

# THOR

## The Health and Occupation Research network

(Incorporating specialists' and THOR-GP reports)

<http://www.population-health.manchester.ac.uk/epidemiology/COEH/research/thor/>

Or

<http://www.coeh.man.ac.uk/thor>

Dear colleague,

I am pleased to provide you with the latest quarterly report of THOR, covering data collected during the last quarter of 2018.

In addition to a summary of the cases reported to the various schemes, we have included a summary of occupational asthma due to exposure to methyl methacrylate, based on a data request from ANSES in France.

I would like to thank Drs. Jenny Callander and Glenda Hill for providing the Case of the Quarter, describing a case of irritant contact dermatitis in a dog hydrotherapist. Considering the growth in services to treat and groom pets, this is perhaps a group that would be worthwhile of further investigation.

Finally, I would also like to thank Dr Mark Wilkinson for his contribution as the 'Beck Report'.

We hope that you find the information provided in this report useful and informative.

Yours sincerely,



Martie van Tongeren  
Professor of Occupational and Environmental Health

This THOR combined quarterly report summarises all the cases reported in the quarter October to December 2018 to SWORD, EPIDERM, OPRA and THOR-GP. It includes a special feature on cases of occupational asthma attributed to methyl methacrylate.

If you have any comments regarding the type of information you would like to see included (or not) in future reports, or suggestions as to how we could improve the reports then please contact THOR's Manager, Dr Melanie Carder at [melanie.carder@manchester.ac.uk](mailto:melanie.carder@manchester.ac.uk) or phone 0161 275 5636. We are always pleased to hear from you.

### CASE REPORTS: October to December 2018

Around 850 physicians currently participate in the four THOR schemes (as of March 2019). Physicians can report either on a core (reporting each month) or a sample (reporting for one randomly selected month each year) basis (except GPs who report as sample only).

A total of 227 cases were reported during this quarter (actual cases). The 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. In total 69 cases of respiratory disease were reported, as well as 75 cases of skin disease, 28 cases of musculoskeletal problems and 52 cases of mental ill-health.

**Table 1      Actual cases by major category and diagnostic group, Oct to Dec 2018**

CATEGORY	DIAGNOSTIC GROUP	CLINICAL SPECIALISTS		OCCUPATIONAL PHYSICIANS		GENERAL PRACTITIONERS	
		Actual diagnoses	%	Actual diagnoses	%	Actual diagnoses	%
<b>RESPIRATORY DISEASE</b>	Asthma	18	28	3	100	0	0
	<i>ascribed to sensitisation</i>	12	-	-	-	-	-
	<i>ascribed to irritation/RADS</i>	3	-	-	-	-	-
	<i>Unspecified</i>	0	-	-	-	-	-
	Inhalation accidents	0	0	0	0	0	0
	Allergic alveolitis	1	2	0	0	0	0
	Bronchitis/emphysema	1	2	0	0	0	0
	Infectious disease	1	2	0	0	0	0
	Non-malignant pleural disease	19	29	0	0	0	0
	<i>predominantly plaques</i>	16	-	-	-	-	-
	<i>predominantly diffuse</i>	6	-	-	-	-	-
	<i>Unspecified/other</i>	0	-	-	-	-	-
	Mesothelioma	6	9	0	0	0	0
	Lung cancer	4	6	0	0	0	0
	Pneumoconiosis	12	18	0	0	0	0
	Other	7	11	0	0	1	100
	Total diagnoses	69		3		1	
	Total cases	65	100	3	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	%	Actual diagnoses	%	Actual diagnoses	%
SKIN	Contact dermatitis	63	93	1	100	3	50
	<i>Allergic</i>	28	-	-	-	-	-
	<i>Irritant</i>	20	-	-	-	-	-
	<i>Allergic and irritant</i>	12	-	-	-	-	-
	<i>Unspecified</i>	2	-	-	-	-	-
	Contact urticaria	0	0	0	0	1	17
	Folliculitis/acne	0	0	0	0	0	0
	Infective	1	1	0	0	2	33
	Mechanical	0	0	0	0	0	0
	Nail	0	0	0	0	0	0
	Neoplasia	3	4	0	0	0	0
	Other	1	1	0	0	0	0
	Total diagnoses	68		1		6	
	Total cases	68	100	1	100	6	100
MUSCULOSKELETAL	Hand/wrist/arm	No case reports from clinical specialists		13	62	4	57
	Elbow			1	5	0	0
	Shoulder			2	10	0	0
	Neck/thoracic spine			0	0	1	14
	Lumbar spine/trunk			4	19	1	14
	Hip/knee			1	5	0	0
	Ankle/foot			0	0	0	0
	Other			0	0	1	14
	Total diagnoses			21		7	
	Total cases			21	100	7	100

