The incidence of work-related ill-health as reported to The Health and Occupation Research (THOR) network by physicians in the Republic of Ireland between 2005 and 2019.

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GLOSSARY OF TERMS

EPIDERM - The EPIDERM scheme began in the UK in 1993 and collects reports of cases of occupational skin disease from consultant dermatologists.

EPIDERM-ROI – The EPIDERM-ROI scheme began in 2005 and collects reports of cases of occupational skin disease from consultant dermatologists within the Republic of Ireland.

HSA - The Republic of Ireland Health and Safety Authority.

HSE - The UK Health and Safety Executive.

OPRA – The Occupational Physicians Reporting Activity scheme began in the UK in 1996 and collects reports of work-related disease from occupational physicians employed in the public sector and private sector. OPRA reports are not confined to a particular disease category.

OPRA-ROI - The OPRA-ROI scheme began in 2007 and collects reports of cases of work-related ill-health from occupational physicians within the Republic of Ireland.

SWORD - The Surveillance of Work-related and Occupational Respiratory Disease scheme began in the UK in 1989 and collects reports of cases of occupational respiratory disease from consultant respiratory physicians.

SWORD-ROI - The SWORD-ROI scheme began in 2005 and collects reports of cases of occupational respiratory disease from consultant respiratory physicians within the Republic of Ireland.

THOR - The Health and Occupation Research network which runs several surveillance schemes for work-related disease including EPIDERM, SWORD and OPRA.

THOR-ROI - The Health and Occupation Research network in the Republic of Ireland which includes EPIDERM-ROI, SWORD-ROI, OPRA-ROI and THOR-GP-ROI. THOR-ROI began in 2005.

THOR-GP – The THOR-GP scheme began in the UK in 2005 and enables general practitioners to report cases of work-related ill-health seen in a general practice setting. All THOR-GP reporters have a diploma in occupational medicine.

THOR-GP in the ROI – THOR-GP in the ROI began in 2015 and enables general practitioners with an interest in occupational medicine to report cases of work-related ill-health seen in a general practice setting.

MAIN MESSAGES

- This is the latest annual report summarising results from The Health and Occupation Research network in the Republic of Ireland (THOR-ROI).
- THOR-ROI comprises 4 surveillance schemes collecting data on incident cases of work-related illness (WRI) in the Republic of Ireland (ROI); SWORD-ROI (chest physicians), EPIDERM-ROI (dermatologists), OPRA-ROI (occupational physicians - OPs) and THOR-GP-ROI (general practitioners - GPs).
- At present, 26 occupational physicians, 20 general practitioners, 13 dermatologists and 10 chest physicians participate in THOR-ROI.
- In total, 110 cases were reported in 2019 (OPs: 80, dermatologists: 14, chest physicians: 13, and GPs: 3). Total reported incident case between 2005 and 2019 is 2669 (OPs: 1898, dermatologists: 511, chest physicians: 225, GPs: 35, excluding one historic chest physician report as being domestic hence non-occupational exposure).
- OP case reports (2007-2019) were predominantly mental ill-health (53%) and musculoskeletal (34%) with smaller proportions of skin (9%), respiratory (2%) and 'other' WRI (3%). The majority (76%) of cases were reported in health and social care (mainly nurses) with a significant proportion also reported in transport (bus/train drivers) (12%).
- Dermatologist case reports (2005-2019) were predominantly contact dermatitis (CD) (96%), female (56% of CD cases) with a mean age (all CD cases) of 37 years. Frequently reported industries/occupations were healthcare (nurses), manufacturing (process operatives) and hairdressing and beauty, and agents included rubber, nickel, wet work and preservatives.
- Chest physician case reports (2005-2019) were predominantly asthma (34%), male (84%) with a mean age (all cases) of 57 years. Frequently reported industries/occupations were construction (labourers) and manufacturing, with cement/plaster/masonry dust the most frequently reported agent.
- The 20 GPs participating in THOR-GP-ROI have reported 35 cases since the scheme commenced data collection in 2015; musculoskeletal cases were reported most frequently (15 cases).
- Analysis of trends in incidence rates (based on reports to OPRA-ROI) suggest an overall decrease in incidence of total WRI of approximately 4% per year.

Summary of cases reported to THOR-ROI

Disease group	Reporting physicians	Number of cases		
		2019	**2005[a]-2019**	
Skin	Dermatologists	14	511	19%
	Occupational physicians	2	166	6%
	General practitioners	0	5	<1%
Respiratory	Chest physicians	13	225[b]	8%
	Occupational physicians	1	37	1%
	General practitioners	0	0	
Musculoskeletal	Occupational physicians	31	643	24%
	General practitioners	3	15	1%
Mental ill-health	Occupational physicians	45	1012	38%
	General practitioners	0	8	<1%
Other	Occupational physicians	2	56	2%
	General practitioners	0	7	<1%
Total cases[c]	**All physicians**	**110**	**2669**	

[a] 2007 for occupational physicians; 2015 for general practitioners

[b] one historic domestic (non-occupational) exposure case has been excluded

[c] a case may have been assigned to more than one disease group (for example, musculoskeletal and mental ill-health)

EXECUTIVE SUMMARY

BACKGROUND: Chest physicians, dermatologists, occupational physicians (OPs) and general practitioners (GPs) voluntarily report cases of work-related illness (WRI) to the 4 surveillance schemes which comprise The Health and Occupation Research (THOR) network in the Republic of Ireland (THOR-ROI). This report describes the cases of WRI reported to THOR-ROI in the latest full calendar year (2019) and provides a summary of reporting activity since the commencement of reporting (2005 for dermatologists and chest physicians; 2007 for OPs; 2015 for GPs).

