MANCHESTER 1824
The University of Manchester

THOR

The Health and Occupation Research network

(Incorporating specialists' and THOR-GP reports)

http://research.bmh.manchester.ac.uk/epidemiology/COEH/research/thor
or
http://www.coeh.man.ac.uk/thor

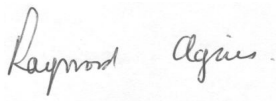
Dear colleague,

Thanks to your continuing support, the reporting schemes continue to generate useful information, not merely in quantity but also in the range and utility of outputs. Thus in this report we highlight the often overlooked function of THOR in identifying potentially new occupational hazards or emerging risks.

Participation in reporting can also benefit your professional development and assist you to self audit if you use our 'Electronic Experiential Learning, Audit and Benchmarking' (EELAB). Therefore if you are an occupational physician or a general practitioner, I would encourage you to use our EELAB resource (see reminder details in the report below) and in so doing earn up to 5 CPD points at no cost to yourself. In due course we hope to have the resource to adapt EELAB to suit chest physicians and dermatologists.

As some of you may know, later this month I shall become an Emeritus Professor. The overall academic management of the Centre for Occupational and Environmental Health will now be the responsibility of my successor Professor Martie van Tongeren who is an exposure scientist and epidemiologist. Martie was a senior lecturer in our Centre until about ten years ago and I have been handing over to him proleptically since the start of this year to help him take over smoothly. It is also hoped to appoint a part time clinical lecturer to continue to fulfil the occupational medicine specialist needs of the THOR schemes. As an Emeritus Professor I shall continue to support the schemes and their academic output. Moreover, I look forward to meeting some of you again in person in the UK and elsewhere for example at the ICOH Congress in Dublin next year.

Very best wishes



Raymond Agius
Professor of Occupational and Environmental Medicine

QUARTERLY REPORT SEPTEMBER 2017

This THOR and THOR-GP combined quarterly report summarises all the cases reported in the quarter April to June 2017. It includes a special feature on novel causes and identifying new hazards and risks.

CASE REPORTS: April to June 2017

Over 1000 physicians currently participate in THOR / THOR-GP (as of September 2017). Physicians can report either on a 'core' basis (reporting each month) or a 'sample' basis (reporting for one randomly selected month each year). A total of 339 actual, 1516 (estimated) cases were reported during this period. The 'estimated cases' are those reported by sample reporters multiplied by 12 and added to the core cases.

The actual and estimated cases by major category and diagnostic group, for clinical specialists (chest physicians, dermatologists, occupational physicians (OPs) and general practitioners (GPs)) are shown in Table 1 (NB. only actual cases are provided for THOR-GP; since methods for calculating estimated totals based on GP reports are under further development).

Table 1 Actual and estimated cases by major category and diagnostic group, April to June 2017

CATEGORY	DIAGNOSTIC GROUP	CLINICAL SPECIALISTS			OCCUPATIONAL PHYSICIANS			GENERAL PRACTITIONERS	
		Actual diagnoses	Estimated diagnoses	%	Actual diagnoses	Estimated diagnoses	%	Actual diagnoses	%
RESPIRATORY DISEASE	Asthma	25	47	*15*	5	27	*53*	1	*50*
	ascribed to sensitisation	*23*	*45*	-	-	-	-	-	-
	ascribed to irritation/RADS	*2*	*2*	-	-	-	-	-	-
	Unspecified	*0*	*0*	-	-	-	-	-	-
	Inhalation accidents	2	2	*1*	1	12	*24*	0	*0*
	Allergic alveolitis	1	1	*<1*	0	0	*0*	0	*0*
	Bronchitis/emphysema	0	0	*0*	1	12	*24*	1	*50*
	Infectious disease	0	0	*0*	0	0	*0*	0	*0*
	Non-malignant pleural disease	44	99	*31*	0	0	*0*	1	*50*
	predominantly plaques	*39*	*83*	-	-	-	-	-	-
	predominantly diffuse	*7*	*18*	-	-	-	-	-	-
	Unspecified/other	*3*	*14*	-	-	-	-	-	-
	Mesothelioma	15	136	*42*	0	0	*0*	0	*0*
	Lung cancer	3	25	*8*	0	0	*0*	0	*0*
	Pneumoconiosis	11	22	*7*	0	0	*0*	0	*0*
	Other	7	7	*2*	1	12	*24*	0	*0*
	Total diagnoses	**108**	**339**		**8**	**63**		**3**	
	Total cases	**101**	**321**	***100***	**7**	**51**	***100***	**2**	***100***

