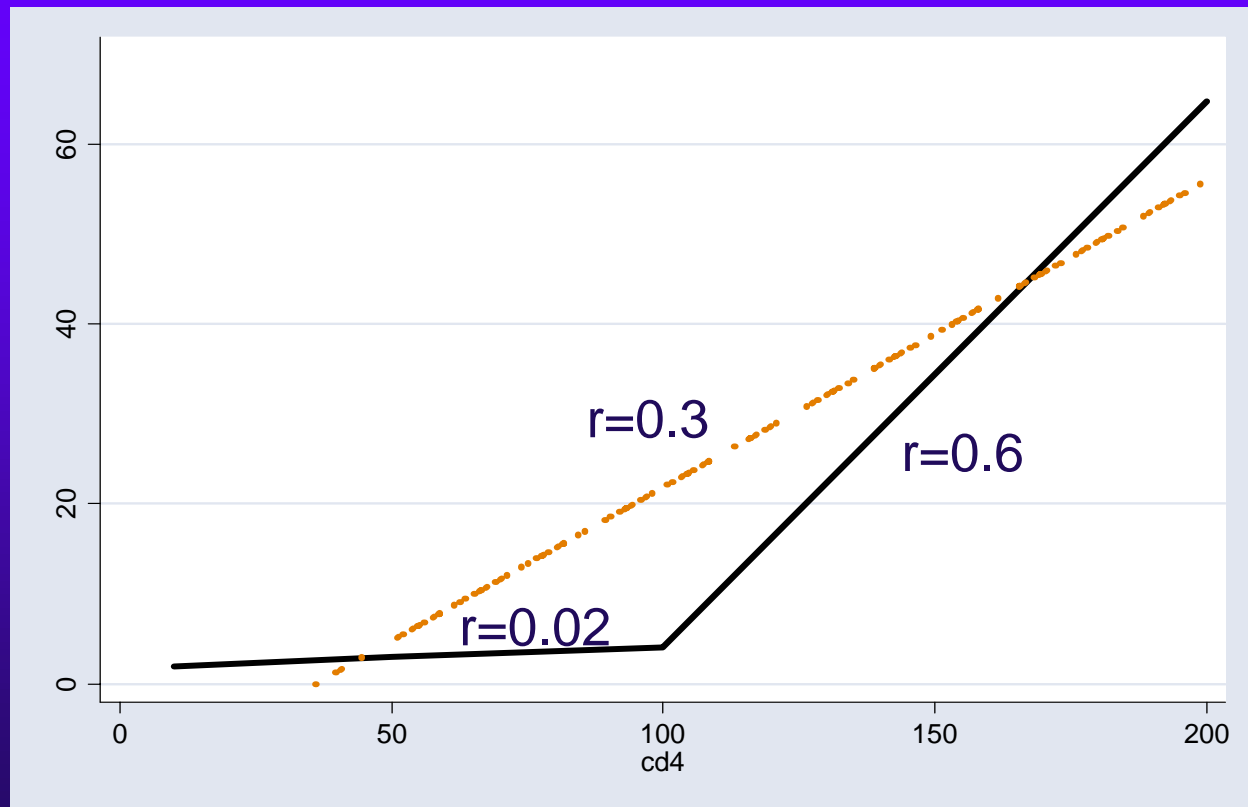
# Background

- ◆ HIV infected patients are living longer
- ◆ Comorbid disease is becoming more important for outcomes
- ◆ Impact of HCV coinfection is not clear:
  - Some studies show increased mortality
  - Some studies show no additional mortality



# Background

- ◆ Most studies treat CD4 as continuous variable



# Hypothesis

- ◆ HCV's impact on mortality is dependent on a *threshold* CD4 count.



