



Universiteit Utrecht

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A systematic review of exposure assessment methods in studies of occupational pesticide exposure 1993-2017

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Background

- Assessment of occupational pesticide exposure is methodologically challenging:
 - Variance by climate, application method, personal protection equipment, number of pesticides applied etc.
 - large exposure variability between workers, body parts, and over time
- Numerous exposure assessment methods (EAM) developed: e.g. biomonitoring, self-report of exposure, job-exposure matrices (JEM)
- Different EAM generate different study results¹ (misclassification)

1. Lewis-Mikhael et al. Occupational exposure to pesticides and prostate cancer: a systematic review and meta-analysis. Occup Environ Med. 2016;73(2)



Objective

- To systematically review EAM used in epidemiological studies of occupational exposure to pesticide published the last 25 years
- This review combined with future studies assessing the validity of EAM (as in IMPRESS*) may inform on the magnitude of exposure misclassification

*IMPRESS (Improving exposure assessment methodologies for epidemiological studies on pesticides)



Methods: searches

- Medline and Embase (subject headings and keywords):
pesticide **AND** (occupational exposure **OR** dermal exposure **OR** inhalation exposure **OR** dietary exposure **OR** paternal exposure **OR** maternal exposure **OR** environmental monitoring)
- Original research published 1.1.1993-31.12.2017
- Languages: English, Dutch, Spanish, French, German and Scandinavian languages