METHODS: Participating physicians were asked to provide anonymised case reports of incident cases seen during their reporting period. Ongoing recruitment of physicians to the schemes is facilitated by the scheme's champions and relevant societies with the ROI. Cases reported to THOR-ROI were analysed by age, sex, occupation/industry, suspected causal agent and symptom onset. Incidence rates and trends in incidence rates were estimated for selected reporter groups/diagnoses, using a 'multi-level' statistical model to investigate the relative incidence of reported cases over time whilst taking into account other factors that might influence the trend (such as the number of physicians reporting and the number of people employed).

RESULTS: The 69 physicians enrolled in THOR-ROI in 2019 (26 OPs, 20 GPs, 13 dermatologists and 10 chest physicians) reported a total of 110 cases (119 diagnoses) during 2019. Of these, 80 cases were reported by OPs to OPRA-ROI, 13 were reported by chest physicians to SWORD-ROI, 14 were reported by dermatologists to EPIDERM-ROI, and 3 cases of WRI were reported by GPs. This brings the total cases ever reported (2005-2019) to 2669 case reports (dermatologists: 511, chest physicians: 225, OPs: 1898, GPs: 35 case reports, with one respiratory case caused

by domestic/non-occupational exposure excluded). Analysis of trends in incidence rates (based on reports to OPRA-ROI) suggest an overall decrease in incidence of total WRI of approximately 4% per year.

CONCLUSION: THOR-ROI continues to provide the best overall source of data relating to medically attributed occupational disease incidence in the ROI, with 2669 cases reported since the inception of the schemes. Results suggest that the incidence of total WRI appears to be declining, although in most recent years this trends appears to be plateauing. With continued funding and increased enrolment and participation in the schemes, and the promotion of THOR in the ROI, case numbers will increase year on year. This would enable further more detailed analyses of data by the various determinants of risk e.g. causal agent, precipitating event (mental ill-health) and task/movement (musculoskeletal).

1 INTRODUCTION

The Health and Occupation Research (THOR) network in the Republic of Ireland (THOR-ROI) currently comprises 4 surveillance schemes enabling different groups of physicians to (voluntarily) report cases of work-related illness (WRI).[1,2] These are SWORD (chest physicians), EPIDERM (dermatologists), OPRA (occupational physicians) and THOR-GP (general practitioners). SWORD and EPIDERM both started data collection in the ROI in 2005, whilst OPRA commenced in 2007. THOR-GP is the newest ROI scheme with data collection commencing in January 2015. The ROI schemes are based on the analogous well-established UK-wide schemes.[3-7]

This report describes the cases of WRI reported to SWORD, EPIDERM, OPRA and THOR-GP in the ROI during the previous calendar year (2019) and since reporting commenced (SWORD and EPIDERM 2005; OPRA 2007; THOR-GP 2015). This builds on previous reports submitted annually to the ROI Health and Safety Authority (HSA) since 2006.[8-20]

2 METHODS

The methodology behind THOR has been described in detail previously. In brief, participating physicians report new cases of work-related disease seen in their clinic. All ROI physicians report via our online web form and either report every month ('core' reporters – EPIDERM; SWORD and OPRA) or for 1 randomly assigned month per year ('sample' reporters – THOR-GP). Reporters are requested to give information on diagnosis, age, sex, geographical location, occupation, industry and suspected agent(s). The occupation and industry are coded using the Standard Occupational Classification (SOC) and the Standard Industrial Classification (SIC), respectively.[21,22] Suspected agents are coded using in-house coding schemes developed in conjunction with the Health and Safety Executive (HSE) in the UK. All coding is undertaken independently by two researchers, and any discrepancies are reconciled by a third person.

Physicians reporting to EPIDERM are requested to assign their case to one or more of the following major sub-groups: contact dermatitis (CD), contact urticaria (CU), folliculitis/acne, infection, mechanical dermatoses, nail disorders, neoplasia, and "other dermatoses" (with the ability to specify the diagnosis if the latter is chosen). Similarly, the sub-groups for chest physician reporting to SWORD are occupational asthma, inhalation accidents, allergic alveolitis, bronchitis/emphysema, infectious disease, non-malignant pleural disease (NMPD), mesothelioma, lung cancer, pneumoconiosis, and "other respiratory disease". Physicians reporting to OPRA and THOR-GP (who can return case details for all causes of occupational ill-health) record the diagnosis which is subsequently coded using the International Classification of

Disease 10th Revision (ICD-10) [23] so that comparisons can be made between reporting schemes.

Cases of occupational disease reported to EPIDERM, SWORD and OPRA by physicians in the Republic of Ireland (ROI) from 2005 to 2019 have been extracted from the databases and analysed using the statistical package SPSS V25.0.

