



# Hjärt-kärl och lungeeffekter av ozon och dieslavgaser

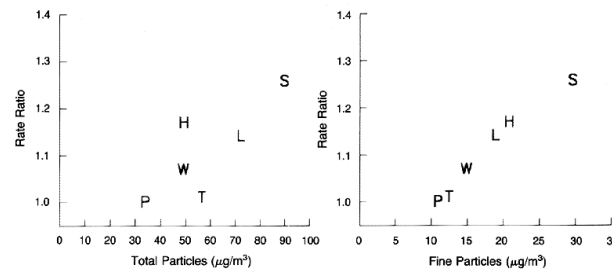
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# The NEW ENGLAND JOURNAL of MEDICINE

## Mortality in Six US Cities in relationship to PM air pollution



Dockery et al. NEJM 1993

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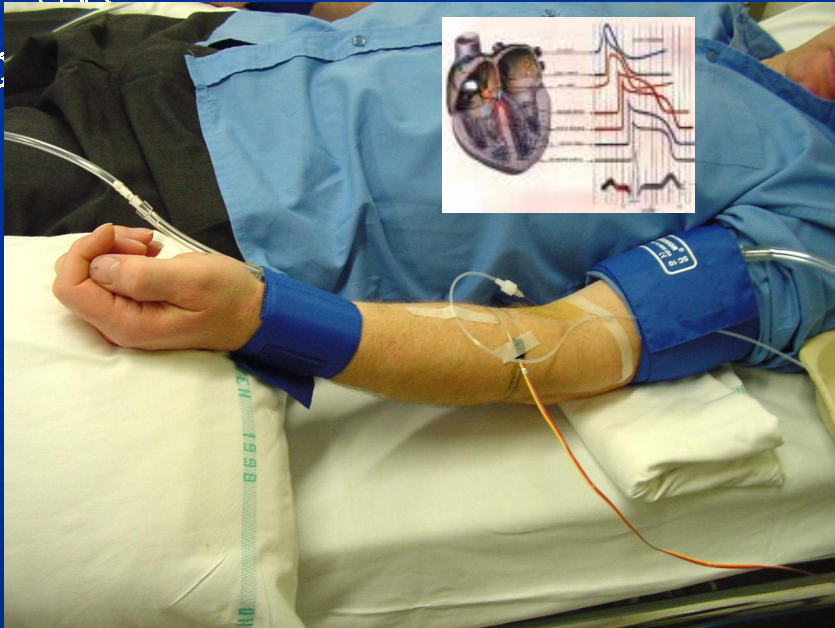
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## Exposure to Traffic and the Onset of Myocardial Infarction

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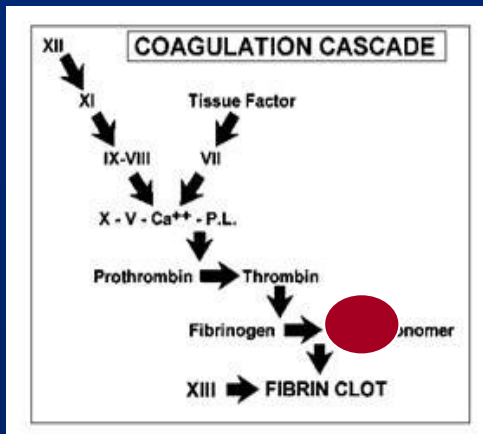
Blood vessel dilatation