As more than one diagnosis may be reported the sum of percentages and total cases in each diagnostic category may be greater than 100%

CATEGORY	DIAGNOSTIC GROUP	CLINICAL SPECIALISTS			OCCUPATIONAL PHYSICIANS			GENERAL PRACTITIONERS	
		Actual diagnoses	Estimated diagnoses	%	Actual diagnoses	Estimated diagnoses	%	Actual diagnoses	%
SKIN	Contact dermatitis	61	138	*53*	2	2	*14*	1	*100*
	Allergic	*18*	*51*	-	-	-	-	-	-
	Irritant	*31*	*64*	-	-	-	-	-	-
	Allergic and irritant	*10*	*10*	-	-	-	-	-	-
	Unspecified	*2*	13	-	-	-	-	-	-
	Contact urticaria	1	1	*<1*	0	0	*0*	0	*0*
	Folliculitis/acne	0	0	*0*	0	0	*0*	0	*0*
	Infective	0	0	*0*	0	0	*0*	0	*0*
	Mechanical	0	0	*0*	1	12	*86*	0	*0*
	Nail	0	0	*0*	0	0	*0*	0	*0*
	Neoplasia	11	121	*47*	0	0	*0*	0	*0*
	Other	0	0	*0*	0	0	*0*	0	*0*
	Total diagnoses	**73**	**260**		**3**	**14**		**1**	
	Total cases	**72**	**259**	***100***	**3**	**14**	***100***	**1**	***100***
MUSCULOSKELETAL	Hand/wrist/arm	**No case reports from clinical specialists**			29	139	*40*	1	*9*
	Elbow				2	13	*4*	3	*27*
	Shoulder				8	74	*21*	2	*18*
	Neck/thoracic spine				1	12	*3*	1	*9*
	Lumbar spine/trunk				7	51	*15*	3	*27*
	Hip/knee				3	25	*7*	2	*18*
	Ankle/foot				2	24	*7*	0	*0*
	Other				4	26	*7*	0	*0*
	Total diagnoses				**56**	**364**		**12**	
	Total cases				**54**	**351**	***100***	**11**	***100***

As more than one diagnosis may be reported the sum of percentages and total cases in each diagnostic category may be greater than 100%

CATEGORY	DIAGNOSTIC GROUP	CLINICAL SPECIALISTS			OCCUPATIONAL PHYSICIANS			GENERAL PRACTITIONERS	
		Actual diagnoses	Estimated diagnoses	%	Actual diagnoses	Estimated diagnoses	%	Actual diagnoses	%
MENTAL ILL-HEALTH	Anxiety/depression	**No case reports from clinical specialists**			41	272	*60*	6	*55*
	Post-traumatic stress disorder				5	49	*11*	1	*9*
	Other work-related stress				37	213	*47*	6	*55*
	Alcohol or drug abuse				0	0	*0*	0	*0*
	Psychotic episode				0	0	*0*	0	*0*
	Other				2	2	*<1*	0	*0*
	Total diagnoses				**85**	**536**		**13**	
	Total cases				**72**	**457**	***100***	**11**	***100***

As more than one diagnosis may be reported the sum of percentages and total cases in each diagnostic category may be greater than 100%

Other cases

In addition to the main diagnostic categories described in Table 1, OPs and GPs can report 'other' diagnoses of work-related ill-health (WRIH). This quarter, OPs reported 5 in total; 3 cases of noise induced hearing loss (NIHL) in soldiers (2) and an agricultural worker; a case of Hepatitis C in a doctor, and a case of lead poisoning in a lead mill worker.
GPs did not report any cases of 'other' WRIH this quarter.

QUARTERLY FEATURE
Novel causes and identifying new hazards and risks.

Many of you will be familiar with the work of THOR in terms of its central role in collecting, collating and analysing medically certified information on incidence, trends and sickness absence burden of occupational disease and work-related ill health (WRIH) in the UK. Another, less visible, but nonetheless important, aspect of the THOR network is its role in the identification of new hazards or new risks to health from work. Figure 1 describes this observational epidemiological process as exemplified by THOR.