# Methods

- ◆ Used combined cohort data
  - VACS 3
  - CHORUS
- ◆ CD4 & viral load closest to baseline
  - CD4 – sq root transformed
  - Viral load – log10 transformed
- ◆ Stratified by CD4 count
  - Cutpoints: 350, 200, 100, 50



# Methods

- ◆ Kaplan-Meier curves
- ◆ Cox proportional hazards adjusting for:
  - Age
  - Sex
  - Race
  - Cohort
  - CD4
  - Viral load

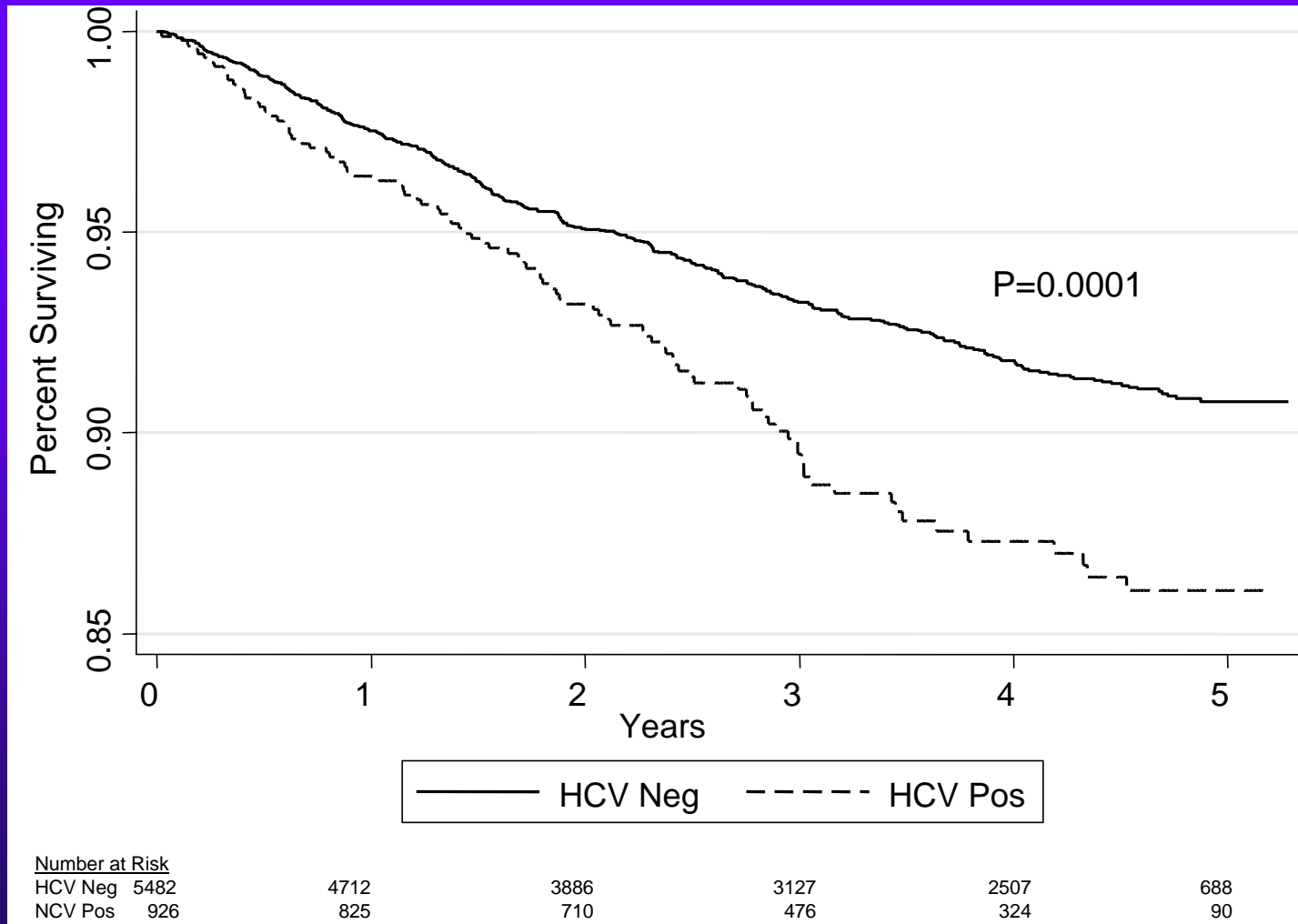


# Results

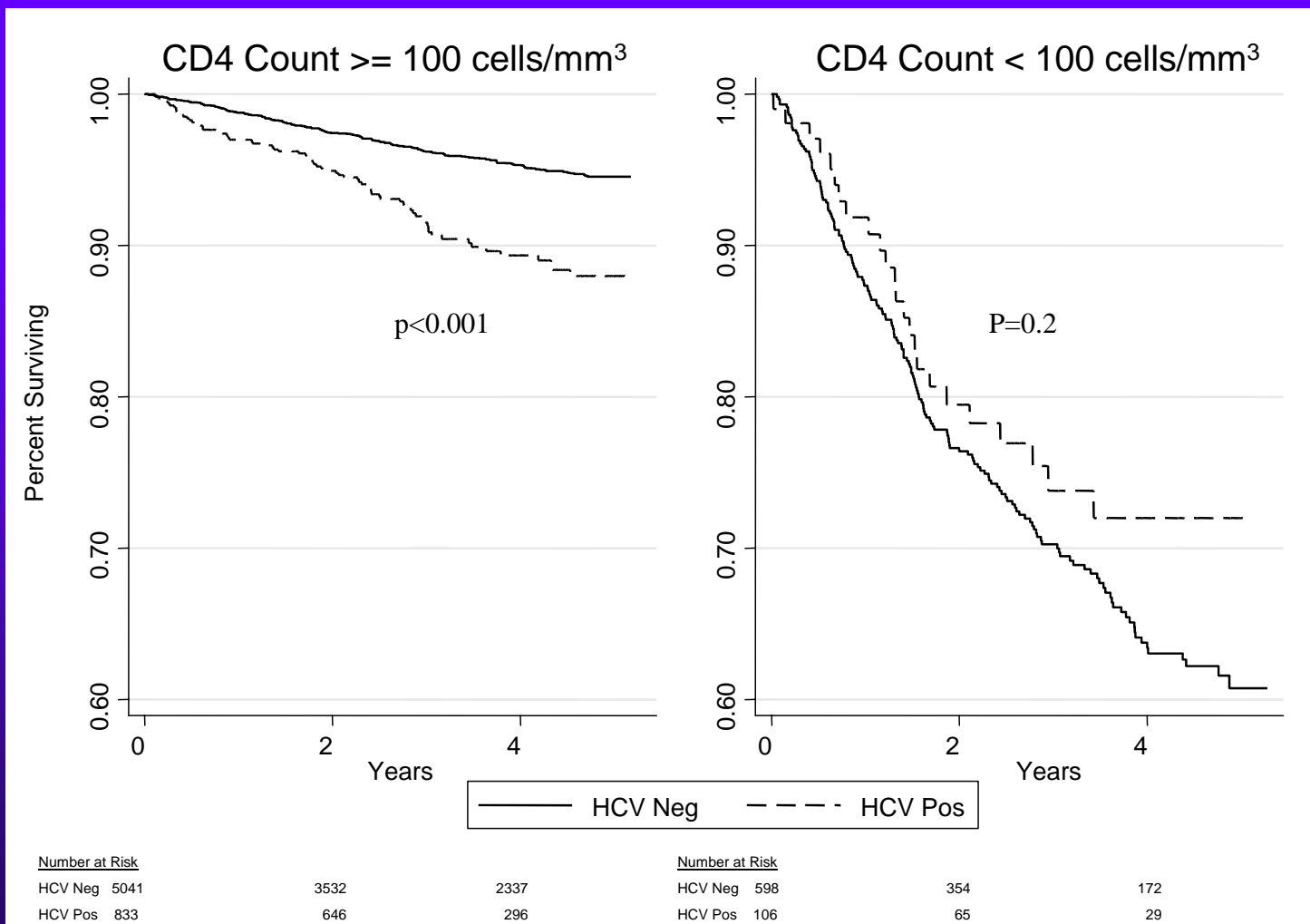
	VACS 3	CHORUS	p-value
	n= 865	n= 5,543	
Age, mean (SD)	48.8 (9.1)	40.1 (8.3)	<0.0001
Male (%)	99	91	<0.001
Race (%)			<0.001
--White	34	77	
--Black	54	15	
--Hispanic	12	8	
Alcohol Diagnosis (%)	27	5	<0.001
Hepatitis C (%)	34	11	<0.001
Median CD4 (IQR)	333 (185-510)	378 (217-566)	0.0001
Median log10 VL (IQR)	2.9 (1.7-4.1)	3.1 (2.6-4.3)	0.0001
Follow-up, median (yrs)	2.7	4.1	
Deaths (#)	83	384	
Deaths/1000 person-years	38.9	20.9	