Annual average incidence rates (per 100,000 employed) of dermatologist and chest physician reported WRI were estimated based on a previously published methodology.[23] In brief, numerators were adjusted for participation (the proportion of physicians participating in THOR-ROI) and response (the proportion of participants actively responding by either returning cases or declaring 'I have nothing to report this month') whilst the denominator was the total number of persons employed from 2005-2019 obtained from the ROI National Household Survey.[24] Both 'unadjusted' (no adjustment for participation and response) and 'adjusted' (adjustment for participation and response) rates are presented. Incidence rates were calculated for total work-related skin disease, CD, total work-related respiratory disease, asthma, and asbestos related diseases. The numbers of actual case reports in other diagnostic sub-groups were deemed too low to accurately determine meaningful incidence rates. Incidence rates based on OP data were not calculated because it was not possible to accurately determine the population covered by OPs (access to an OP within the ROI is biased towards the public sector and larger employers). Trends in incidence (total, mental ill-health, musculoskeletal and skin) were investigated based on reports to OPRA. The number of cases reported to other schemes and for other diagnoses was not sufficient to permit meaningful analysis. The STATA software command xtnbreg was used to fit longitudinal, negative binomial (i.e. over-dispersed) Poisson models with random

effects.[25] In these models, the dependent variable was the number of actual cases, including zeros, per reporter per month; the main 'covariate' is calendar time. The aim of the analysis is to estimate the relationship between annual ROI incidence rate and time, after adjusting for potential confounders. Numbers of cases might vary from year to year solely because of changes in the size of the ROI working population, even though the rate is constant. Therefore estimated population sizes for each year were included in the model as an 'offset'; this feature means that the model estimates change in rates, not changes in case counts. Apart from 'calendar time', the other variables included in the regression models as covariates were 'season' and 'first month as a new reporter' as these are factors that can influence the reported incidence levels.

Changes in incidence were estimated in two different ways:

1) 'non-parametric' approach: the model contained separate indicator variables for different years. In the current analyses, 2019 was taken as the reference year and the percentage increase or decrease in incidence compared to 2019 was estimated. These analyses had no in-built assumptions about the pattern of change over time.

2) 'parametric' approach with a continuous time variable measured on a scale of years. The statistical models for these analyses assumed that the percentage change from one year to the next is a constant throughout the relevant period.

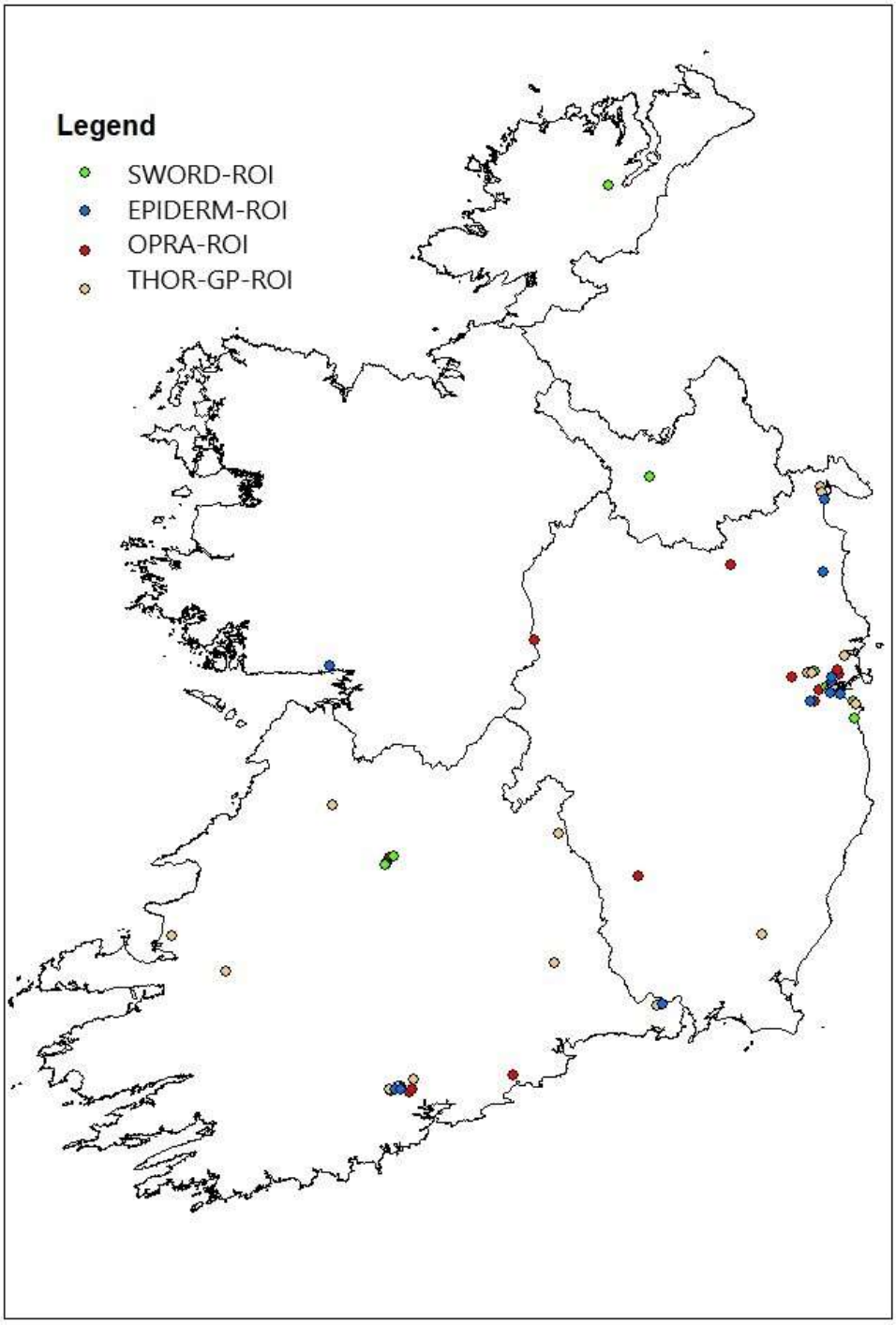
Ethics Committee approval has been given for THOR in the Republic of Ireland by the Public Health Research Ethics Committee of The Royal College of Physicians of Ireland and the Irish College of General Practitioners.