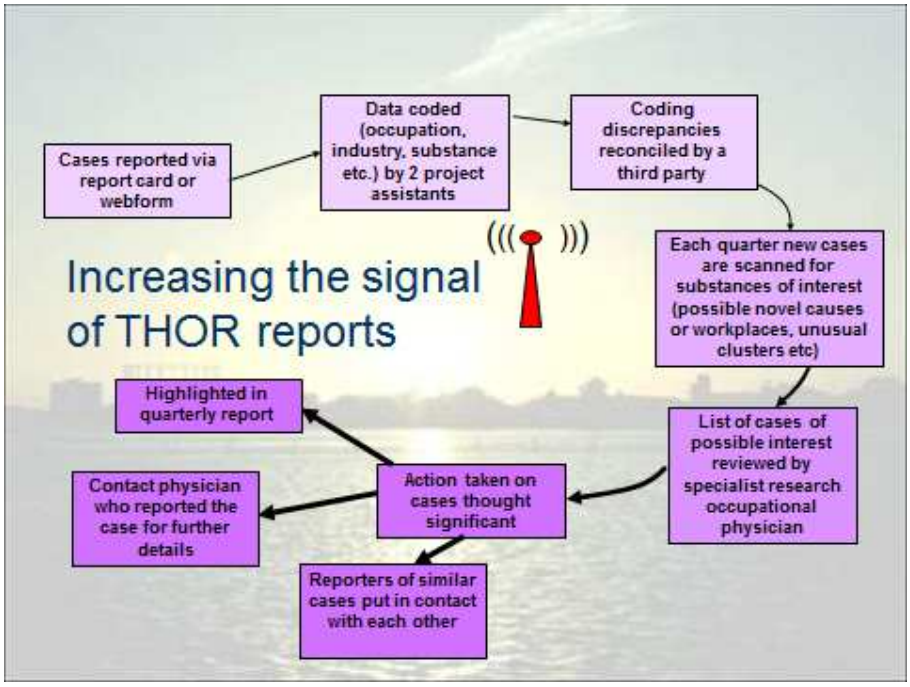


Figure 1 Overview of process for identifying new risks and novel causes in the THOR network

Reporters who participate in these schemes will be familiar with one output in this identification of novel causes or new risks in the form of the 'Beck Report', that is included in these reports every quarter. The Beck Report deals with the identification of new hazards and risks relating specifically to occupational skin disease cases reported via our clinical specialists scheme, EPIDERM, and via skin reports made by occupational physicians to OPRA and general practitioners to THOR-GP. In addition, reporters have the facility, and are encouraged, to submit cases of WRIH that are either outside their reporting month (if 'sample' reporters), which are attributed to a novel cause, or appear to be an unusual cluster of cases. These 'extra' reports are made through our on-line webform: https://coeh.manchester.ac.uk/thor/thorextra/form.php

By way of illustration, Table 2 highlights a selection of the cases that have been reported to this 'THOR-EXTRA' scheme.

scheme	diagnosis	occupation	industry	agent
Opra	Morphea	dry cleaning manager	Other business activities	perchlorethylene
Opra	Occupational asthma	gardener	nhs	freshly generated bark chippings (willow and beech wood). He also reports symptoms when tackling a plant species named eliagnus.
Opra	Occupational Asthma	Plaster Room Technician	Hospital Activities	Water-cured casting materials - MDI and other constituents
Epiderm	Allergic contact dermatitis	laboratory worker	veterinary laboratory worker (histology and post-mortem work)	D-limonene
Opra	Occupational asthma	dental nurse	Hospital Activities / dental practice	acrylic self curing agent
Sword	exogenous lipoid pneumonia following exposure	graphic designer		spray mount glue
Sword	Pulmonary alveolar proteinosis induced by aluminium	mould maker		aluminium
Opra	Occupational Asthma	Production Operative	refractory ceramics	furfural
Opra	Scleroderma (systemic sclerosis)	factory worker	Manufacture of chemicals and chemical products	perchlorethylene
Opra	airways inflammation ?	plant operative	electricity generation	endotoxin
Epiderm	'Facial chilblains'	Food Industry Worker	Food	Work up to 2 hours in the freezer without facial protection
Opra	clear cell renal cell carcinoma 2012 acoustic neu	Flame cutter/burner	Recycling	Lead/ other metals
Opra	Adenocarcinoma of the lung	Jute Mill owner	textiles	jute and linen dust
Sword	Irritation (RADS) - A2	Ebola PPE Monitor	Armed Forces	Chlorine
Sword	Pulmonary fibrosis	Foundry labourer/railway track layer	Manufacture of fabriacted metal OR land transport	graphite and/or silica

Table 2 Cases of WRIH reported to THOR-EXTRA

It is also possible to look within specific work-related conditions that may appear from the overall trends analysis to be declining, and identify new causes in terms of new work practices, or by looking at specific agents. For example, the overall trend for contact dermatitis, Figure 2, shows an estimated annual decrease for both clinical specialist and occupational physician reporting.