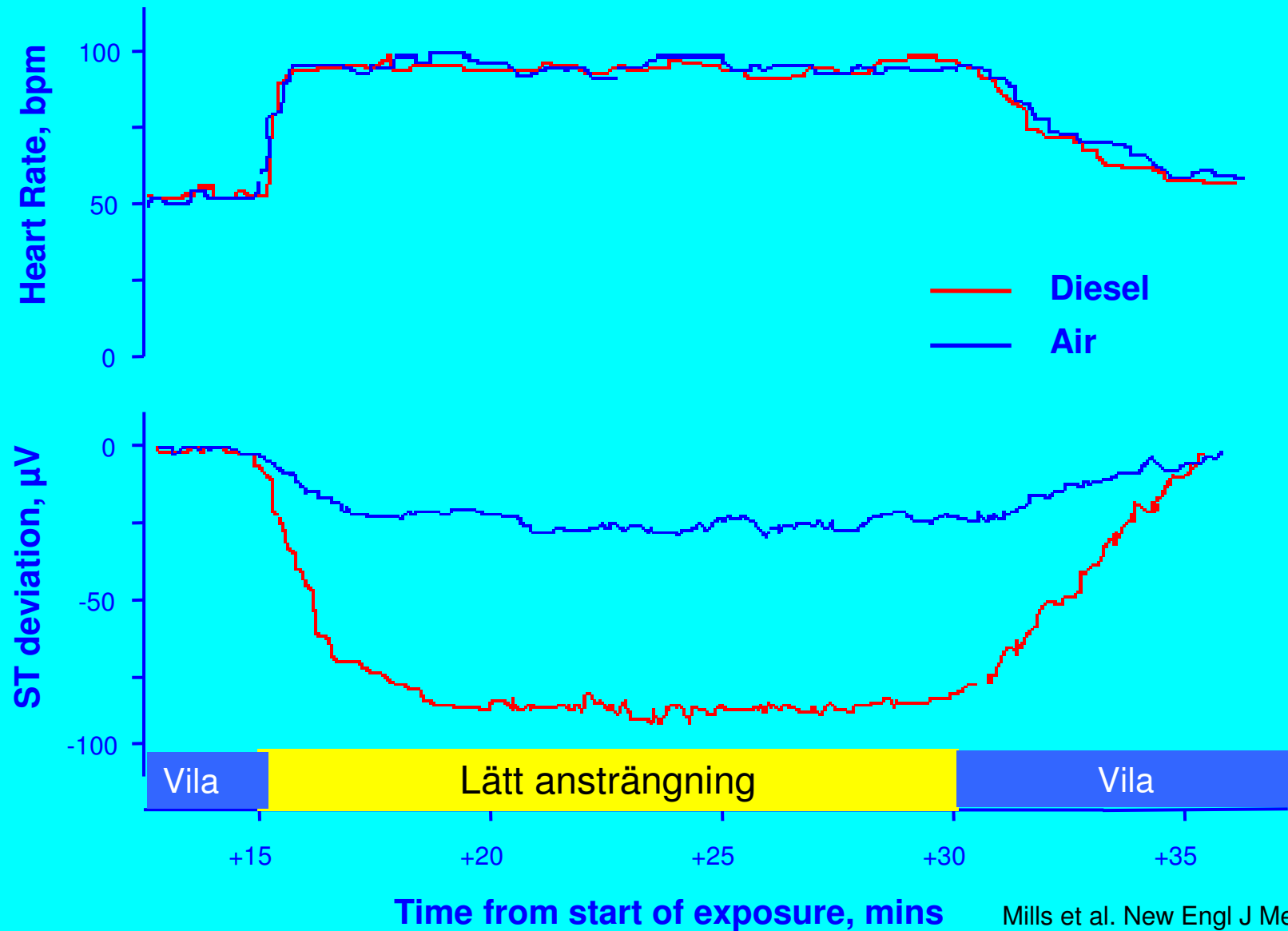
Nitric oxide



- Mycket snabb påverkan på blodkärl – inom 1 tim
- Kvarstår delvis vid 24 tim
- Proppbildningstendensen ökar



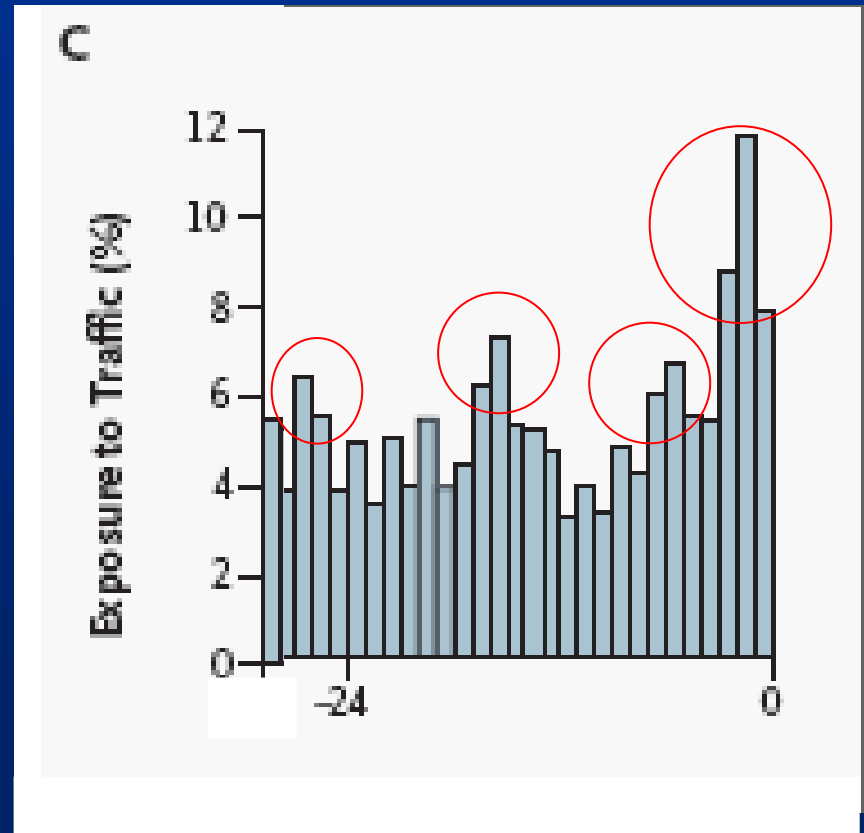
# EKG påverkan och ökad proppbildningstendens hos hjärtpatienter trots medicinering