3 RESULTS

3.1 PARTICIPATION

A total of 26 OPs, 20 GPs, 13 dermatologists and 10 chest physicians were enrolled in THOR-ROI in 2019 (Figure 1). Of the 13 dermatologists, 4 (31%) actively participated in 2019 (i.e. returned a web form at least once either containing cases or declaring 'I have nothing to report this month'). 9 dermatologists have been actively participating (submitted at least once either a case or a nil return declaring 'I have nothing to report this month') during 2005-2019. Of the 10 chest physicians, 2 (20%) actively reported in 2019. 7 chest physicians have been actively participating during 2005-2019. Of the 26 OPs enrolled in OPRA-ROI, 9 (35%) actively participated in 2019. 21 OPs have been actively participating during 2007-2019. Of the 20 GPs enrolled in THOR-GP-ROI in 2019, 5 (20%) actively participated in 2019. 14 GPs have been actively participating during 2015-2019.

Figure 1 Location of THOR-ROI reporters



3.2 OVERVIEW OF 2019 CASE REPORTS

A total of 111 cases were reported to THOR-ROI in 2019 (Table 1). These comprised 81 cases reported by OPs to OPRA-ROI, 13 respiratory cases reported by chest physicians to SWORD-ROI, 14 skin cases reported by dermatologists to EPIDERM-ROI, and 3 cases reported by general practitioners to THOR-GP-ROI.

All 14 of the cases reported to EPIDERM-ROI had a diagnosis of CD (10 diagnosed as allergic and 4 as irritant). The cases were reported in

- Other service activities (4 cases): beautician (3) and hairdresser (1)
- Health and social care (3 cases): therapists (2), and lab technicians (1)
- Manufacturing (4 cases): process operatives (1), goods handling (1), motor mechanics (1), and printer (1)
- Accommodation and food service activities (1 case): cleaner (1)
- Administrative and support service activities (1 case): gardener (1)
- Farming (1 case), farmer

26 agents were associated with the 14 cases reported; these were, plants (cited 5 times), rubber chemicals and materials (5 times), perfumes/fragrance (3 times) metals (3 times), acrylics and acrylates (twice), protective clothing and equipment (twice), preservatives (twice), and the following all cited once: cleaning and sterilizing agents, wet work, cement and plaster and petroleum oils.

Table 1 Number of cases / diagnoses reported to SWORD-ROI, EPIDERM-ROI, OPRA-ROI and THOR-GP-ROI, 2019

	Diagnosis	SWORD-ROI	EPIDERM-ROI	OPRA-ROI	THOR-GP-ROI[a]
Skin disease	Contact dermatitis	/	14	2	0
	Urticaria	/	0	0	0
	Other skin	/	0	0	0
	Total skin diagnoses	/	14	2	0
	Total skin cases	/	14	2	0
Respiratory disease	Asthma	4	/	0	0
	Inhalation accidents	0	/	1	0
	Non-malignant pleural disease	5	/	0	0
	Lung cancer	1	/		
	Pneumoconiosis	1	/	0	0
	Other respiratory disease	2	/	0	0
	Total respiratory diagnoses	13	/	1	0
	Total respiratory cases	13	/	1	0
Mental ill-health	Anxiety and depression	/	/	12	0
	Adjustment disorder	/	/	1	0
	Other work stress	/	/	31	0
	Other mental ill-health	/	/	7	0
	Total mental diagnoses	/	/	51	0
	Total mental cases[b]	/	/	45	0
Musculoskeletal disorders	Upper limb	/	/	14	2
	Spine/back	/	/	15	1
	Lower limb	/	/	4	0
	Other musculoskeletal	/	/	2	0
	Total musculoskeletal diagnoses	/	/	35	3
	Total musculoskeletal cases[b]	/	/	31	3
Other work-related illness	Total other diagnosis	/	/	2	0
	Total other cases			2	
	Total diagnoses	**13**	**14**	**91**	**3**
	Total cases[b]	**13**	**14**	**80**	**3**

[a] NB GPs report on a 'sample' basis for only 1 randomly assigned month per calendar year
[b] a case may have been assigned to more than one disease group (for example, musculoskeletal and mental ill-health)

The 13 cases (13 diagnoses) reported to SWORD-ROI included the following:

- 4 cases of occupational asthma: (3 due to sensitisation, 1 due to irritation),
- 5 cases of non-malignant pleural disease (predominantly plaques), 1 with a co-diagnosis of pleural effusion,
- 1 case of inhalation accidents,
- 1 cases of pneumoconiosis,
- 1 case of lung cancer,
- 1 'other' respiratory disease (diagnosed as organic dust toxic syndrome)

The most frequently reported industry sectors for the 13 cases were construction (62%) followed by manufacturing of food and chemical and pharmaceutical products (15%), and agriculture (15%). Other industry sectors reported include, administrative and support service activities (8%). The most frequently reported occupations were labourers in building and woodworking trades (54%). The following 13 agents were associated with the 13 cases of work-related respiratory disease; asbestos (cited 7 times), and each of the following cited once – soaps and detergents, synthetic coolants, silica, flour, food, and epoxy resins.