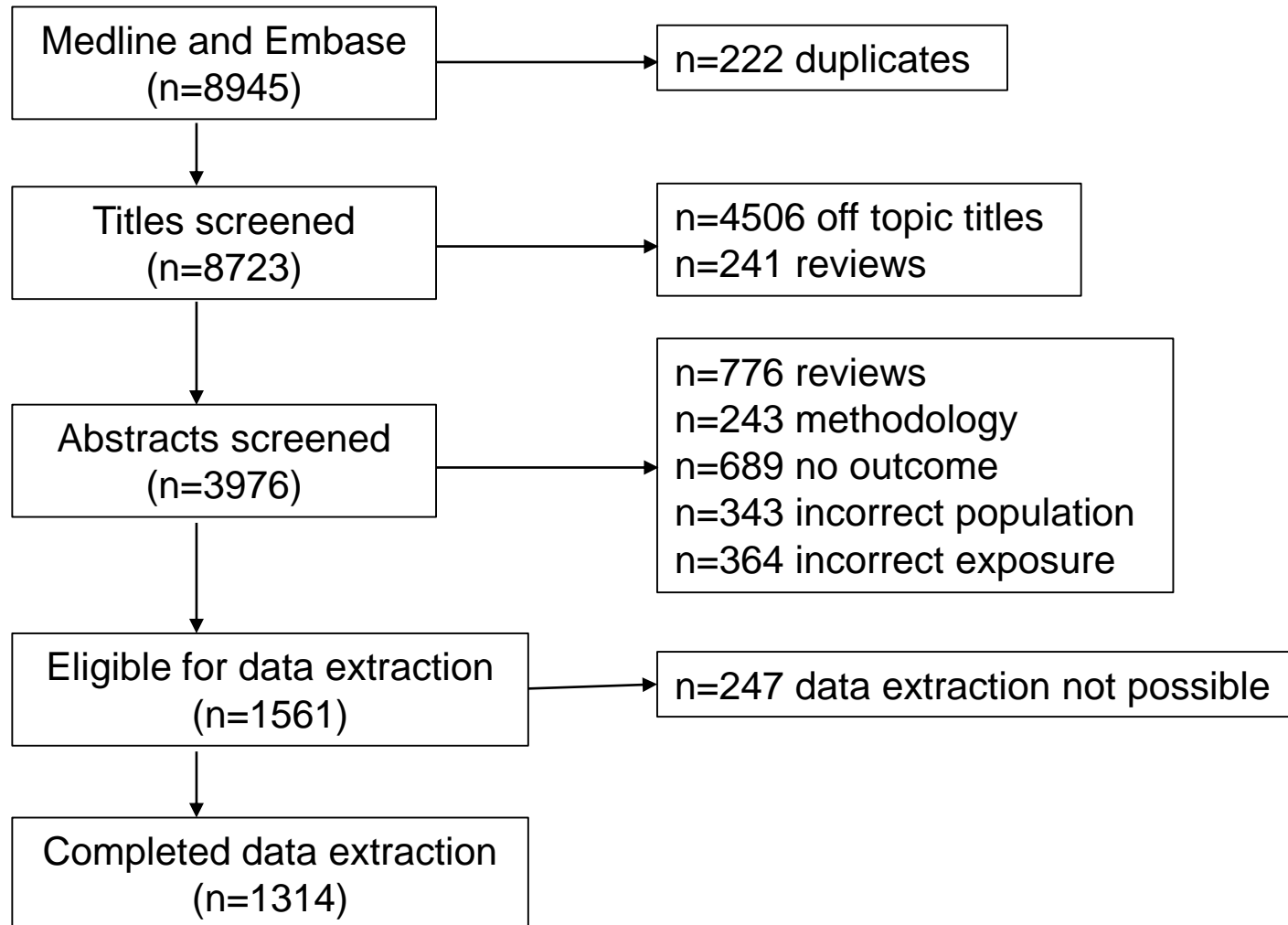


Methods: study eligibility

- Included
 - Studies analyzing associations of occupational pesticide exposure and any health outcome
- Excluded
 - reviews
 - methodology studies
 - case reports
 - descriptive studies without health endpoints