# Hjärtinfarkt och timmar sedan trafikexponering

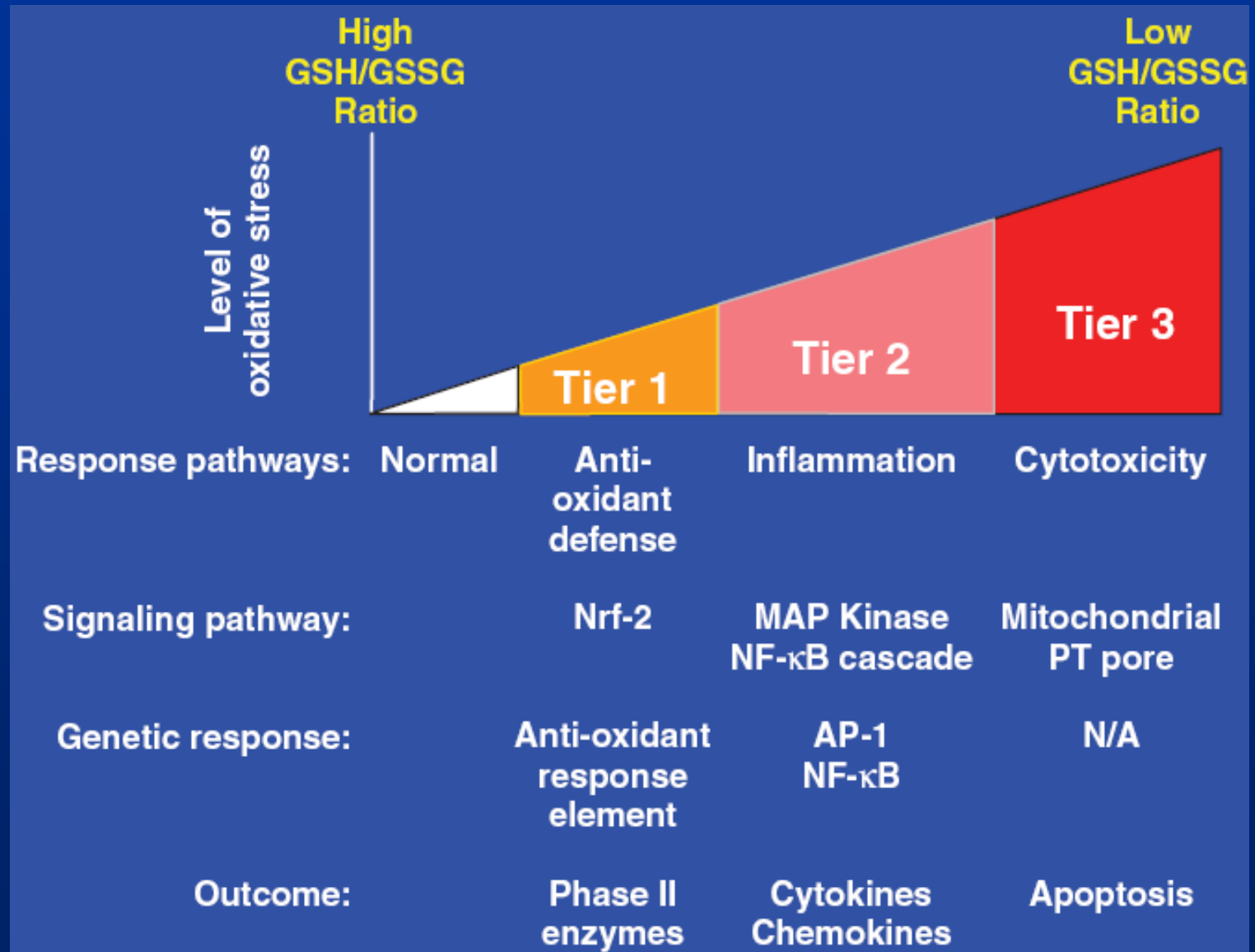
**Table 2. Odds Ratios for the Onset of Myocardial Infarction (MI) after Time Spent in Traffic, According to the Means of Transportation.\***