CATEGORY	DIAGNOSTIC GROUP	CLINICAL SPECIALISTS		OCCUPATIONAL PHYSICIANS		GENERAL PRACTITIONERS	
		Actual diagnoses	%	Actual diagnoses	%	Actual diagnoses	%
<b>MENTAL ILL-HEALTH</b>	Anxiety/depression	<b>No case reports from clinical specialists</b>		18	45	3	25
	Post-traumatic stress disorder			4	10	0	0
	Other work-related stress			21	53	10	83
	Alcohol or drug abuse			0	0	0	0
	Psychotic episode			0	0	0	0
	Other			2	5	1	8
	Total diagnoses			45		14	
	Total cases			40	100	12	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). Within OPRA there was one case reported of vocal cord dysfunction in a nurse. Within THOR-GP there was one case of poor diabetic control (co-diagnosis of sleep apnoea and insomnia) in a car park attendant, and one case of epilepsy in a baggage handler.

## BECK REPORT

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

It was interesting to see this quarter the effect of changes in EPIDERM reporting working their way through the system. In addition to the causative agent, there is now a box to record the body site, so we can see that the builder with a basal cell carcinoma developed this on the shoulder. We can also highlight the nail technician with allergy to acrylate chemicals who developed a facial dermatitis rather than the hand dermatitis that one might expect. Presumably adequate hand protection but airborne acrylate, perhaps from filing the nail, resulting in the facial rash and emphasising a need for better curing of the acrylic system and improved extraction. There is also a space to record the source, in the case of the nail technician, acrylate in artificial nails. This becomes especially important when it's less easy to predict the source e.g. when rubber accelerators could be in either gloves or shoes, or the preservative methylisothiazolinone could be in hand wash or cutting fluid. This should enable much greater accuracy in future reports and highlight, more specifically, sources of exposure to target with preventative measures.

Although allergy to methylisothiazolinone (MI) seems to be declining following legislative measures in Europe<sup>1</sup>, occupational cases still occur. 4.3% of cases this quarter quoted MI as the cause with the new reporting system confirming soaps and shampoo as the source in a hairdresser. Dermatological interest is moving on to other isothiazolinones, both benzisothiazolinone (BIT) and octylisothiazolinone (OIT) being found in cleaning products and as industrial preservatives. OIT is also found in leather, as an antimicrobial, producing a similar picture to the sofa dermatitis<sup>2</sup> that hit the headlines a few years ago when dimethyl fumarate was used for a similar purpose in leather sofas<sup>3</sup>. BIT was listed as a cause in 7.2% of the cases this quarter exceeding those due to MI. Sources of exposure included oils in 2 car mechanics, cleaning products in a chef, cutting fluid in a metal machinist and during silicone manufacture in the chemical industry. These 2 additional isothiazolinones are now being considered for addition to the list of standard allergens that are routinely tested throughout Europe when investigating patients with contact dermatitis<sup>4</sup>.