The 80 cases (91 diagnoses) reported to OPRA-ROI in 2019 were predominantly cases of mental ill-health (56%) followed by musculoskeletal (38%), with smaller proportions of skin (2%), 'other' WRI (2%) and respiratory (1%). The most frequently reported sector for the 45 mental ill-health cases was health and social care (91%) with frequently reported occupations within this industry sector being nurses (24%), nursing auxiliaries (22%), and clerical officers (11%). The types of events reported as associated with these cases included factors intrinsic to the work (25%, including

workload/demand, organisational factors, work schedule), traumatic events (25%, including violence at work / verbal abuse / sexual assault), and interpersonal relationships (23%, including difficulties with co-workers/ patients / clients etc., and bullying / sexual harassment). In terms of the 31 musculoskeletal ill-health reported to OPRA-ROI, upper limb and spine / neck / back problems were reported most frequently (40% and 43%), followed by lower limb disorders (11%) and other musculoskeletal problems (6%). All of these 2019 cases are from the health and social care sector (100%) and the nurse occupation (42%) with frequently reported tasks/movements including accidents (41%), manual handling (28%), heavy lifting/ carrying/ pushing/ pulling (22%) and keyboard work (6%).

Two skin cases were reported by OPs in 2019 to OPRA-ROI, all diagnosed as CD. Both cases were from the health and social care sector (one cook and one student nurse). The agents associated with the CD cases were cited as gloves and wet work.

The 1 respiratory case was reported as inhalation accident in a clerical officer in the healthcare sector attributed to cleaning agent.

There were 2 further cases of 'other' WRI reported in 2019, 1 case diagnosed as influenza in a nurse working in healthcare sector and another was a nursing assistant caused by assaults at work, which was also assigned as a mental health case as anxiety followed the event.

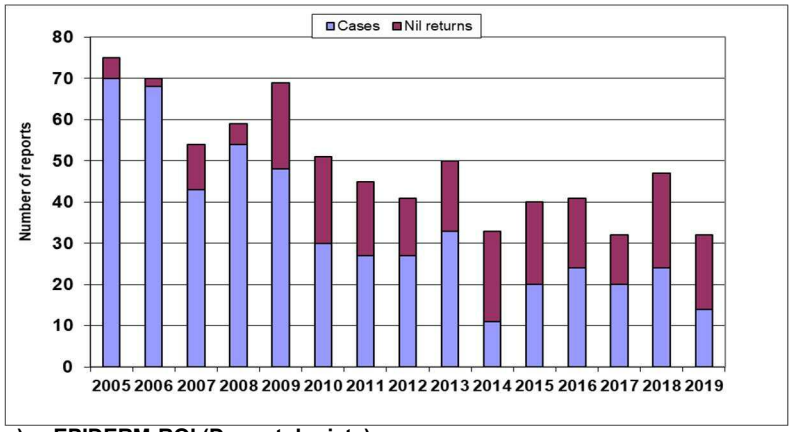
General practitioners reported 3 cases of WRI in 2019. All 3 cases were reported under the musculoskeletal category and specified as wrist pain (2) in a biomedical

scientist attributed to holding tools and in a barman attributed to materials handling, as well as lower back pain (1) in a retail assistant attributed to materials handling.

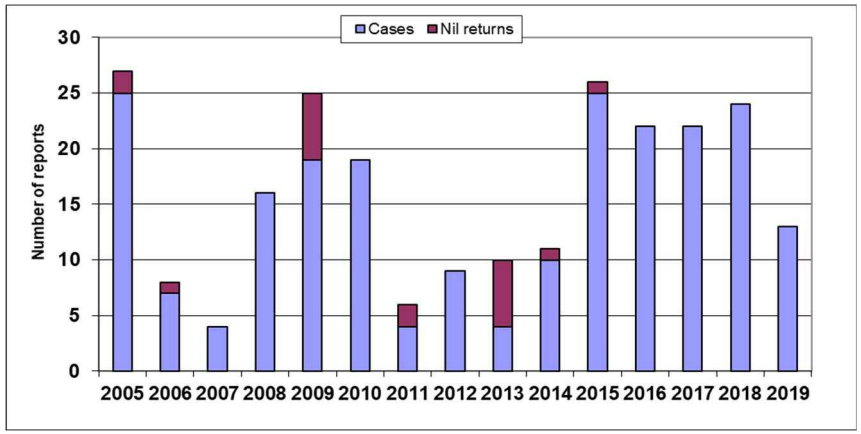
3.3 INCIDENCE RATES AND TRENDS IN INCIDENCE RATES

The number of reports received for EPIDERM-ROI, SWORD-ROI, OPRA-ROI and THOR-GP-ROI by year is shown in Figure 2 whilst Figure 3 shows the cases per active reporter per year.

