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,

I am pleased to enclose the latest quarterly report of the THOR scheme, summarising the data that were collected earlier this year, between April and June 2018. Thanks, again for your continued support!

We hope that you find the information provided within this quarterly report useful and informative. We are currently reviewing the format and content of these reports. Hence, we are very interested in receiving any feedback on the quarterly (and annual) reports. Please get in touch if you have any suggestions for improvement. We are keen to ensure that we provide you with the information that you would like to receive.

The Lane Lecture this year will be delivered by Professor John Cherrie from Heriot-Watt University and the Institute of Occupational Medicine. John is a very good friend, colleague and mentor, and one of the top academics in the UK in the field of Occupational Health and Exposure Science. I am sure that his lecture on "The Exposome and Work" will be of interest to many of you. If you would like to attend the lecture as well as the reception and buffet meal afterwards, make sure to book your place (see details on page 10). I hope to see many of you there.

Very best wishes

Martie van Tongeren
Professor of Occupational and Environmental Health

QUARTERLY REPORT SEPTEMBER 2018

This THOR and THOR-GP combined quarterly report summarises all the cases reported in the quarter April to June 2018. It includes a special feature on work related asthma and metal working fluids.

CASE REPORTS: April to June 2018

Approximately 900 physicians currently participate in THOR / THOR-GP (as of September 2018). 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 284 actual, 1384 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 2018

CATEGORY	DIAGNOSTIC GROUP	CLINICAL SPECIALISTS			OCCUPATIONAL PHYSICIANS			GENERAL PRACTITIONERS	
		Actual diagnoses	Estimated diagnoses	%	Actual diagnoses	Estimated diagnoses	%	Actual diagnoses	%
RESPIRATORY DISEASE	Asthma	10	10	*4*	2	24	*67*	1	*100*
	ascribed to sensitisation	*9*	*9*	-	-	-	-	-	-
	ascribed to irritation/RADS	*1*	*1*	-	-	-	-	-	-
	Unspecified	*0*	*0*	-	-	-	-	-	-
	Inhalation accidents	1	1	*<1*	0	0	*0*	0	*0*
	Allergic alveolitis	1	1	*<1*	0	0	*0*	0	*0*
	Bronchitis/emphysema	3	3	*1*	0	0	*0*	0	*0*
	Infectious disease	0	0	*0*	0	0	*0*	0	*0*
	Non-malignant pleural disease	28	105	*39*	0	0	*0*	0	*0*
	predominantly plaques	*25*	*102*	-	-	-	-	-	-
	predominantly diffuse	*3*	*3*	-	-	-	-	-	-
	Unspecified/other	*1*	*1*	-	-	-	-	-	-
	Mesothelioma	13	90	*34*	0	0	*0*	0	*0*
	Lung cancer	1	1	*<1*	0	0	*0*	0	*0*
	Pneumoconiosis	20	53	*20*	0	0	*0*	0	*0*
	Other	4	4	*2*	2	24	*67*	0	*0*
	Total diagnoses	**81**	**268**		**4**	**48**		**1**	
	Total cases	**80**	**267**	***100***	**3**	**36**	***100***	**1**	***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	72	204	*51*	1	12	*100*	**No case reports from GPs this quarter**	
	Allergic	*32*	*87*	-	-	-	-		
	Irritant	*23*	*56*	-	-	-	-		
	Allergic and irritant	*16*	*60*	-	-	-	-		
	Unspecified	1	1	-	-	-	-		
	Contact urticaria	2	2	1	0	0	*0*		
	Folliculitis/acne	0	0	*0*	0	0	*0*		
	Infective	0	0	*0*	0	0	*0*		
	Mechanical	0	0	*0*	0	0	*0*		
	Nail	0	0	*0*	0	0	*0*		
	Neoplasia	18	194	*49*	0	0	*0*		
	Other	0	0	*0*	0	0	*0*		
	Total diagnoses	**92**	**400**		**1**	**12**			
	Total cases	**91**	**399**	***100***	**1**	**12**	***100***		
MUSCULOSKELETAL	Hand/wrist/arm				16	93	*68*	1	*17*
	Elbow				0	0	*0*	0	*0*
	Shoulder				4	26	*19*	1	*17*
	Neck/thoracic spine				0	0	*0*	0	*0*
	Lumbar spine/trunk				6	6	*4*	3	*50*
	Hip/knee				0	0	*0*	1	*17*
	Ankle/foot				0	0	*0*	0	*0*
	Other				1	12	*9*	0	*0*
	Total diagnoses				**27**	**137**		**6**	
	Total cases				**27**	**137**	***100***	**6**	***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**			31	251	*53*	5	*38*
	Post-traumatic stress disorder				3	25	*5*	0	*0*
	Other work-related stress				31	240	*50*	10	*77*
	Alcohol or drug abuse				1	1	*0*	0	*0*
	Psychotic episode				0	0	*0*	0	*0*
	Other				4	15	*3*	1	*8*
	Total diagnoses				**70**	**532**		**16**	
	Total cases				**60**	**478**	***100***	**13**	***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 4 in total; 1 case of headache and post-traumatic stress symptoms in a cash in transit officer, 1 case of metal foreign body in left middle finger in an electrical and mechanical fitter, 1 case of acoustic shock in a customer service advisor (CSA) and 1 case of acoustic trauma in a customer service advisor. GPs reported 1 other case of WRIH this quarter, a case of vertigo in a tree surgeon.