Results: screening

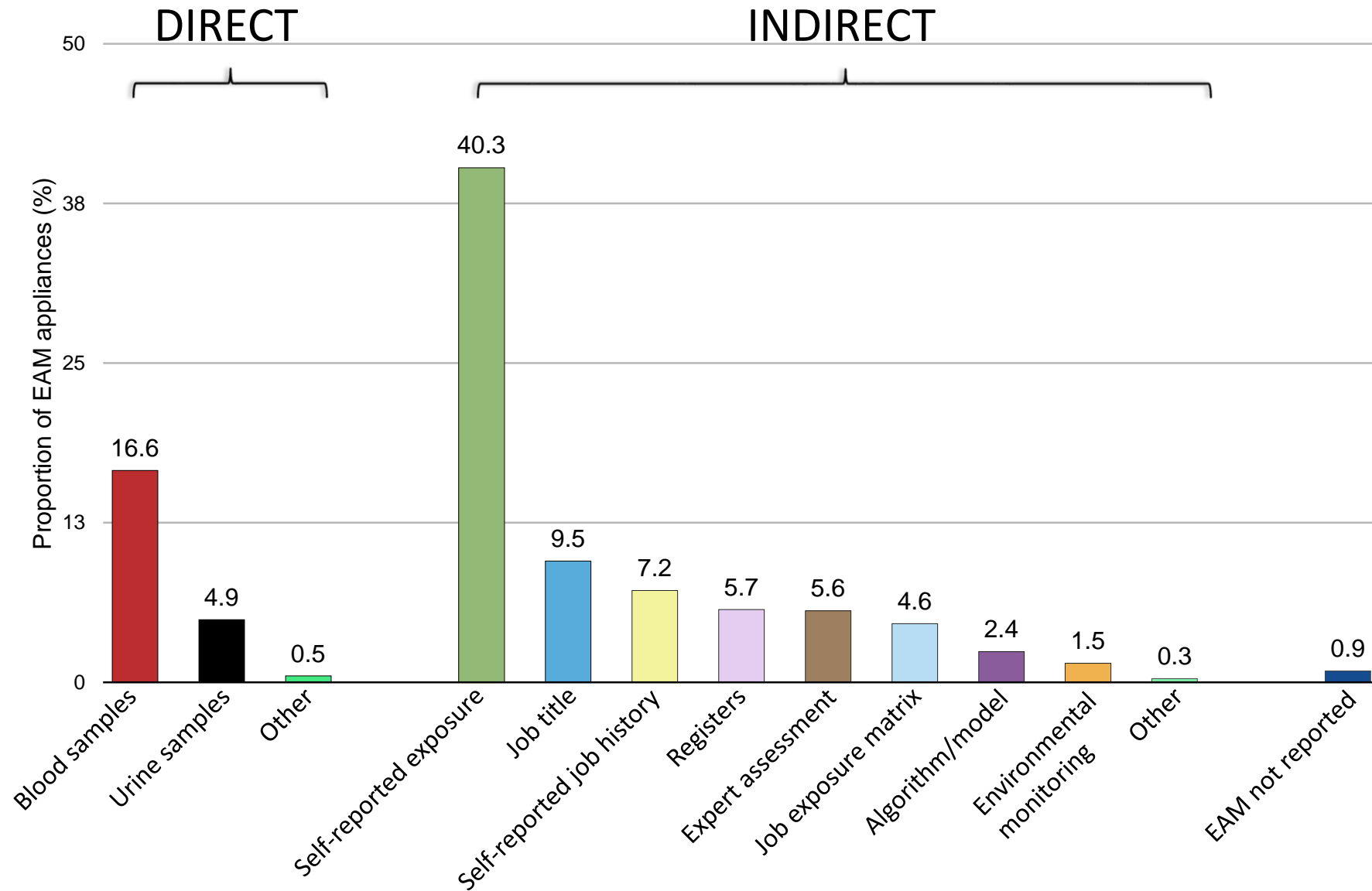


Results: data extraction and analysis

- Extracted from 1314 relevant studies:
 - EAM
 - Health outcome
 - Study type
 - Publication year
- 176 articles with >1 EAM → in total n=1497 EAM applied
- Analysis of relative frequencies of EAM in relation to the total number of EAM appliances throughout all studies