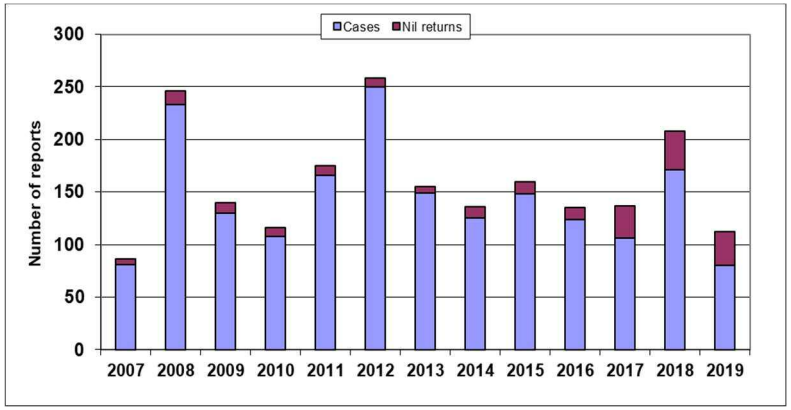
Figure 2 Reports (cases and nil returns) in a) EPIDERM-ROI (2005-2019) b) SWORD-ROI (2005-2019) c) OPRA-ROI (2007-2019) and d) THOR-GP-ROI (2015-2019)



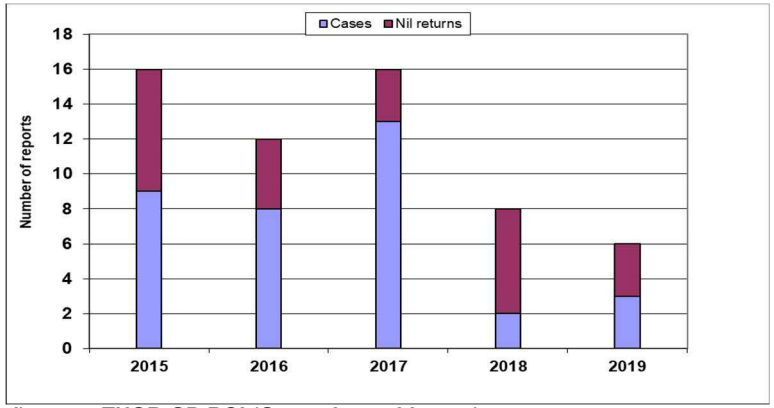
a) EPIDERM-ROI (Dermatologists)



b) SWORD-ROI (Chest physicians)



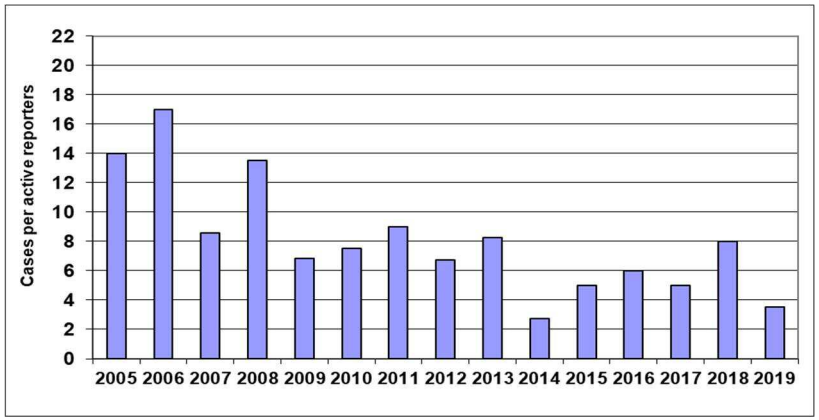
c) OPRA-ROI (Occupational physicians)



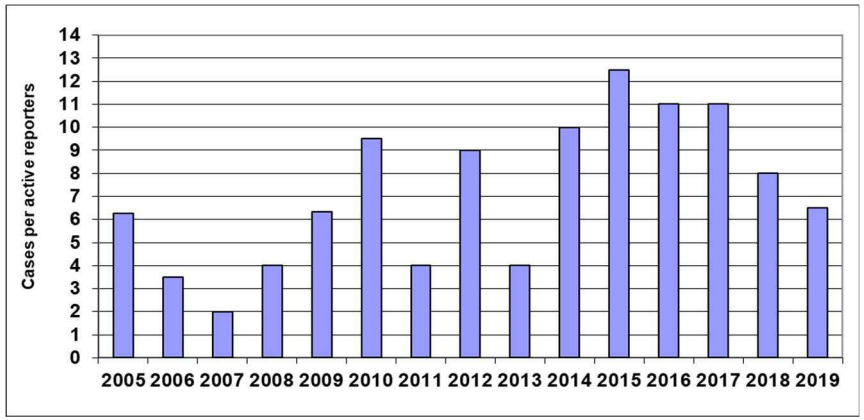
d) THOR-GP-ROI (General practitioners)

NOTE: Scale differences

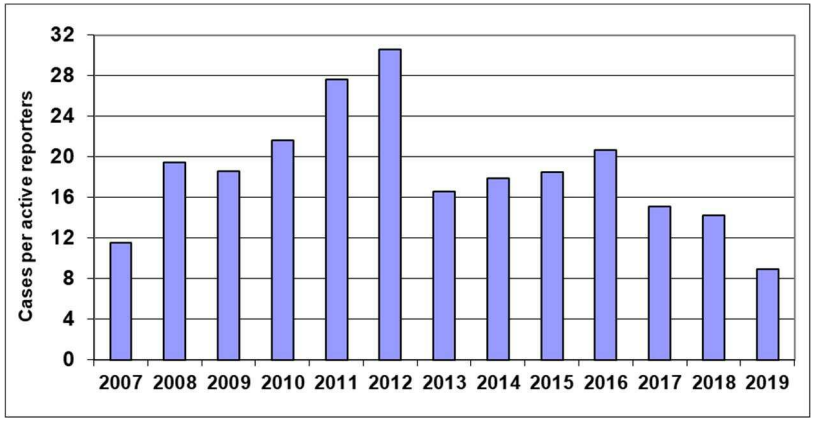
Figure 3 Cases per active reporter* in a) EPIDERM-ROI (2005-2019) b) SWORD-ROI (2005-2019) c) OPRA-ROI (2007-2019) and d) THOR-GP-ROI (2015-2019)



