

Identification of new causes of occupational disease: The THOR network and allied approaches

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Introduction:

This presentation will outline the structure and function of The Health and Occupation Research Network (THOR) in the British Isles (United Kingdom & Republic of Ireland) with special reference to the sentinel surveillance (vigilance) role of THOR in identifying new causes of occupational disease and emerging risks. It will also indicate other approaches that complement THOR in identifying new causes of occupational disease. Finally the presentation will illustrate an educational self learning and audit approach that helps encourage and assist physicians in participating in networks such as THOR

Methods / approaches:

THOR is a research and surveillance programme, fulfilling a medical observatory and sentinel function for occupational disease, work related ill health and sickness absence (Carder et al 2017). It started in the UK with the first scheme for chest physicians and occupational physicians in 1989 called SWORD (Surveillance of Work-related and Occupational. Respiratory Disease). In 2005, recruitment of physicians started in the Republic of Ireland (Money et al 2015), as well as recruitment of General Practitioners with specific training in occupational medicine (Hussey et al 2008). Therefore currently there are four schemes: for respiratory physicians (SWORD), dermatologists (EPIDERM), occupational physicians (OPRA) (Seed et al 2019) and General Practitioners (THOR-GP). Physicians (sometimes others e.g. Trainees / nurses) participate in THOR either on a monthly basis (core reporters) or for one randomly selected month per year (sample reporters). They report cases believed to have been 'caused or aggravated by work'. Data collected includes: diagnosis, demographic information, employment - occupation & industry, suspected causal agent/task/event, Sickness absence and patient referrals (GPs). As a means of corroborating reports of putative novel low molecular weight asthmagens, a Quantitative Structure Activity Relationship (QSAR) model has been used. (Jarvis et al 2015).

An Electronic, Experiential, Learning, Audit & Benchmarking (EELAB) resource was developed to encourage recruitment and retention of participants and to help improve the quality of their clinical data reports (Zhou et al 2017).

Findings:

Several published papers demonstrate the findings from THOR and allied approaches. By way of illustration, in a total of 1215 cases of work-related respiratory diseases reported to SWORD between January 2015 and December 2017, thirteen potentially emerging causes of occupational asthma were identified (Zhou et al 2020). However additional indications could also be found by using disproportionality metrics (Bonneterre et al 2010). Novel causes of occupational disease can be traced and tracked by looking at subsets of data in trend studies for example in occupational hypersensitivity pneumonitis where metal

working fluids have become more prominent (Barber et al 2017). Allergic Contact Dermatitis attributed to fragrances by dermatologists (Montgomery et al 2018) have become more prominent. Nowadays especially, careful watch needs to be kept for new causes of Irritant Contact Dermatitis attributed to hand hygiene in healthcare workers (Stocks et al 2015). Isothiazolinones and allied compounds warrant special vigilance (Urwin et al 2015)

Evidence for novel causes of occupational disease ranged widely from solvent scleroderma, to lipoid pneumonia caused by glues, to obliterative bronchiolitis caused by ketone peroxides. In respect of occupational asthma evidence supporting many putative new causes was found by using the QSAR model, for example for denatonium benzoate (Hazard Index = 0.92) and for thiamine, (Hazard Index = 0.95).

The EELAB resource was an important asset in recruiting and retaining participating physicians. Feedback obtained from the overwhelming majority of the respondents was positive, and the resource was externally officially endorsed for Continuing Professional Development credits.

Conclusions:

Surveillance / sentinel schemes such as THOR, based on clinical data reports from trained practitioners are feasible ways of identifying new causes of occupational disease, and emerging risks (besides their function of monitoring trends in 'known' occupational disease). The network findings can be corroborated or amplified across different contexts e.g. specialties or countries, and by using complementary statistical techniques such as QSARs. Targetted learning, self audit and benchmarking resources help in the recruitment and retention of practitioners, as well as to improve the quality of their reports.

References:

Barber et al 2017 <https://oem.bmj.com/content/74/7/528.short>

Bonneterre et al 2010 Occup Environ Med; 67:178–186

Carder et al 2017 <https://doi.org/10.1016/j.shaw.2016.12.003>

Hussey et al 2008 <https://doi.org/10.3399/bjgp08X330753>

Jarvis et al 2015 <https://doi.org/10.1093/occmed/kqv105>

Money et al 2015 <https://doi.org/10.1093/occmed/kqu137>

Montgomery et al 2018 <https://doi.org/10.1111/cod.12902>

Seed et al 2019. <https://doi.org/10.1093/occmed/kqy118>

Stocks et al 2015 <https://doi.org/10.1111/bjd.13719>

Urwin et al 2015 <https://doi.org/10.1111/cod.12379>

Zhou et al 2017 <https://doi.org/10.1093/occmed/kqx057>

Zhou et al 2020 <https://doi.org/10.1093/occmed/kqz159>