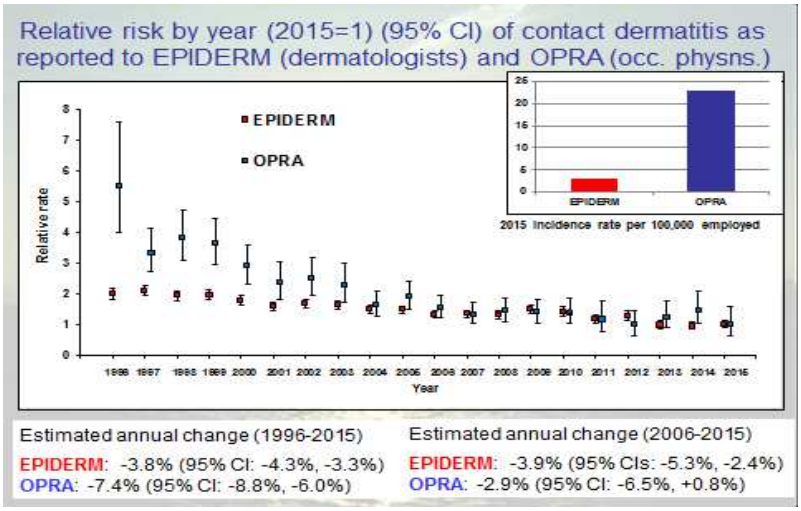


Figure 2 Relative risk by year of contact dermatitis reported to EPIDERM and OPRA (1996-2015)

However, 'hidden' within this overall trend are a number of new work practices and substances for which the incidence is increasing, e.g. allergic contact dermatitis attributed to fragrance, or irritant contact dermatitis attributed to hand hygiene in healthcare workers – Figures 3a and 3b; both studies have either been published in the peer reviewed literature [i] or are currently under review for publication.

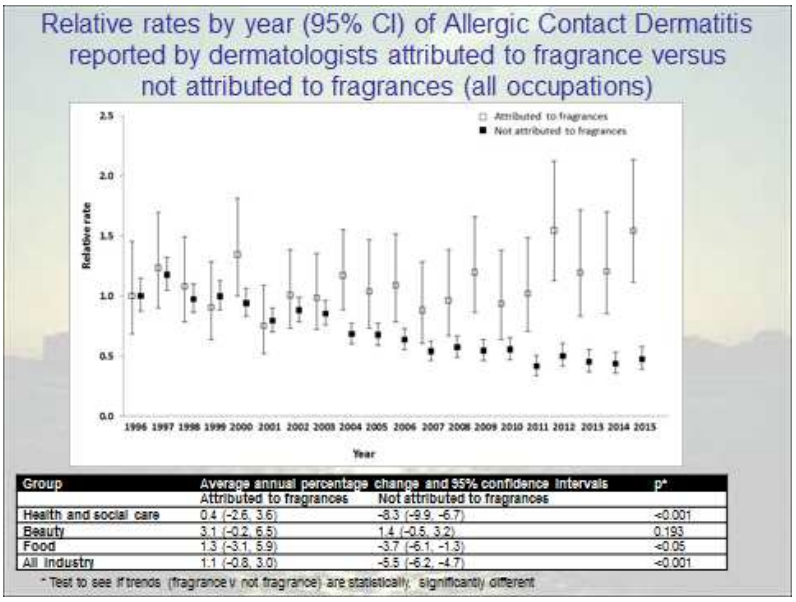


Figure 3a Example - relative rates of allergic contact dermatitis attributed to fragrances.