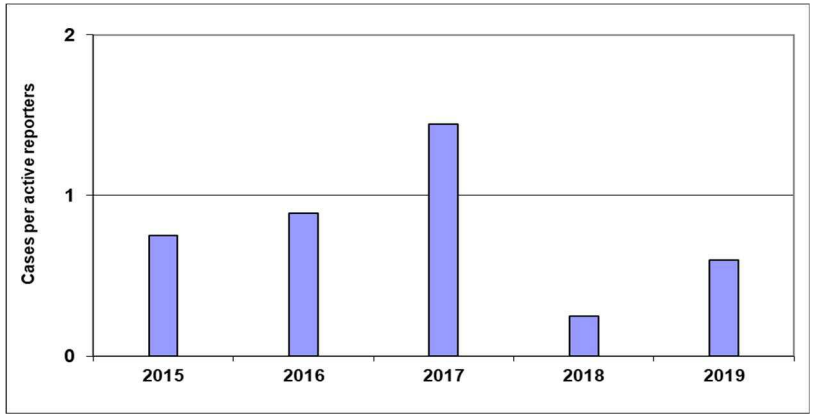
a) EPIDERM-ROI (Dermatologists)



b) SWORD-ROI (Chest physicians)



c) OPRA-ROI (Occupational physicians)



d) THOR-GP-ROI (General practitioners)

*An active reporter is defined as someone who returns a case report or responds 'I have nothing to report' in a calendar year.
** The number of cases per active reporters can be less than one when the number of active reporters, that is reporters who reported cases or nil returns ('I have nothing to report' responses), is greater than the number of cases.
NOTE: Scale differences

The annual average incidence rate for dermatologist reported skin disease in the ROI was 1.7 per 100,000 employed, per year (Table 2). After adjusting for 'non-participation' and 'non-response', this increased to an estimate of 16.2 per 100,000 employed.

For chest physicians in the ROI, the annual average incidence rate of total respiratory disease was 0.8 per 100,000 employed per year, rising to 20.1 per 100,000 employed, per year, after adjusting for 'non-participation' and 'non-response'.

Analyses of trends in incidence rates based on OP reports to OPRA-ROI suggest an (overall) statistically significant decrease in incidence for total WRI, mental ill-health, musculoskeletal disease, and skin disease (Table 3). The graphs showing relative rates by year (Figure 4) suggest that there may not be a linearly declining trend in the incidence of work-related disease over time and that the incidence in total work-related disease appears to be stable during the last number of years.

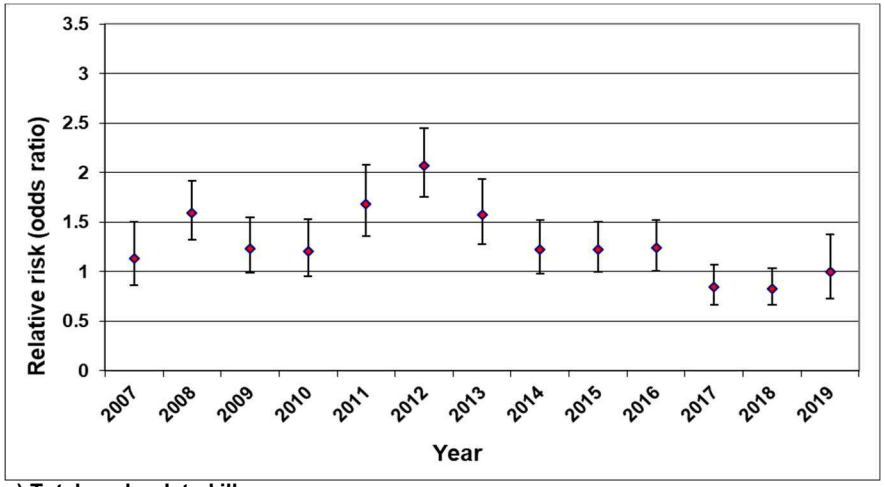
Table 2 Annual average 'crude' and 'adjusted' incidence rates per 100,000 persons employed of work-related skin and respiratory disease reported by dermatologists and chest physicians to SWORD and EPIDERM in the Republic of Ireland (2005-2019)

	Annual, average incidence rate per 100,000 employed	
	'Crude'	**'Adjusted'**
Respiratory (chest physicians)		
All	0.8	20.7
Asthma	0.3	6.6
Asbestos related	0.2	7.0
Skin (dermatologists)		
All	1.7	16.2
Contact dermatitis	1.6	15.7

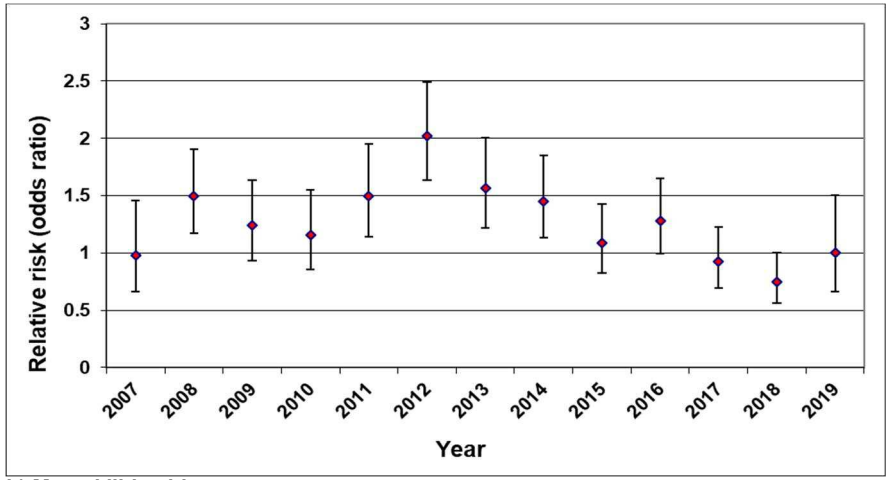
Table 3 Average annual percentage change in reported incidence in work-related illness as reported by occupational physicians to OPRA, 2007-2019

