The importance of reliable exposure assessments in TCE epidemiology

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"…without comprehensive exposure information, one's ability to make robust inferences about TCE are limited."

Wartenberg *et al* (2000) Trichloroethylene and cancer: Epidemiological evidence. Environmental Health Perspectives; 108(S2): 161-176.

Incidence and mortality…

Kidney cancer	Blair *et al*	Henschler *et al*
Incidence (SIR)	0.7 (4)	8.0 (5)
Mortality (SMR)	1.6 (15)	3.2 (2)

Vamvakas et al

Exposure	Odds ratio
+++	11.4
++	11.9
+	6.6
none	1

Determinants of inhalation exposure

- intrinsic emission, e.g. volatility
- handling, e.g. washing components
- local controls, e.g. ventilation
- time the source is emitting
- room size and general ventilation
- personal protection, e.g. respirators

Cherrie (1999) The effect of room size and general ventilation on the relationship between near and far-field concentrations. Appl. Occup. Environ. Hyg. J; 14: 539-546.

Emission ...

- intrinsic emission (ε_i)
- handling (h)
- efficiency of local controls (η_{lv})

where ...

$$\varepsilon_T = \varepsilon_i \,.\, h \,.\, (1 - \eta_{lv}) + \varepsilon_p$$

Exposure level ...

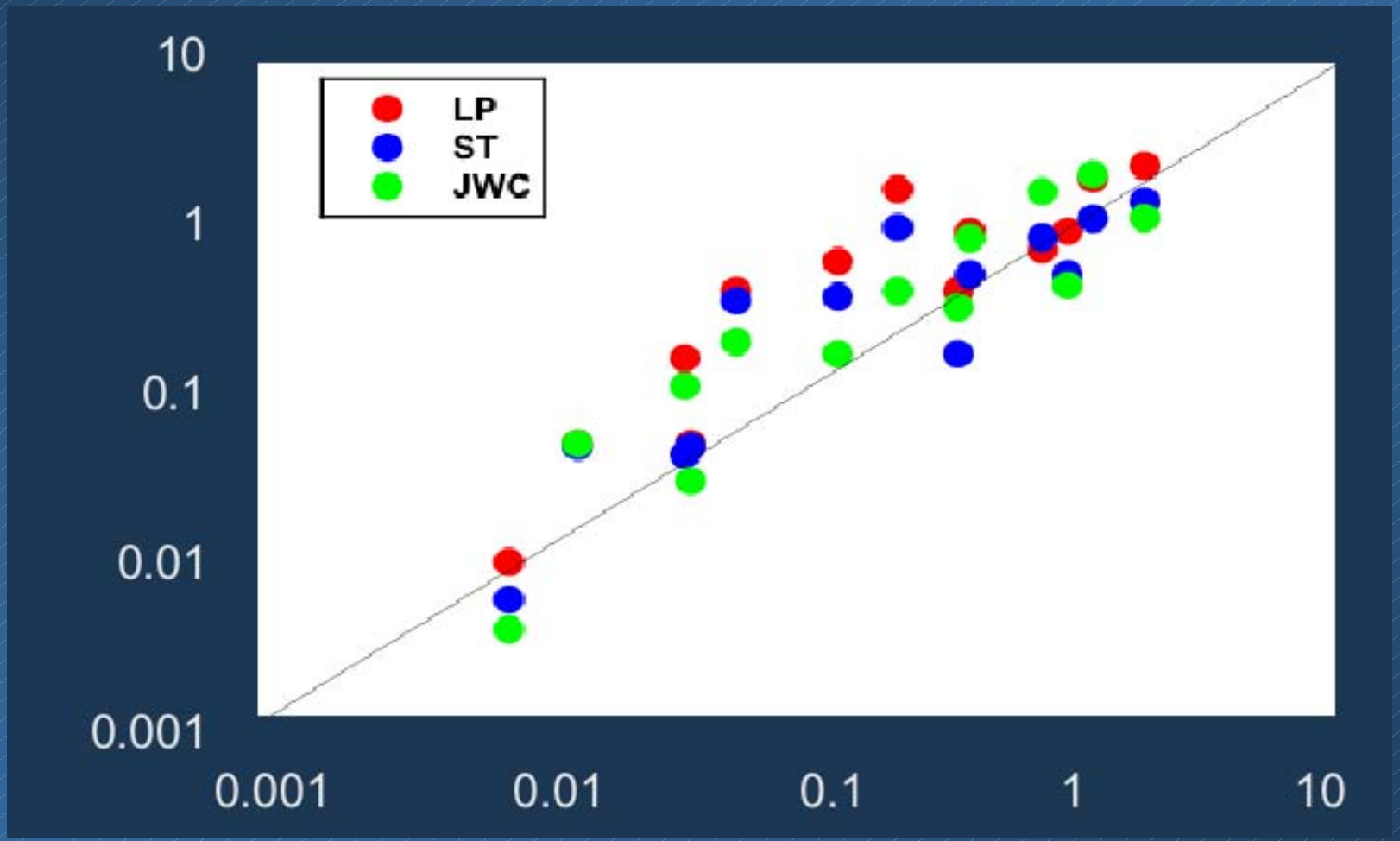
$$C_T = C_{NF} + C_{FF}$$

where

$$C_{NF} = (\varepsilon_{i,NF} \cdot t_{a,NF} + \varepsilon_{p,NF}).(1 - \eta_{ppe}) \cdot d_{gv,NF}$$

$$C_{FF} = (\varepsilon_{T,FF} \cdot t_{a,FF} + \varepsilon_{p,FF}). (1 - \eta_{ppe}).d_{gv,FF}$$

How reliable is this method?