QUARTERLY FEATURE

Data Request Feature:
Work-related asthma and metal working fluids

The Centre for Occupational and Environmental Health (COEH) at the University of Manchester provides an ad-hoc data enquiry service for the Health and Safety Executive, participating physicians and other interested parties to request information about work-related ill-health cases reported to THOR.

COEH received and completed a total of 15 data requests this quarter. In this quarterly feature, we present the findings of one such data request: **'Cases of work-related asthma attributable to metal working fluids reported to the SWORD scheme from year 2013 to 2017'**.

Metal working fluids

Metal working fluids (MWFs) are a group of oils and water-based fluids used to reduce heat and friction during the machining of metals[1]. Also referred to as suds, coolants, soap or slurry, MWFs improve the performance and lifespan of machines and cutting tools and protect workplace surfaces from corrosion through continuous removal of swarf, fines, and chips during the work process[2]. The fluids are mostly applied by a continuous jet, spray or hand dispenser.

Workers can be exposed to MWFs through inhalation of mist generated in the machining process, skin contact (particularly hands and forearms) or through ingestion when eating in work areas[1]. Exposure to MWFs can cause various health effects namely respiratory conditions such as work-related asthma, extrinsic allergic alveolitis, and impaired lung function; dermatologic conditions such as allergic and irritant dermatitis; and have been associated with increased risk of some types of cancer[3]. Here we present the case selection and findings of a data request describing work-related asthma cases attributable to MWFs.

Source of information and case selection

The database for the Surveillance of Work-Related and Occupational Respiratory Disease (SWORD) scheme for the period 2013 to 2017 was searched for cases with the following criteria:

1. The diagnosis of the case was asthma
2. The suspected agent reported for the case was either 'cutting oils/soluble oils' or 'synthetic coolants' (coded in-house as 315.0 and 316.0 respectively)

Results

- There was a total of 21 actual cases (21 estimated cases) of work-related asthma attributable to metal working fluids reported by chest physicians to the SWORD scheme from year 2013 to 2017.
- The number of cases per year is shown in Figure 1, whilst a breakdown by industry group is shown in Table 2.
- During this period, the most often reported agents attributed to work-related asthma besides metal working fluids were flour, isocyanates, and wood / wood dust with 78, 46, and 22 cases respectively.