Cases reported to THOR-GP this quarter had a distinctly maritime theme. 4 of the 6 cases were sailors (3 in the Royal Navy). In 2, the dermatosis was athletes' foot attributed to occlusive footwear. The EPIDERM team have recently published a summary of non-glove PPE related dermatoses<sup>5</sup> that highlights that of all PPE-related cases, 9.2% were attributable to non-glove PPE. The non-glove PPE-related dermatoses were

diagnosed as: allergic contact dermatitis (47.4%), irritant contact dermatitis (16.0%), friction (11.3%), occlusion (11.3%), unspecified dermatitis (8.8%), acne (3.1%), infections (1.5%), and contact urticaria (0.52%).

Finally, pity the entertainer allergic to copper in their guitar strings! I'd always been a bit sceptical about allergy to copper until I came across a patient allergic to a malachite necklace<sup>6</sup>. Good to have one's biases challenged once in a while.

**Dr Mark Wilkinson (Leeds General Infirmary)**

## DATA REQUEST FEATURE

### Occupational asthma attributed to methyl methacrylate

We provide an ad-hoc data enquiry service for the Health and Safety Executive, participating physicians and other interested parties to request information about WRIH cases reported to THOR.

In this quarterly feature, we present the findings of one such data request: **'Cases of occupational asthma attributed to methyl methacrylate reported to THOR'**.

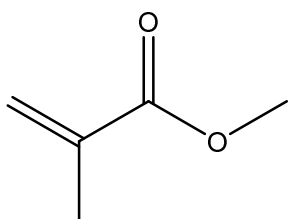
This particular data request originated from colleagues at ANSES (French Agency for Food, Environmental and Occupational Health & Safety). As part of a substance evaluation process under REACH, ANSES is currently gathering evidence for a classification proposal for methyl methacrylate, in particular, regarding its respiratory sensitizing properties. Substance evaluation is a process under REACH Regulation (EC) No.1907/2006 and is a concern driven process, which aims to clarify whether a substance constitutes a risk to human health or the environment<sup>7</sup>.

Methyl methacrylate is an organic compound used in the manufacture of polymethyl methacrylate acrylic (PMMA) plastics; as a co-polymer in methyl methacrylate-butadiene-styrene (MBS); as a modifier for polyvinyl chloride (PVC)<sup>8</sup>. According to the REACH summary evaluation, methyl methacrylate is found in products such as paints, adhesives, sealants, detergents, car care products and also used as a cement for hip and knee replacements.

We identified 24 cases of occupational asthma attributed to methyl methacrylate reported to the THOR network; 23/24 cases reported by chest physicians to SWORD and 1 case reported by occupational physicians to OPRA. The cases were reported most frequently in males (61%) and the age range (all cases) was 43 years. Nearly half of the cases were reported in the health and social care industry sector with a further 38% reported in the manufacturing sector. Other industries reported were education, construction, other service activities and other business activities. Within the healthcare sector, medical and dental technicians were reported most frequently (30%) followed by nurses (17%). Other

reported occupations were chemical process operatives, engineering professionals, teacher, machine setter, metal working machine fitter, painter/decorator, dental assistant, beautician, plastic process operative, vehicle assembler and elementary construction workers.

A toxicological review article published in 2011<sup>9</sup> concluded that '*the weight of evidence, both experimental and observational, argues that MMA is not a respiratory sensitizer*'. However, clinical evidence for sensitisation mechanisms has been described<sup>10</sup> and the evidence from these 24 THOR case reports of occupational asthma would also be in support of methyl methacrylate being a respiratory sensitiser. Fourteen of the 24 cases were coded A1 (sensitisation) and only one case as A2 (irritation), the remainder being unspecified asthma (A0). Furthermore there is evidence that methyl methacrylate has respiratory sensitisation potential using the quantitative structure activity relationship (QSAR) models developed and validated here at COEH (<http://www.coeh.man.ac.uk/asthma/login.php>). Using the model available through this weblink, methyl methacrylate has a hazard index of 0.48 and the more recently published revised version of the model<sup>11</sup> assigns it a hazard index of 1. Hazard indices represent the probability (hence value ranges zero to one) that a given low molecular weight organic compound has the chemical features required to cause asthma by sensitisation.