# Kaplan Meier – Entire Cohort



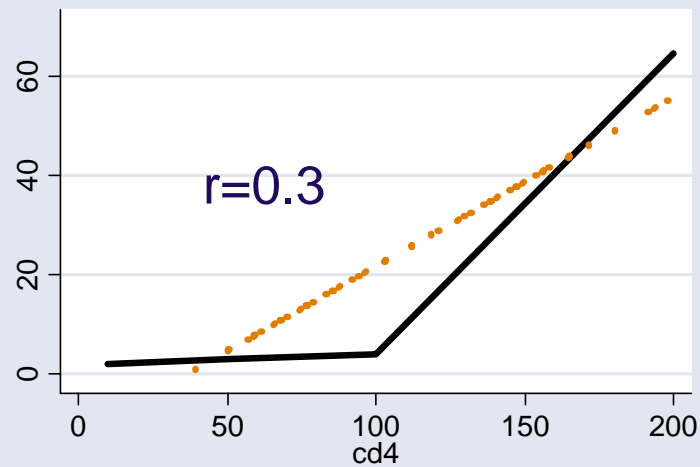
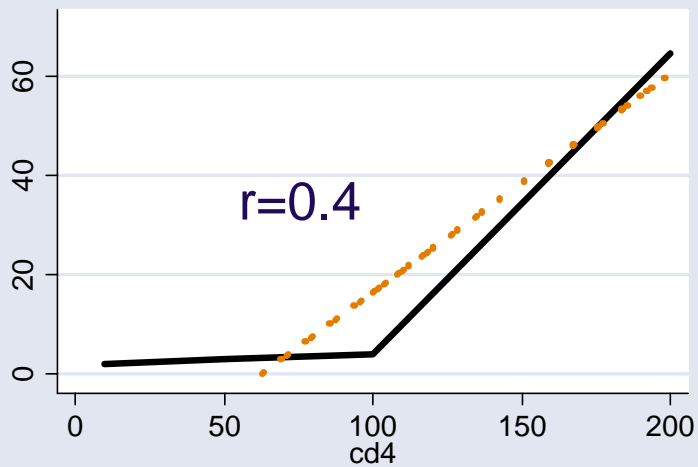
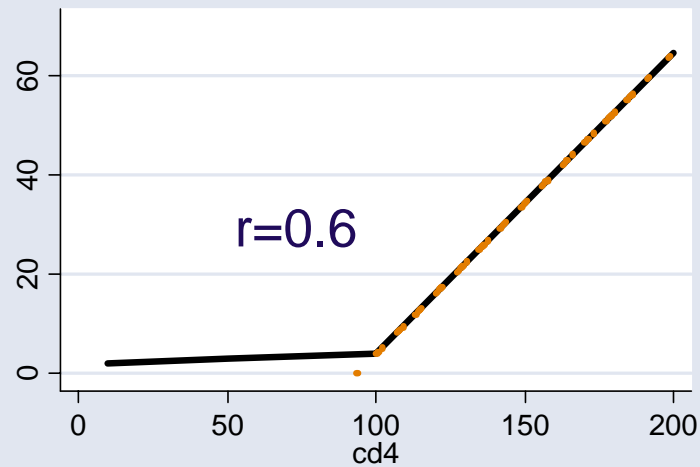
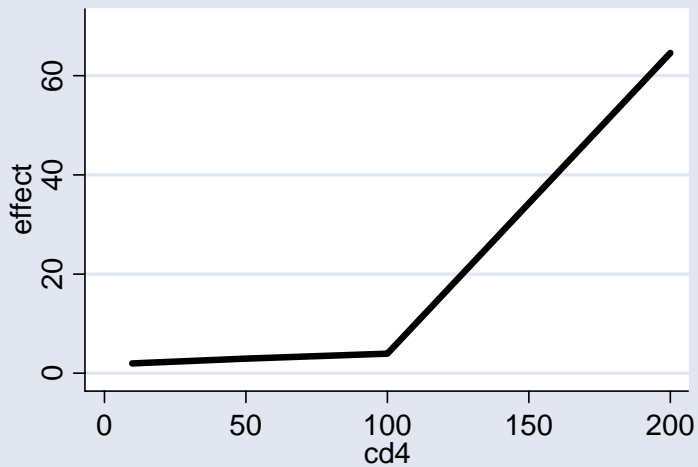
# Kaplan Meier –By CD4 Strata