Figure 1. Actual cases of work-related asthma attributed to metal working fluids by year reported to SWORD (2013-2017)

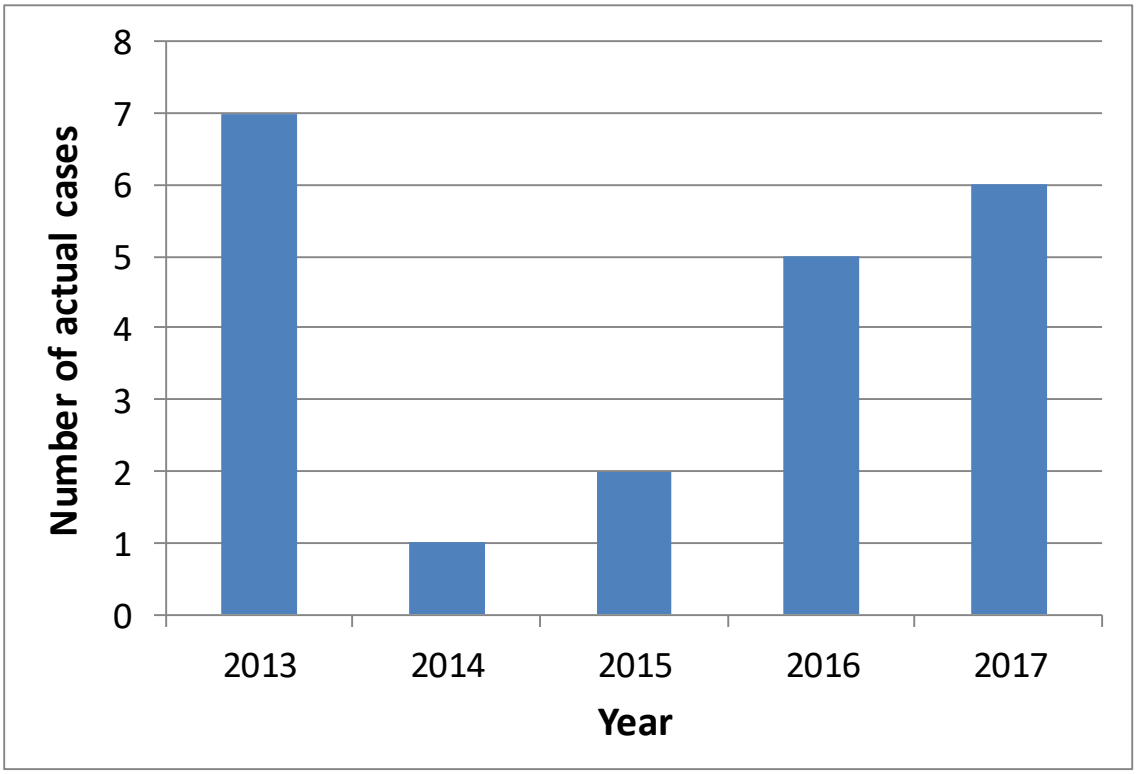

Table 2. Actual cases of work-related asthma attributed to metal working fluids by industry (SIC 2007)

Manufacture of other transport equipment	8
Other manufacturing	6
Manufacture of fabricated metal products, except machinery & equipment	4
Manufacture of motor vehicles, trailers & semi-trailers	3

References:

1. Health and Safety Executive. *About metalworking fluids*. [online] Available at: http://www.hse.gov.uk/metalworking/about.htm [Accessed 10 Sep. 2018].
2. Canadian Centre for Occupational Health and Safety. *Metalworking Fluids: OSH Answers*. [online] Available at: https://www.ccohs.ca/oshanswers/chemicals/metalworking_fluids.html [Accessed 12 Sep. 2018].
3. The National Institute for Occupational Safety and Health (NIOSH). (2018). *Metalworking Fluids*. [online] Available at: https://www.cdc.gov/niosh/topics/metalworking/default.html [Accessed 12 Sep. 2018].