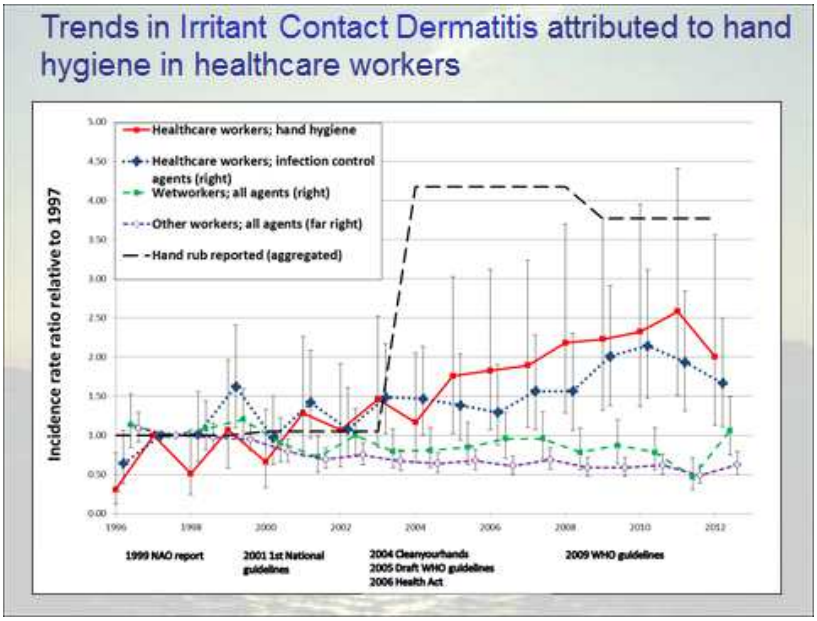


Figure 3b Example - trends in irritant contact dermatitis attributed to hand hygiene.

The same level of identification of new hazards and emerging risks is undertaken with the respiratory cases reported to THOR; recent examples (such as those included in Table 2); cover a range of respiratory disease,

- Chemical pneumonitis / alveolitis caused by silicone waterproofing sprays in boat repair and (in another case) in furniture manufacture
- Lipoid pneumonia from spray mount glue in a graphic designer
- Bronchiolitis (? ketone peroxides) in boat laminator
- Asthma caused by heated triglycidyl isocyanurate (TGIC), a hardening agent used in powder paints.

The systematic methodology leading to the identification of such potential new occupational respiratory hazards has been highlighted in presentations by Prof Raymond Agius in Brussels (EU-OSHA) in May and at the FOM/SOM conference in June. This will also be the subject of an original article to be submitted for peer-reviewed publication.

Moreover, work has also been undertaken looking at the musculoskeletal and mental ill-health data that THOR collects, in particular, at emerging hazards in specific industries – in this example (Figure 4), how trends in work-related back pain were seen to be decreasing as trends in incidence of work-related stress were increasing in the health and social care sector[ii].

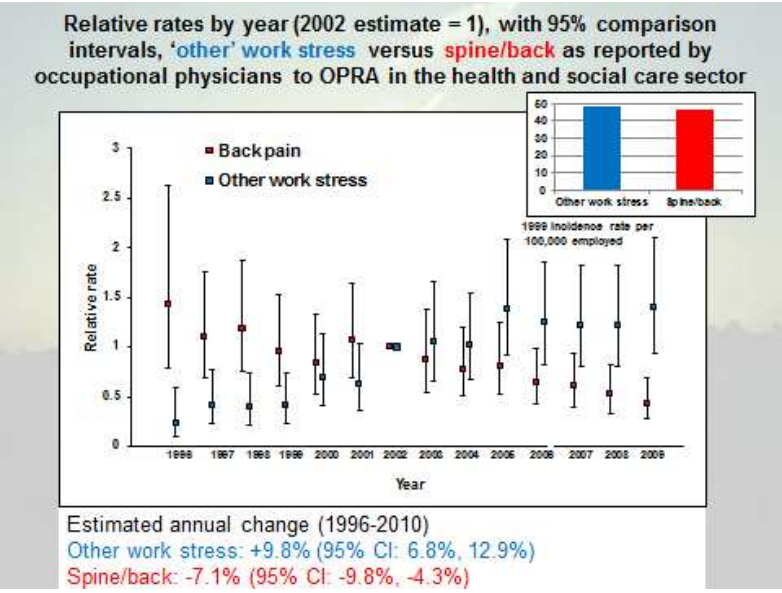


Figure 4 Relative rates by year (2002=1) of back pain versus other work-related stress as reported by Occupational Physicians to Occupational Physicians Reporting Activity (OPRA) in the health and social care sector.