Type of Transportation and Hours before MI	No. of Subjects	Frequency of Exposure in Case Period on Day of MI (%)	Odds Ratio (95% CI)	P Value
<b>Any means of transportation†</b>				
Concurrent	585	8.0	1.50 (1.07–2.09)	0.02
1 hr	625	12.1	2.92 (2.22–3.83)	<0.001
2 hr	634	8.9	2.01 (1.49–2.72)	<0.001
3 hr	635	5.5	1.15 (0.79–1.66)	0.47
4 hr	638	5.6	1.27 (0.89–1.83)	0.19
5 hr	639	6.8	1.64 (1.17–2.30)	0.004
6 hr	640	6.1	1.34 (0.93–1.92)	0.11
<b>Cars</b>				
Concurrent	585	5.6	1.33 (0.90–1.99)	0.15
1 hr	625	8.3	2.60 (1.89–3.57)	<0.001
2 hr	634	6.5	1.94 (1.37–2.76)	<0.001
3 hr	635	4.2	1.16 (0.76–1.78)	0.49
4 hr	638	4.0	1.21 (0.79–1.86)	0.38
5 hr	639	5.3	1.73 (1.19–2.54)	0.005
6 hr	640	5.0	1.55 (1.04–2.30)	0.03
<b>Bicycles</b>				
Concurrent	585	1.8	2.59 (1.27–5.29)	0.009
1 hr	625	2.4	3.94 (2.14–7.24)	<0.001
2 hr	634	1.6	2.70 (1.37–5.33)	0.004
3 hr	635	1.0	1.66 (0.74–3.74)	0.22
4 hr	638	0.7	1.16 (0.45–2.96)	0.76
5 hr	639	0.9	1.49 (0.63–3.54)	0.37
6 hr	640	0.7	1.02 (0.36–2.87)	0.97
<b>Public transportation</b>				
Concurrent	585	0.5	1.08 (0.33–3.55)	0.90
1 hr	625	1.2	3.09 (1.41–6.75)	0.005
2 hr	634	0.9	2.13 (0.91–5.23)	0.08
3 hr	635	0.3	0.69 (0.17–2.88)	0.62
4 hr	638	0.9	2.27 (0.95–5.41)	0.06
5 hr	639	0.6	1.54 (0.55–4.37)	0.41
6 hr	640	0.3	0.73 (0.17–3.06)	0.67





# Oxidative stress response levels





## Summary of effects in healthy and diseased human subjects

	Respiratory effects	Cardiovascular effects
Diesel exhaust	++	+++
Ozone	++	?
Diesel + ozone	+++	
Road tunnel	+	
Woodsmoke	+ ?	







## Subjects and Methods

- 14 healthy, non-smokers
- One hour morning exposure to filtered air or DE (PM conc  $300 \mu\text{g}/\text{m}^3$ )
- Two hour afternoon exposure to  $0.2 \text{ ppm O}_3$
- Bronchoscopy with BW and BAL performed 24 hours after morning exposure.