# Cox Regression by CD4 Cutpoint

	$\geq 100$ cells/mm <sup>3</sup>		$<100$ cells/mm <sup>3</sup>	
	HR	p-value	HR	p-value
<b>HCV</b>	<b>1.92</b>	<b>&lt;0.001</b>	<b>0.72</b>	<b>0.2</b>
<b>Age</b>	<b>1.89</b>	<b>&lt;0.001</b>	<b>1.10</b>	<b>0.3</b>
<b>Female</b>	<b>0.99</b>	<b>0.9</b>	<b>1.42</b>	<b>0.1</b>
<b>Black</b>	<b>1.05</b>	<b>0.8</b>	<b>0.89</b>	<b>0.5</b>
<b>Hispanic</b>	<b>0.96</b>	<b>0.9</b>	<b>1.07</b>	<b>0.8</b>
<b>VACS</b>	<b>1.19</b>	<b>0.4</b>	<b>1.19</b>	<b>0.4</b>
<b>Alcohol Diagnosis</b>	<b>1.49</b>	<b>0.03</b>	<b>0.98</b>	<b>0.9</b>
<b>Viral Load</b>	<b>1.60</b>	<b>&lt;0.001</b>	<b>1.65</b>	<b>&lt;0.001</b>





# Cox Models

	<b>HR</b>	<b>95% CI</b>	<b>HR</b>	<b>95% CI</b>
<b>Hepatitis C</b>	<b>1.37</b>	<b>1.09 – 1.75</b>	<b>0.92</b>	<b>0.60 – 1.41</b>
<b>Age (10 years)</b>	<b>1.50</b>	<b>1.35 – 1.66</b>	<b>1.50</b>	<b>1.35 – 1.66</b>
<b>Female</b>	<b>1.24</b>	<b>0.90 – 1.71</b>	<b>1.29</b>	<b>0.93 – 1.78</b>
<b>Black</b>	<b>0.94</b>	<b>0.75 – 1.18</b>	<b>0.93</b>	<b>0.74 – 1.17</b>
<b>Hispanic</b>	<b>0.89</b>	<b>0.63 – 1.25</b>	<b>0.89</b>	<b>0.64 – 1.26</b>
<b>VACS 3</b>	<b>1.25</b>	<b>0.94 – 1.65</b>	<b>1.23</b>	<b>0.93 – 1.63</b>
<b>Alcohol Dx</b>	<b>1.24</b>	<b>0.92 – 1.67</b>	<b>1.22</b>	<b>0.91 – 1.65</b>
<b>CD4</b>	<b>0.89</b>	<b>0.87 – 0.90</b>	<b>0.88</b>	<b>0.87 – 0.90</b>
<b>Viral Load</b>	<b>1.45</b>	<b>1.32 – 1.58</b>	<b>1.45</b>	<b>1.33 – 1.59</b>
<b>HCV-CD4 Interaction</b>			<b>1.82</b>	<b>1.12 – 2.96</b>



# Conclusions

- ◆ Effect of hepatitis C is dependent on CD4 count
  - Appears to be a threshold at  $\sim 100$  cells/mm<sup>3</sup>
  - Due to competing mortality
- ◆ Does not mean no HCV effect below threshold
- ◆ May explain conflicting results of other studies



# Acknowledgements

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