**Figure 1 Chemical structure of methyl methacrylate (hydrogen atoms omitted)**

A paper published in 2015<sup>12</sup> showed how the data collected by occupational disease surveillance systems such as THOR are an extremely useful source of information, the use of which extends beyond informing government on disease incidence and trends in incidence and includes providing a framework to assist a wide range of enquirers with clinical diagnoses, the identification of suspected causative agents/exposures and highlighting growing risks in particular industrial and occupational sectors; this data request is one example of this use. If you are interested in reading further about the outcome of the substance evaluation then please visit <https://echa.europa.eu/documents/10162/c92faa6c-7134-fc58-5266-5b373cdc9286>



## CASE OF THE QUARTER

Many thanks to Dr Jenny Callander and Dr Glenda Hill, Consultant Dermatologists, for their case of the quarter. We hope you find this of interest.

If you have an unusual case that you would like to write up for inclusion in future quarterly reports then please contact the Project Assistant for your scheme (details in Table 3).

### Case of the Quarter

We present a case of irritant contact dermatitis in a 35 year old dog hydrotherapist. This unusual occupation involves manipulating dogs' limbs underwater to help them recover from injury. Our patient was immersed in 30°C water for up to 9 hours a day with a one hour break. The water was treated 3 times a day with slow release chlorine and cleaned more completely once a week.

Since starting this job two years ago, the patient had experienced an eczematous itchy rash in the delicate axillary skin. This area is prone to irritancy due to occlusion. The rash appeared after approximately one hour in the water and settled over the weekends. She had experienced a similar eruption on her legs when wearing a wetsuit which trapped the water against the skin; this had improved after she changed to wearing looser waders.

The patient had a history of eczema and asthma as a child and has a strong family history of atopy. She was patch tested to the British Standard battery and textiles series. There was an equivocal reaction to nickel which was felt to be irrelevant. She was diagnosed with contact irritant dermatitis on a background atopic diathesis and given advice regarding barrier creams.

## THOR NEWS

### CHANGES TO REPORTING

At the end of 2018 we trialled a number of changes to the EPIDERM and SWORD reporting cards / webforms – the proposed changes are summarised in Table 2.

**Table 2 Summary of proposed changes to the SWORD and EPIDERM cards**

Proposed changes	SWORD	EPIDERM
No need to record total numbers on front of card for each diagnosis	✓	✓
One diagnosis per line	✓	✓
Removal of sub-category for mixed allergic and irritant dermatitis		✓
New sub-category for work-aggravated asthma	✓	
New sub-categories for pneumoconiosis	✓	
New sub-category for rhinitis	✓	

No longer need to record whether the case was seen for medico-legal reasons.		✓
Primary site (e.g. hand) of the diagnosis		✓
Source of exposure (e.g. glove)		✓
Date first exposed	✓	✓
Size of the report card		✓

Commencing January 2019, a number of these changes were implemented into the re-design of the cards / webforms. Therefore, if you are a 'core' reporter you may well be familiar with the new format by now, however if you report on a 'sample' basis (just 1 randomly allocated month per year) you may not have seen the changes yet. Initial inspection of the first few months of reporting has flagged an issue that we would like to bring to your attention concerning the change to having one diagnosis per line. The rationale behind this change is that many of you often report a case that has more than one (occupational) diagnosis with different causal agents, thereby using a separate line for each diagnosis allows us to ensure that we assign the correct agent to the correct diagnosis. Examples of how to correctly and incorrectly complete the card is provided in Figure 2.