The changing nature of work in the UK, for example, the infiltration of precarious contracts, part-time work, 'zero hours', downsizing, poor job security, remote working, coupled with demographic changes such as an ageing population, calls for a system that is able to anticipate and identify these new hazards, and work with the relevant agencies (e.g. HSE) to promote vigilance and allow for preventative measures to be put in place to protect sections of the work force. THOR information has been previously shared with the HSE (while safeguarding the anonymity of the original reports) on specific hazards in hairdressing, car manufacture / repair, metal working fluids, and silica in new contexts.

Reporting schemes are only a part (albeit a very important part) of the means for identifying potential new hazards. Work such as we have undertaken and published on Quantitative Structure Activity Relationships (QSARs) to predict respiratory hazards from their chemical structure has been successfully validated, as well as used by others. These methods used in partnerships between all stakeholders including practitioners, academics as well as industry can help anticipate and predict future risks. In turn this information can be used to mitigate risks starting from a 'safer by design' attitude in manufacture, to enhanced control of exposure, and finally focussed surveillance - thus closing the loop.

BECK REPORT

We are most grateful to Dr Mark Wilkinson for this quarter's 'Beck Report', which provides a commentary for cases of work-related skin disease reported to THOR and THOR-GP UK this quarter.

The 'Beck' Report

Reports this quarter give an interesting snapshot of problems experienced by agricultural and horticultural workers. 7 of 73 cases reported to EPIDERM were from these industries with 2 developing skin cancer presumably from a lifetime of outdoor work. 3 had developed dermatitis from contact with plants. 1 had an irritant dermatitis and 2 were found to be allergic to the Compositae (daisy) family of plants. 1 was a gardener and the other worked in a factory making flower bouquets and handled chrysanthemums. The other classic presentation not represented is of florists allergic to Alstroemeria (the Inca lily) with hand dermatitis after stripping leaves from the stem in making flower arrangements. The other cases were a landscape gardener allergic to chromate – presumably in cement used in hard landscaping and a farmer allergic to acrylates – the source wasn't mentioned but we can speculate that they were used as an adhesive to keep their machinery together!

Cases of allergy to methylisothiazolinone continue although there may be light at the end of the tunnel. The European Union has now legislated and MI has been banned from sale in leave on products (hand creams etc.) since February 2017. Similar legislation will prevent its sale in rinse off products (e.g. hand wash) above a concentration of 15ppm from April 2018. Finally, there will be a requirement for labelling of MI in industrial chemicals above a concentration of 1.5ppm. I do wonder what will happen if a similar outbreak occurs post Brexit and what systems will replace the European which have taken roughly 4 years to regulate the chemical after the problem was highlighted in late 2013. This does leave industry trying to find an alternate preservative to use – interesting to see the case of allergy to the preservative iodopropynyl butylcarbamate in paint used to distress furniture. The cycle continues?

To finish, there were a couple of jobs that at first glance looked as though they'd be fun. A play therapist allergic to a blue clothing dye potentially in their navy work trousers – easily solved. But not so easily, the engineer test driving cars in the desert who developed irritant dermatitis from the heat and dust!

