



Estimating Pesticide Handler Exposure

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U.S. EPA, Office of Pesticide Programs

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Statutory Framework

- EPA regulates pesticides under FIFRA
- FIFRA requires registration of all pesticides sold in the US
- Each product has a defined composition, labeling, and packaging



Pesticide Product – Registration Terms

- Composition – defined by a Confidential Statement of Formula (percentage of active and inert ingredients; type of formulation, e.g., liquid, granules, wettable powder, etc.)
- Labeling – use directions (site, target pests, method of mixing, loading, application; application rate, timing, and frequency; personal protective equipment; warnings; limitations (e.g., REI, PHI, plant back), etc.
- Packaging – container size, composition, other characteristics



Statutory Standard

- EPA may register a pesticide if it will not cause “unreasonable adverse effects on the environment”
- This standard is defined in a way that directs EPA to balance the risks of using a pesticide against its benefits
- Risk is a function of toxicity and exposure



Types of Risks Considered

- EPA considers a wide range of potential risks – human health and environmental
- For human health, EPA considers occupational, dietary, bystander, residential risks
- Occupational risks includes handlers and workers



Handler Exposure

Handler exposure depends on three factors:

- How the particular pesticide is mixed, loaded, and applied – unit exposure for a handling scenario (mg active ingredient / amount of active ingredient handled (AaiH))
- How much of the pesticide is handled – AaiH
- The impact of using personal protective equipment (PPE)

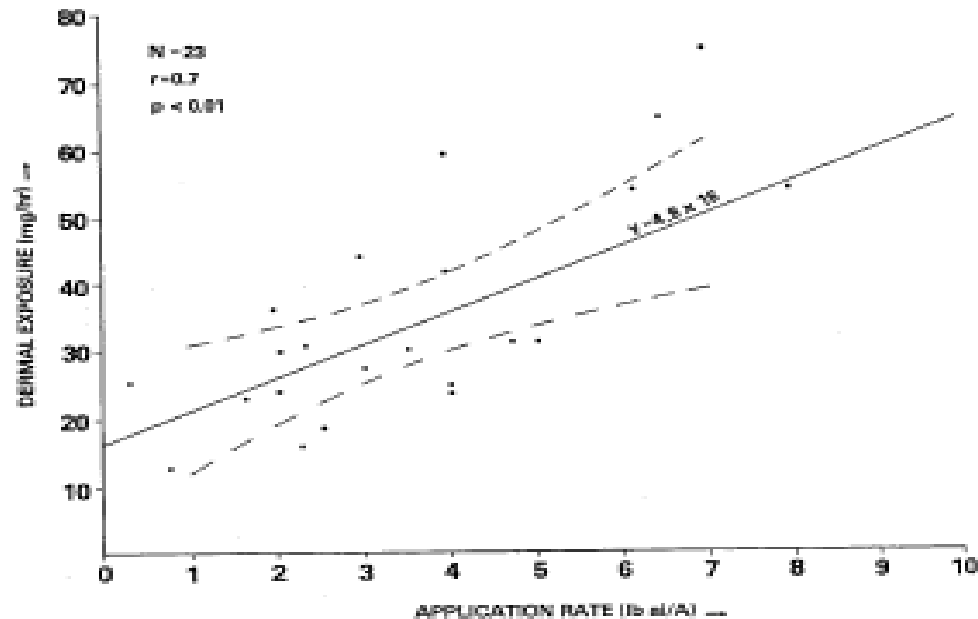


Data sources for estimating occupational exposure

- Unit exposure – studies with surrogate chemicals measuring inhalation & dermal exposure of handlers' body parts, when performing scenario tasks (mg active ingredient/AaiH)
- AaiH – data on pesticide product composition, product application rate, and high end quantities handled during a work period
- Impact of PPE – studies of protection



Historical Background



Reinart, J.C. and D.J. Severn, 1985; pg 360

“In estimating exposure for a pesticide application from a surrogate study, it has been our experience that the proper (and logical) conversion factors are amounts of pesticide applied for applicators and the quantity of chemical handled by mixer/loaders.” (Reinart, J.C. and D.J. Severn, 1985; pg 361)



Proportionality Analysis Discussion

- Practicality of estimating handler exposure using unit exposure values together with data on AaiH
- Potential Error from assuming proportionality
 - May underestimate @ lower AaiH
 - May overestimate exposure @ higher AaiH
- From a policy perspective, this type of error is acceptable