IMPRESS: Improving exposure assessment methodologies for epidemiological studies on Plant Protection Products (PPPs)

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IMPRESSION: Improving exposure assessment methodologies for epidemiological studies on Plant Protection Products (PPPs)

Start date: 1st Sept. 2017 (3 year project)

Funded by:

Project team: IOM, HSL, IRAS and UoM
Project aims

• Better understand performance of exposure assessment (EA) methods used in epi. studies

• Assess reliability and external validity of surrogate measures used to assign exposure within individuals / groups and evaluate size / effects of recall bias on misclassification

• Recommend improvements for future studies
How will we do this?

We will:

• Use previously collected exposure data from existing epi studies and historical records
• Assess current exposure (using biomonitoring) in various populations to examine performance of EA approaches
• Compare and contrast performance of EA methods within existing epi studies

Main project outcomes:

• Validation of an accepted and adaptable semi-quantitative individual-based EA method against measured levels of urine pesticide metabolites in a broad range of settings
• Comparison of reliability and performance of several grouped- and individual-based EA methods
Project structure

**WP1:** Review the methods and techniques of exposure assessment (EA) used in occupational epidemiology
- Inventory of exposure assessment/assignment methods
- Inventory of determinants of PPP exposure

**WP2:** Assess the reliability of recalled information
- Compare agreement between the original data and those from the reliability questionnaires/interviews
- Review the available measurement data and, if resources and quality allow, evaluate the reliability of self-reports against measurement data in WP3 and WP4

**WP3:** Assess the reliability and validity of individual-based EA methods
- Collect biological samples from a sample of workers in different populations and farming systems
- Validate the exposure assignment methods against actual bio-monitoring (BM) data

**WP4:** Compare the performance of alternative EA methods
- Compare the congruence in assigned exposure using different group-based EA methods using the same job history information
- Apply alternative group- and individual-based exposure classifications in existing epi studies to study the dependence of reported associations on EA methods and to examine potential improvements

**Existing epidemiological studies:**
- Current UK workers (Prospective Investigation of Pesticide Applicators’ Health)
- Historical UK workers (Study of Health in Agricultural Work)
- Ethiopian farm workers
- Thai farmers families
- Malaysian farm workers

**Original data**
- Questionnaire / Job history

**New data**
- Reliability questionnaire

**Original data**
- Questionnaire / Job history

**Original data**
- Questionnaires

**New data**
- BM samples and contextual info
**Project team studies being used..**

<table>
<thead>
<tr>
<th>Study</th>
<th>WP2</th>
<th>WP3</th>
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<tr>
<td>Prospective Investigation of Pesticide Applicators' Health (PIPAH)</td>
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<td>Study of Health in Agricultural Work (SHAW)</td>
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<td>Ethiopian farm workers study</td>
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<td>Malaysian farm workers</td>
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Also exploring use of historical biomonitoring data
**WP1: Review exposure assessment methods used in occupational epidemiology (IRAS)**

**Objectives:** Establish overview of pesticide EA methods used in epi community-based studies and studies within agriculture

- Systematic literature reviews
- Use of framework recently developed by Maartji Brouwer (IRAS)
- Inventories of:
  - EA / assignment methods
  - determinants of pesticide exposure
WP2: Recall of past pesticide exposure and determinants (HSL)

Objectives: Evaluate recall of exposure to PPPs and info. on exposure determinants to determine size of any recall bias & misclassification effect

- Identify existing records
- Re-interview participants from existing cohorts
- Evaluate reliability and validity of retrospectively reported pesticide use info.
WP3: Assess reliability & validity of individual-based exposure assessment methods (IOM)

Objectives: Examine reliability & validity of currently available individual-based EA methods

- Collect biological samples from subset of workers from studies previously mentioned
- Urinary biomarkers selection based on:
  - Extent of use within the study populations
  - Knowledge of toxicokinetics parameters
  - Validity of biomonitoring methods
- Validate EA methods against biomonitoring data
**WP4: Compare performance of EA methods in existing epidemiological studies (IRAS)**

**Objectives:** Compare performance of different exposure group- and individual based EA indices to inform future epi studies about most reliable to be employed in analysis with health data

- Compare congruence in assigned exposure using different general population JEMs and CEMs using same job history info
- Apply alternative group- and individual based exposure classifications in existing epi studies to assess impact on exposure response associations
Project Governance

- **Independent Advisory Board convened to provide independent and impartial expert advice**
  - Aaron Blair (Chair), National Cancer Institute (USA)
  - Mark Montforts (Deputy Chair), RIVM (The Netherlands)
  - Len Levy, Cranfield University (UK)
  - Silvia Fustinoni, University of Milan (Italy)

- All completed Conflict of Interest forms
- Project governance document stating agreed roles, responsibilities and interactions of those involved
- Freedom to publish our project findings and will do so via various channels
Project updates?

- Project website - provides updates, copies of presentations and other key materials
  www.impress-project.org

- Further 2018 conferences
  - ICOH 2018, Dublin, April - May
  - X2018, Manchester, Sept
  - 5th Int. Fresenius Conference "Worker, Operator, Bystander and Resident Exposure and Risk Assessment, Dec (TBC)

- Contacts for more information:
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Thank you for listening!