# Timeline setup for two diesel-ozone studies

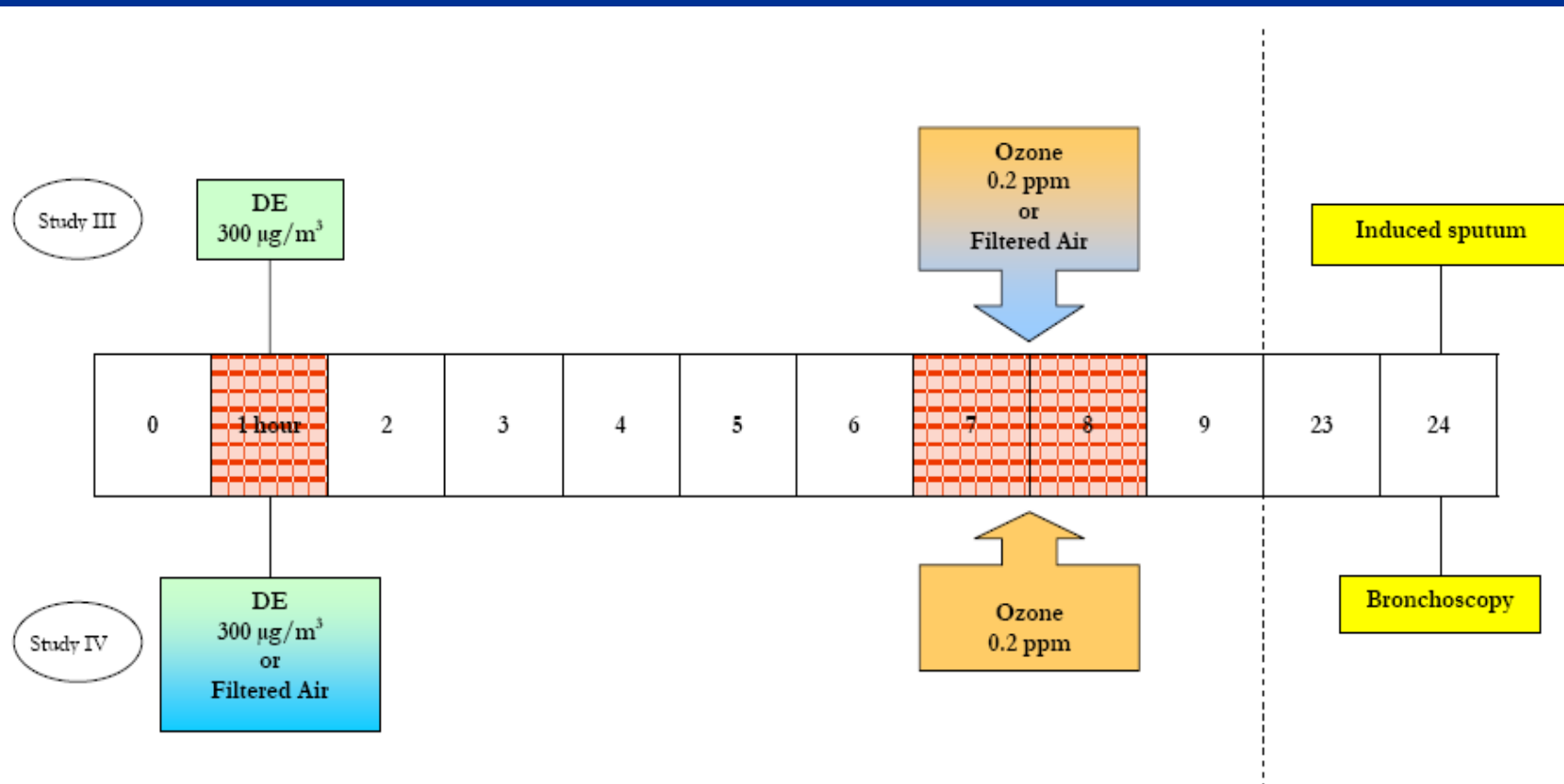


Figure 11: The top sequence of events is the setup for Study III, whereas the lower shows the exposure series for Study IV.



# Quantification

- Inflammatory cells
  - 400 non-epithelial cells counted
  - Expressed as total cell count
- Soluble proteins and cytokines
  - Lavage supernatant
  - Analyzed using radioimmunoassay or ELISA



# Results – HNL + EPX

	HNL		EPX	
	BW	BAL	BW	BAL
<b>Air-O<sub>3</sub></b>	53.5 (44.8-77.5)	7.05 (5.28-10.25)	1.50 (0.85-5.15)	0.25 (0.0-0.49)
<b>DE-O<sub>3</sub></b>	64 (49.8-104.5)	8.45 (6.68-11.25)	2.80 (1.48-5.38)	0.41 (0.0-0.85)
<b>Air vs DE</b>	0.40	0.53	0.45	<b>0.041</b>



## Conclusion

- DE+ O<sub>3</sub> exposure, as compared to Air+O<sub>3</sub>:  
Significant increase in PMN, Macrophages and Total cells in BW
  - Significant increase in EPX expression in BAL
- Ozone-induced inflammatory response is amplified by a pre-exposure to DE
- Urban pollution profile may generate an increased activation of eosinophils