Methods…

- Estimated exposure level for Henschler *et al* and Blair *et al* studies
- Adjusted estimates using measurements from two studies published in the 1950's
- Calculated exposure level for Henschler *et al* study using mass balance
- Attempted to estimate exposure for Vamvakas *et al* study

Henschler *et al*

Estimated 8-hour time-weighted average

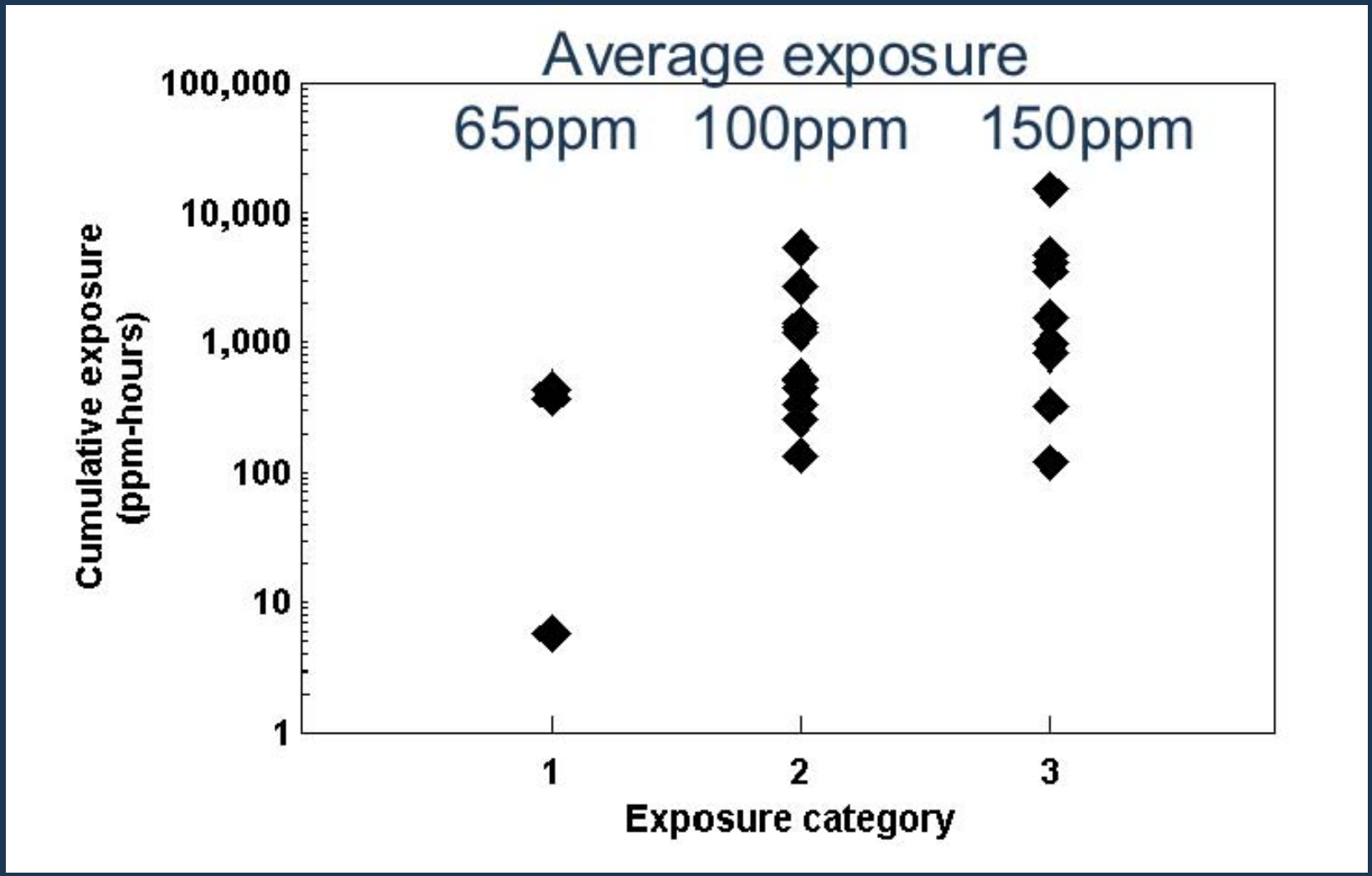
Job	Min (ppm)	Max (ppm)
Cleaning	70	225
Locksmith/Electrician		100
General cleaning		15
Washing hands		5

Blair *et al*

Estimated 8-hour time-weighted average

Job	Min (ppm)	Max (ppm)
Bench work		50
Vapour degreasing	10	140

Vamvakas et al



Conclusions…

- Average TCE exposure levels were probably similar in all three studies
- Peaks (task average) were possibly higher in the Henschler *et al* study
- Peak exposures in Blair et al and Vamvakas et al studies were probably similar