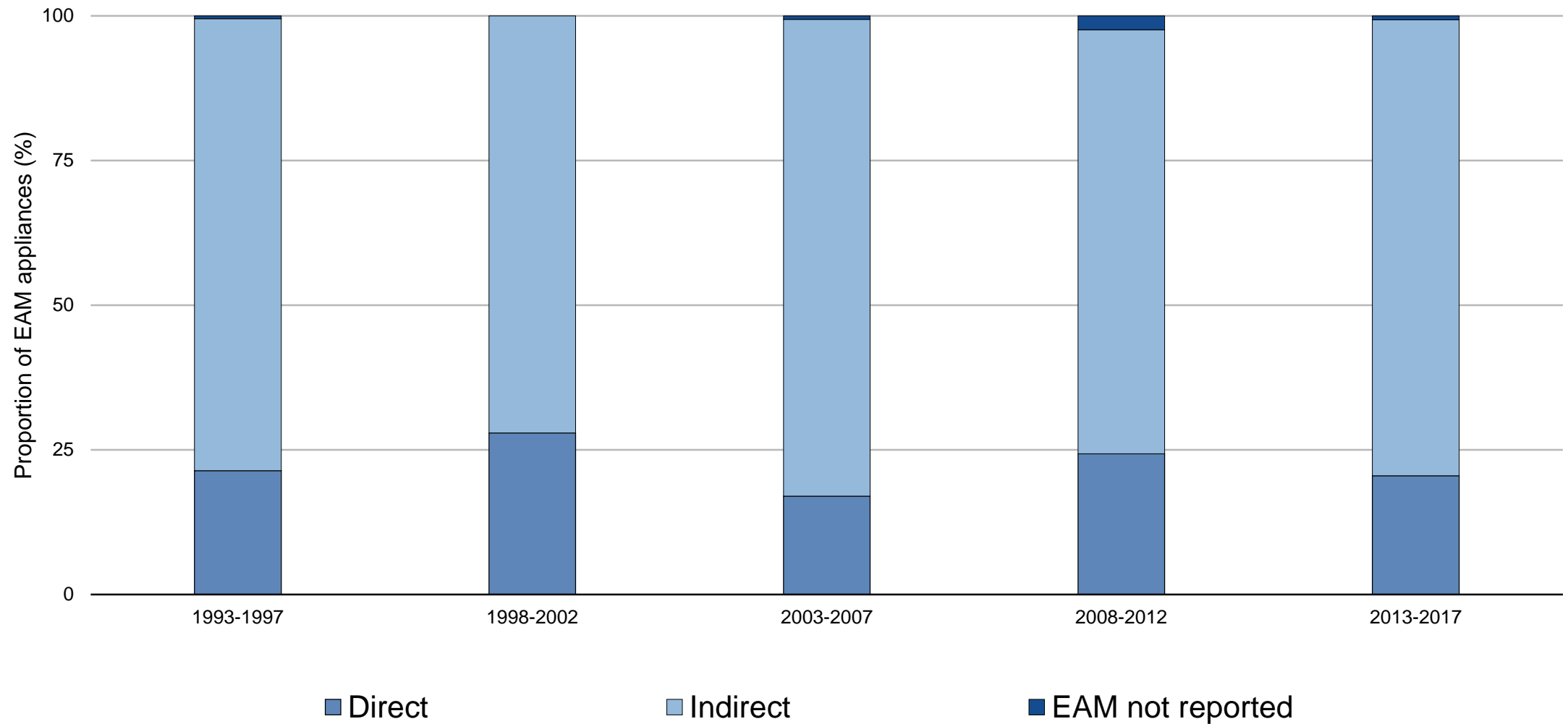


Results: EAM frequencies (total)