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

Amongst the cases reported to EPIDERM this quarter were 2 dentists with an unusual presentation of allergy to amalgam that resulted in a facial dermatitis from airborne exposure during removal of fillings. Typically, mercury within dental amalgam is the contact allergen. Whilst we sometimes see patients concerned about mercury toxicity, the days of the 'mad hatter' are gone. Invented in the mid-17th century, "carroting" was used in the manufacture of felt for men's hats. Rabbit skins were treated with a dilute solution of mercuric nitrate and the skins were dried in an oven where the thin fur at the sides turned orange. The fur was separated from the skin and blown onto a colander and treated with hot water before being passed through wet rollers to produce the felt. When mercury containing ointments were used to treat syphilis in the 18th century the salivation induced and blackening of the teeth was used as confirmation by the physician that the patient was complying with treatment! [1] However, sensitisation can occur and cause clinical disease. Most often a reaction to the organic mercurial, thiomersal, will indicate sensitisation following exposure to this used as a preservative in vaccines during childhood and not be relevant. However, mucosal exposure to amalgam in the mouth can cause oral lichen planus and replacement of the filling with composite result in resolution [2]. More rarely, oral lichen planus has been described as an allergic reaction to gold in dental crowns [3].

I was interested to see the beautician allergic to lauryl and decyl glucoside present in hand wash and shampoo. Glucosides are less irritant non-ionic surfactants used in cosmetics including baby shampoo and products for sensitive skin. Many 'natural' personal care companies use them because they are plant-derived and biodegradable. They are often used as an alternative to sodium lauryl sulphate which has had a bad press amongst consumers as a potential irritant – although in reality the irritancy of a product is often related to the combination of ingredients and their relative concentrations. In the dermatological world, glucosides have been increasingly recognised as causing contact allergy to the extent that in 2017 they were the American Contact Dermatitis Society allergen of the year! [4] Perhaps preferable to use SLS?

Allergy to the preservative methyl isothiazolinone does now seem to be reducing amongst consumers, so I was interested to see the industrial chemist involved in the manufacture of liquid fertiliser allergic to methyl, methylchloro, octyl and benz-isothiazolinones in plant and seaweed emulsions. Laboratory studies suggest that these chemicals may cross react provided there is sufficient exposure [5]. Although in practice, clinical data suggest that methylisothiazolinone cross reacts predominantly with octylisothiazolinone [6]. Irrespective we need to remember that these other isothiazolinones are widely used in an industrial context and are not so well regulated as in cosmetics. The same individual was also allergic to the preservative methyldibromoglutaronitrile banned by the EU from cosmetics in the 'noughties' but still used in industry again highlighting the difference in regulation.

Quirk this quarter was the school manager who developed a facial dermatitis after a plug-in air freshener squirted over her. Proven to be allergic to fragrance she required

oral steroids to settle the eruption. An unnecessary exposure in an occupational context that could easily be avoided and highlighted in a recent publication from EPIDERM [7].

[1] Mercury. Baxter PJ and Igisu H In: Hunter's diseases of occupations. Baxter PJ, Aw TC, Cockcroft A, Durrington P, Harrington JM Eds Hodder & Stoughton (London) 2010: 214-220
[2] The role of patch testing in the management of oral lichenoid reactions. Suter VG, Warnakulasuriya S. J Oral Pathol Med. 2016; 45: 48-57
[3] Contact allergy to gold in patients with oral lichen lesions. Ahlgren C, Bruze M, Möller H, Gruvberger B, Axéll T, Liedholm R, Nilner K. Acta Derm Venereol. 2012; 92: 138-43.
[4] Alkyl Glucosides: 2017 "Allergen of the Year". Sasseville D. Dermatitis. 2017; 28: 296
[5] Cross-reactivity between methylisothiazolinone, octylisothiazolinone and benzisothiazolinone using a modified local lymph node assay. Schwensen JF, Menné Bonefeld C, Zachariae C, et al. Br J Dermatol. 2017; 176: 176-183.
[6] Patterns of concomitant allergic reactions in patients suggest cross-sensitization between octylisothiazolinone and methylisothiazolinone. Aalto-Korte K, Suuronen K. Contact Dermatitis. 2017; 77: 385-389.
[7] UK trends of allergic occupational skin disease attributed to fragrances 1996-2015. Montgomery RL, Agius R, Wilkinson SM, Carder M. Contact Dermatitis. 2018; 78: 33-40.