**Incorrect** – project assistants are unable to determine which agent relates to which diagnosis

Ref number	Diagnosis (A-J)	Sex	Age	Postcode (first half)	Job	Industry	Suspected agent(s)	Symptom onset date	Date first exposed
123	F1, D	M	54	M4	Builder	Construction	Asbestos, tobacco + dust	2017	2005
123	F1	M	54	M4	Builder	Construction	Asbestos	2017	2005
	D						tobacco, dust	2017	2005

**Correct** – a diagnosis and agent per line

**Figure 2** Example of correct and incorrect card reporting for separate diagnosis per line.

## 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**

SCHEME	email	Phone
EPIDERM	<a href="mailto:Laura.byrne@manchester.ac.uk">Laura.byrne@manchester.ac.uk</a>	0161 275 7103
SWORD	<a href="mailto:Laura.byrne@manchester.ac.uk">Laura.byrne@manchester.ac.uk</a>	0161 275 7103
OPRA	<a href="mailto:Susan.taylor@manchester.ac.uk">Susan.taylor@manchester.ac.uk</a>	0161 275 5531
THOR-GP	<a href="mailto:Susan.taylor@manchester.ac.uk">Susan.taylor@manchester.ac.uk</a>	0161 275 5531
DATA REQUESTS	<a href="mailto:Melanie.carder@manchester.ac.uk">Melanie.carder@manchester.ac.uk</a>	0161 275 5636
GENERAL ENQUIRIES	<a href="mailto:Annemarie.money@manchester.ac.uk">Annemarie.money@manchester.ac.uk</a>	0161 275 8492

<sup>1</sup> Methylisothiazolinone: the epidemic is declining - but not gone. Urwin R, Craig S, Latheef F, Wilkinson M. *Contact Dermatitis*. 2017; 76: 301-302.

<sup>2</sup> Severe allergic contact dermatitis caused by octylisothiazolinone in a leather sofa: two new cases. Raison-Peyron N, Amsler E, Pecquet C, et al. *Contact Dermatitis*. 2017; 77: 176-178.

<sup>3</sup> An epidemic of furniture-related dermatitis: searching for a cause. Lammintausta K, Zimerson E, Hasan T, et al. *Br J Dermatol*. 2010; 162: 108-16.

<sup>4</sup> The European baseline series and recommended additions: 2019. Wilkinson M, Gonçalo M, Aerts O, et al. *Contact Dermatitis*. 2019; 80: 1-4

<sup>5</sup> A review of non-glove personal protective equipment-related occupational dermatoses reported to EPIDERM between 1993 and 2013. Bhoirul B, Lecomwasam K, Wilkinson M, et al. *Contact Dermatitis*. 2019; 80: 217-21

<sup>6</sup> Allergic contact dermatitis caused by copper in a malachite necklace. Horton E, Montgomery R, Wilkinson M. *Contact Dermatitis* 2017; 77: 120-121

<sup>7</sup> <https://echa.europa.eu/documents/10162/c92faa6c-7134-fc58-5266-5b373cdc9286>

<sup>8</sup> [https://en.wikipedia.org/wiki/Methyl\\_methacrylate](https://en.wikipedia.org/wiki/Methyl_methacrylate)

<sup>9</sup> Borak J, Fields C, Andrews LS, Pemberton MA. Methyl methacrylate and respiratory sensitization: a critical review. *Crit Rev Toxicol*. 2011;41(3):230–268. doi:10.3109/10408444.2010.532768

<sup>10</sup> G. I. Walters, A. S. Robertson, V. C. Moore, P. S. Burge, Occupational asthma caused by acrylic compounds from SHIELD surveillance (1989–2014), *Occupational Medicine*, Volume 67, Issue 4, June 2017, Pages 282–289, <https://doi.org/10.1093/occmed/kqx036>

<sup>11</sup> Jarvis J, Seed MJ, Stocks SJ and Agius RM. (2015) A refined QSAR model for prediction of chemical asthma hazard *Occup Med (Lond)* 65 (8): 659-666 Full text link: doi:10.1093/occmed/kqv105

<sup>12</sup> Money A, Carder M, Hussey L, Agius RM. (2015) The utility of information collected by occupational disease monitoring systems. *Occup Med (Lond)* 65 (8): 626-631