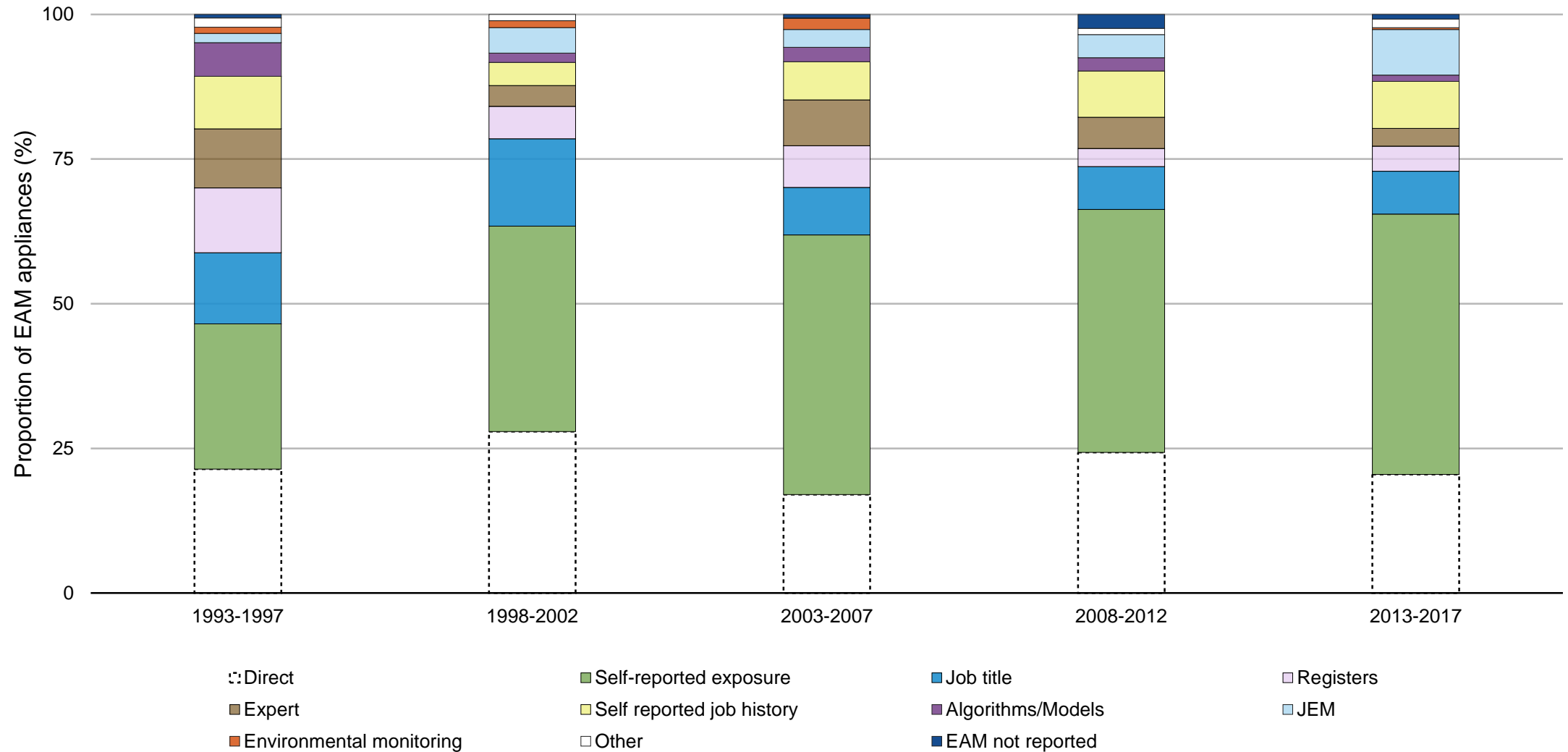


Results: trends direct/indirect EAM

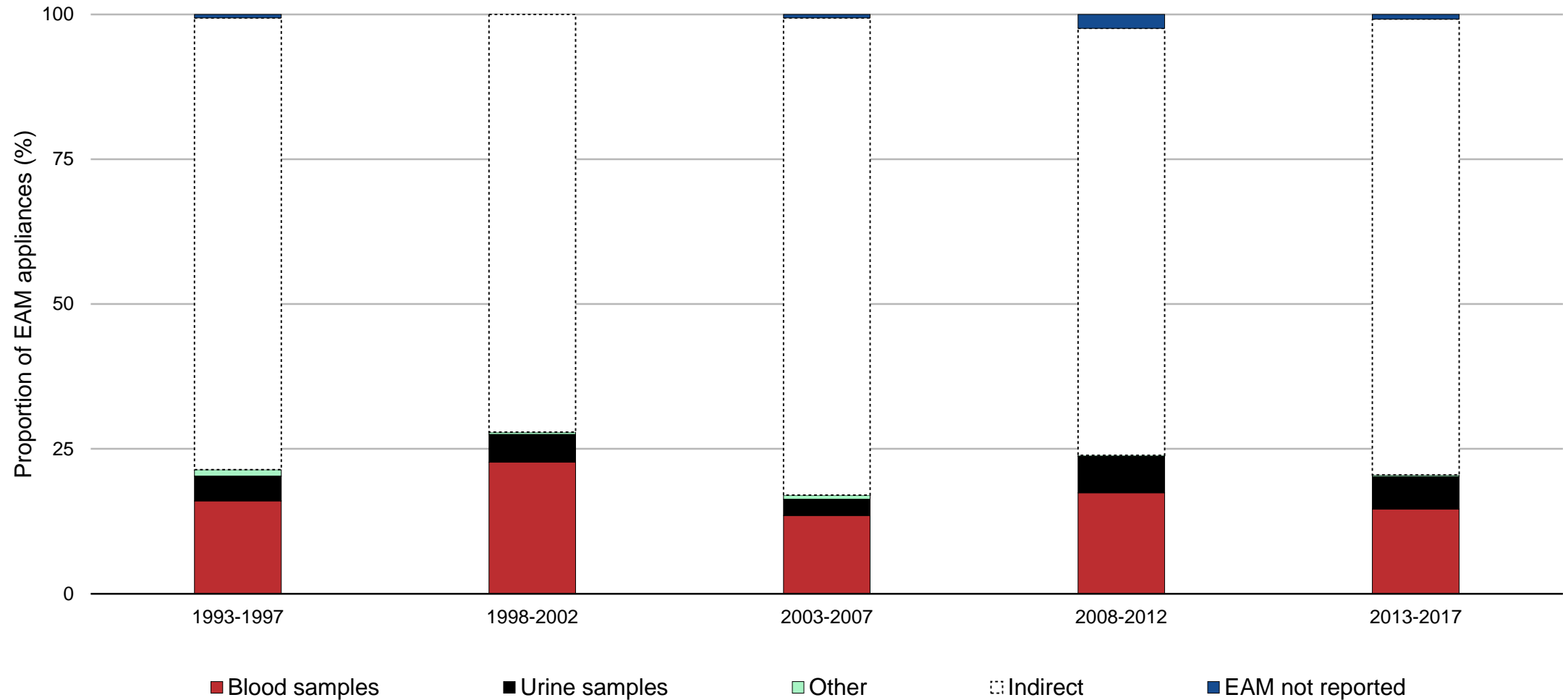
No time trend of studies with >1 EAM



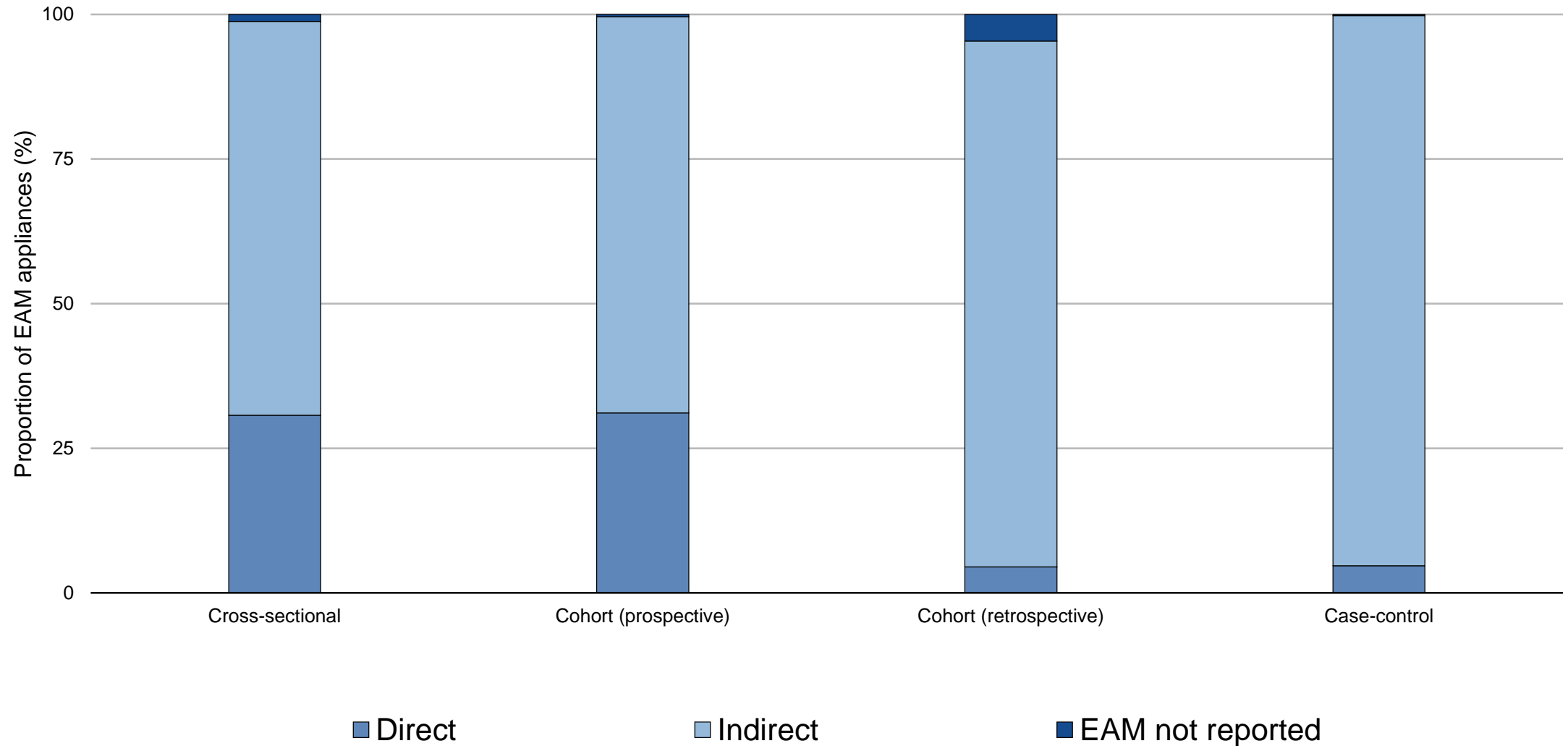
Results: trends in indirect EAM



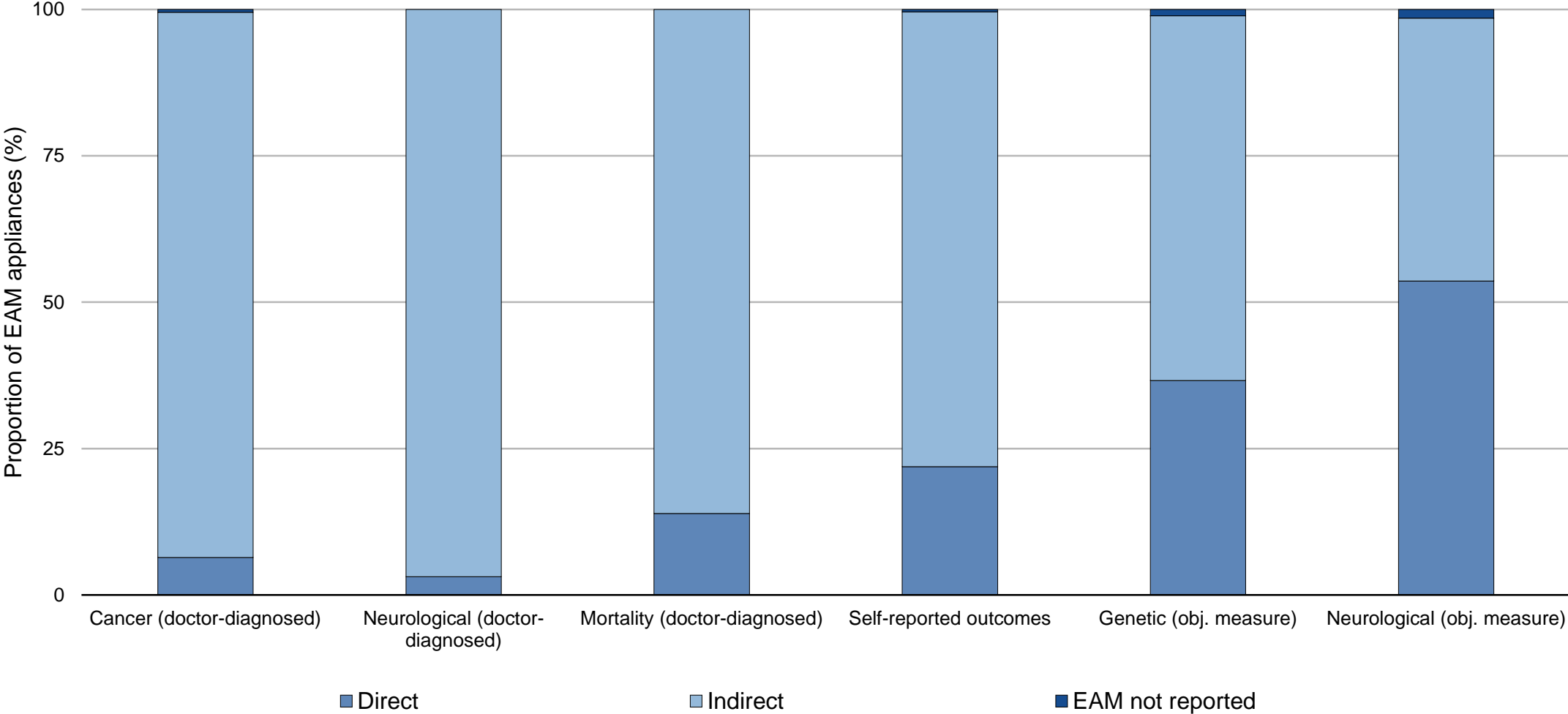
Results: trends in direct EAM



Results: EAM by study type



Results: EAM by outcome type



Discussion/Conclusion

- Limitations
 - One reviewer (eligibility double checked during extraction phase)
 - EAM in 19% of studies could not be extracted (no full text access)
 - Potentially non-detected EAM in full text (extraction mainly based on abstract 80-90%)



Discussion/Conclusion

- Majority of applied EAM were indirect - no trend over time
- Indirect methods frequently applied in cancer studies – potential for responder bias and differential exposure misclassification
- Increase in use of self-reported exposure
- Increase in application of JEM - might partly explain reduction in expert case-by-case assessments
- Decrease in use of job titles/register information
- Relative infrequent use of algorithms and models with slight decrease over time



Acknowledgements



Funded by the European Crop Protection Association (ECPA)