Dr Mark Wilkinson, Leeds General Infirmary

OBSERVATIONS FROM OPRA

Many thanks to Dr Martin Seed, Occupational Physician and Clinical Lecturer here at COEH for this quarters' observations from OPRA.

Work-related musculoskeletal problems are common in the healthcare sector, often linked to high and repetitive physical demands together with workload pressures. Three of the four cases with shoulder diagnoses reported to OPRA this quarter were employed in this sector. Two of these three cases had diagnoses of shoulder impingement, one of which was a pre-existing diagnosis made worse by 'excessive demands and staffing shortage' (sound familiar?) in a phlebotomist. The other case of impingement was reported as having been caused by 'inadequate breaks from VDU work and poor ergonomics' in an administrator. The diagnosis for the third case was reported as rotator cuff tendinopathy in a cardiology technician attributed to the 'ergonomics of echocardiography (with dobutamine challenge)'.

The ergonomic challenges faced by echocardiographers are not to be underestimated. These technicians perform repetitive actions which might require them to reach around the left side of the thorax of patients with their right hand to position the probe, whilst using an abducted left arm to operate the image controls. A search of the OPRA database since 2002 revealed five cases in cardiac echo technicians with conditions affecting the neck and upper limb: two cases of neck and shoulder pain; one of hand and arm pain; one of shoulder impingement; and the other being reported as a work related upper limb disorder.

Other diagnostic technicians such as radiographers also have significant musculoskeletal risks. Hulls et al [1] found that 54 of the 92 cases (59%) reported to

OPRA between 1996 and 2015 in radiographers had musculoskeletal diagnoses. They wrote 'Poor ergonomics, patient handling and repetitive work were commonly reported as the suspected causes of musculoskeletal disorders within this dataset'. A large cross-sectional survey of vascular technologists and diagnostic medical sonographers in the US [2] revealed that 90% respondents were scanning in pain, with 75% respondents reporting shoulder pain. Shoulder, and other musculoskeletal, pathology in diagnostic technicians and associated ergonomic factors are arguably under researched areas.

[1] Hulls PM, Money A, Agius RM and de Vocht F. Work-related ill-health in radiographers *Occupational Medicine* 2018;68:354–359
[2] Evans K, Roll S and Baker J. Work-Related Musculoskeletal Disorders (WRMSD) Among Registered Diagnostic Medical Sonographers and Vascular Technologists. *JDMS* 2009;25:287-299

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.

This year the Lane Lecture will be delivered by Professor John Cherrie, Principal Scientist of the Institute of Occupational Medicine and Professor of Human Health at Heriot-Watt University. The lecture titled **'The exposome and work'** will be held on Tuesday 6th of November, 3pm at the Barnes Wallis Building on University Campus. There will also be presentations by Dr Suzanne Verstappen, Dr Sheena Johnson and Dr Tarani Chandola, demonstrating some of the current research in health and work at the University of Manchester. The lecture will be followed by a drinks reception and a buffet.
If you require any further information, please to contact Debbie Woods either by phone (0161 275 5524) or email (LaneLecture@manchester.ac.uk)

THOR PUBLICATIONS

The following are recently published papers based on THOR work:

Barber CM, Fishwick D, Seed MJ, Carder M, Van-Tongeren M. **Artificial stone-associated silicosis in the UK** Occup Environ Med Published Online First: 14 February 2018

Hulls P, Money A, Agius R, de Vocht F. **Work-related ill-health in UK radiographers.** Occupational Medicine 05.03.2018.

Montgomery RL, Agius R, Wilkinson SM, Carder M. **UK trends of allergic occupational skin disease attributed to fragrances 1996-2015.** Contact Dermatitis. 2018 Jan;78(1):33-40. doi: 10.1111/cod.12902. Epub 2017 Oct 27.

THOR CONTACTS

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

Table 3 THOR Contact details

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