### Key questions for the scientists

**Antonio Hernandez-Jerez**

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BACKGROUND: KEY QUESTIONS TO SUPPORT EPIDEMIOLOGICAL OUTCOMES

Epidemiological studies

Health risks from chemical exposures

Could be applied for regulatory purposes?
**BACKGROUND: KEY QUESTIONS TO SUPPORT EPIDEMIOLOGICAL OUTCOMES**

Epidemiological studies

- **Exposure A** → **Population A** → **Outcome A**
- **Exposure A** → **Population B** → **Outcome B**
- **Exposure B** → **Population A** → **Outcome C**

Evaluation of consistency among epidemiological studies

- Methodology used?
- Target population
- Outcome definition

Causal inferences for hazard identification

Health risks from chemical exposures

Could be applied for regulatory purposes?

- Heterogeneity
- Inconsistency

Key questions for the scientists
**BACKGROUND: KEY QUESTIONS TO SUPPORT EPIDEMIOLOGICAL OUTCOMES**

**Ultimate goal for the scientists:**

- Present epidemiological results informative for risk assessment.
- Provide a better understanding of the frequency, distribution and determinants of diseases in a quantitative way.
  - How?
    - modern biostatistical techniques
- Define ‘inconsistency’ through a thorough interpretation of heterogeneity in the outcomes
- Properly define confounding factors
- Provide a link with experimental data
Issues:

- When is an epidemiological study scientifically adequate?
- Should heterogeneity be evaluated as a qualitative step?
- Endpoints vs. ‘upstream’ effects; what is more sensitive in defining relationships?
- Can the AOP framework help in the assessment of plausibility through a biologically-based assessment of the study results?
- Can the AOP framework be used in a perspective evaluation of epidemiological data?
- Should the methodologies used for pesticide exposure assessment be improved and specified?
- Should biomarkers be introduced as a key step for the improvement of the exposure-effect relationship?
- Should we specify the key analytical tools for quantitative analysis?
ARE THE EPIDEMIOLOGICAL STUDIES FOR PESTICIDES A SPECIAL CASE?

**Issues:**

- When is an epidemiological study scientifically adequate?

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**Key questions for the scientists**

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Are the epidemiological studies for pesticides a special case?

**Issues:**

- When is an epidemiological study scientifically adequate?
- Should heterogeneity be evaluated as a qualitative step?

Key questions for the scientists:

- Variation in the study results
- Heterogeneity → True differences
- Inconsistency → Error, bias
- Study design, Population, Exposure

**ARE THE EPIDEMIOLOGICAL STUDIES FOR PESTICIDES A SPECIAL CASE?**
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**Issues:**

- When is an epidemiological study scientifically adequate?
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- Endpoints vs. ‘upstream’ effects; what is more sensitive in defining relationships?

Exposure (pesticides) → Outcomes (long-term effects)

- Operators
- Farm-workers
- By-standers
- Consumers

Biochemical (molecular) → Functional → Clinical
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Interpretation of results?
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QUESTIONS