Dr Mark Wilkinson
Leeds General Infirmary

THOR NEWS

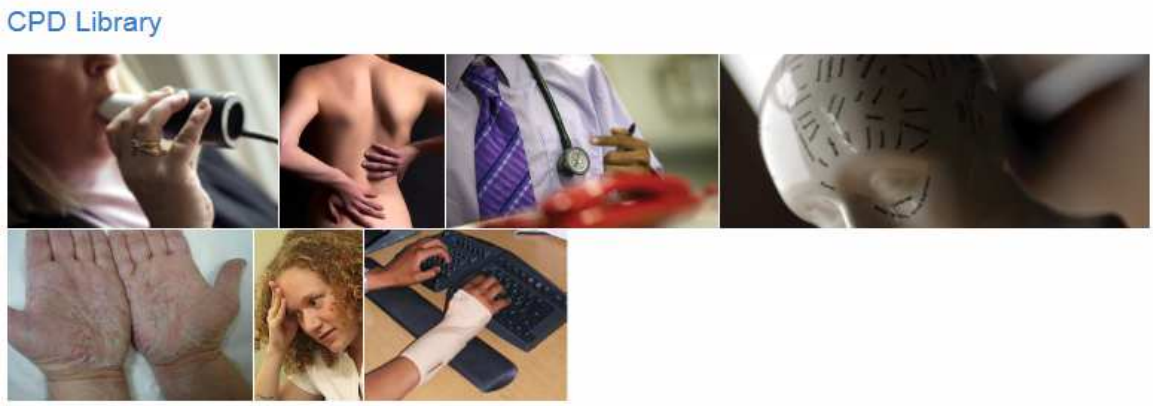
LANE LECTURE

For several years the Centre for Occupational and Environmental Health has organised an annual lecture in memory of the first Professor of Occupational Medicine of this University – Ronald Lane. The University has the distinction of having the oldest extant chair in Occupational Medicine dating back to 1945.

This year the Lane Lecture will be a little different from previous years as we would like to celebrate the work of Professor Raymond Agius who has been Director of the Centre for Occupational and Environmental Health at the University of Manchester since 2002, but will retire on 18th September of this year, to become an Emeritus Professor. Therefore, on Thursday 9th November, Professor Agius will give the Lane Lecture – **"From Patients to Prevention - a Journey through Occupational and Environmental Medicine"**.

EELAB - a novel resource for education and continuing professional development in occupational health

A reminder that OPRA and THOR-GP reporters can access our CPD resource - EELAB (Electronic Experiential Learning, Audit and Benchmarking), http://www.population-health.manchester.ac.uk/epidemiology/COEH/eelab/



EELAB is delivered electronically and is based on the actual patient in front of the doctor, providing:

- *L*earning which is interactive and case-based;
- *A*udit against good practice standards such as evidence based guidance;
- *B*enchmarking actual practice or intent against that of our database built from physician peers.

EELAB has been accredited for CPD purposes (for up to 5 CPD points) by the Faculty of Occupational Medicine.

If you have any comments or suggestions regarding the updated EELAB resource, please contact us either via the web form, or by emailing our Web Developer, Nazia Zarin: nazia.zarin@manchester.ac.uk

THOR PUBLICATIONS

The following are recently published, or forthcoming, papers based on THOR work:

Zhou Y, Carder M, Hussey L, Gittins M, Agius RM. **Differential reporting of work-related mental ill-health in the medical profession.** Occup Med. Published online first https://doi.org/10.1093/occmed/kqx109

Zhou Y, Dodman J, Hussey L, Sen D, Rayner C, Zarin N, Agius RM. **Electronic, Experiential, Learning, Audit and Benchmarking (EELAB): An innovative educational resource in occupational medicine.** Occup Med (2017) Published online first https://doi.org/10.1093/occmed/kqx057

Carder M, Hussey L, Money A, Gittins M, McNamee R, Stock SJ, Sen D, Agius RM. **The Health and Occupation Research Network (THOR) - an evolving surveillance system.** SHAW (2017) Published online first http://dx.doi.org/10.1016/j.shaw.2016.12.003

Gittins M, McNamee R, Holland F, Carter LA. **Accounting for reporting fatigue is required to accurately estimate incidence in voluntary reporting health schemes.** Journal of Clinical Epidemiology. Published online first: http://dx.doi.org/10.1016/j.jclinepi.2016.09.006

THOR CONTACTS

Many thanks for your continued support of THOR, please contact us (Table 3) if you have any queries or data requests.

SCHEME	email	Phone
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OPRA	Susan.taylor@manchester.ac.uk	0161 275 5531
THOR-GP	Susan.taylor@manchester.ac.uk	0161 275 5531
DATA REQUESTS	Melanie.carder@manchester.ac.uk	0161 275 5636
GENERAL ENQUIRIES	Annemarie.money@manchester.ac.uk	0161 275 8491

Table 3 THOR Contact details

[i] Stocks SJ, McNamee R, Turner S, Carder M, Agius RM (2015) The impact of national level interventions to improve hygiene on the incidence of irritant contact dermatitis in healthcare workers: changes in incidence from 1996-2012 and interrupted times series analysis. Br J Dermatol 173(1): 165-171.

[ii] Carder M, McNamee R, Turner S, Hodgson J, Holland F, Agius R. (2013) Time trends in the incidence of work-related mental ill-health and musculoskeletal disorders in the UK. Occup Environ Med, 70: 317-324.