	ESTIMATED % CHANGE (95% CONFIDENCE INTERVAL)
Total work-related illness	-4.0 (-5.7, -2.3)
Mental ill-health	-3.5 (-5.7, -1.3)
Musculoskeletal	-5.1 (-7.9, -2.3)
Skin	-5.6 (-10.2, -0.8)

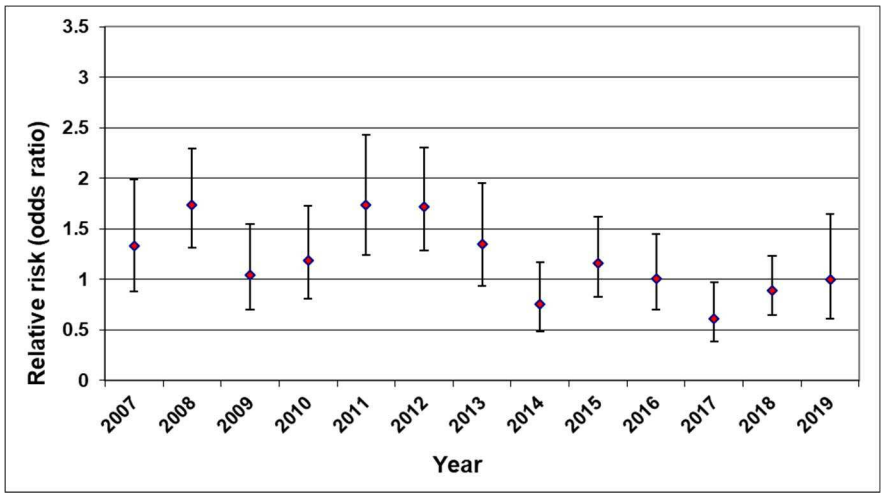
Figure 4 Relative risk by year (2019 estimate = 1), with 95% comparison intervals



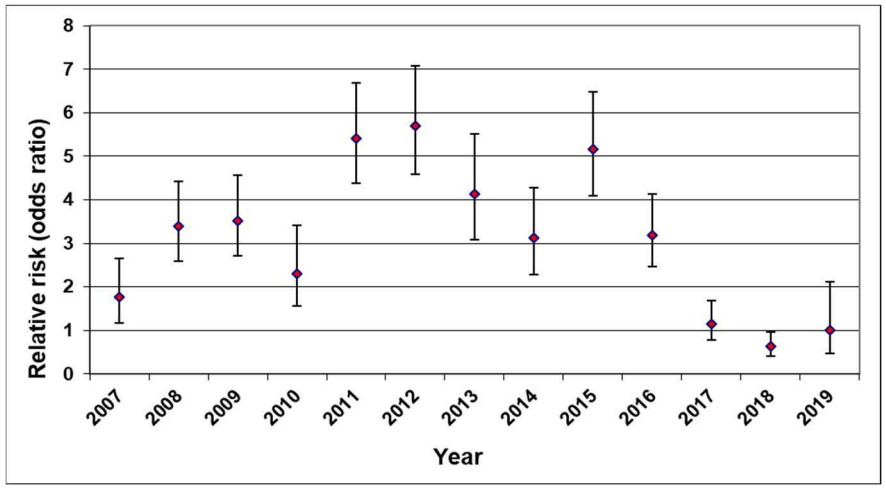
a) Total work-related illness



b) Mental ill-health



c) Musculoskeletal



d) Skin (note scale change)

3.4 OCCUPATIONAL SKIN SURVEILLANCE (EPIDERM): 2005-2019

3.4.1 DIAGNOSES

In total 511 case reports were reported by dermatologists to EPIDERM-ROI between January 2005 and December 2019. These 511 case reports produced 502 diagnoses; 13 cases were not assigned a diagnosis (however information on occupation, industry and suspected agent was provided). The most frequently reported skin diagnosis in the ROI was CD (98%) (Table 4).

Table 4 Number and type of diagnoses reported by dermatologists to EPIDERM-ROI (2005-2019)

	Number (%)
Contact Dermatitis	492 (98%)
• **Allergic**	• 278 (57%)
• **Irritant**	• 172 (35%)
• **Mixed**	• 41 (8%)
• **Unclear**	• 1 (<1%)
Contact urticaria	5 (1%)
Folliculitis/acne	0
Infective	1 (<1%)
Mechanical	0
Nail	3 (1%)
Neoplasia	0
Other dermatoses	1 (<1%)
Total cases	**511**
Total diagnoses	**502* (100%)**

*13 cases were not assigned a diagnosis. However, information on occupation, industry and suspected agent was provided

3.4.2 AGE AND SEX

Overall (2005-2019) cases of CD in the ROI were most frequently reported in the 25-34 year age group for both males and females (Figure 5). More cases with reported

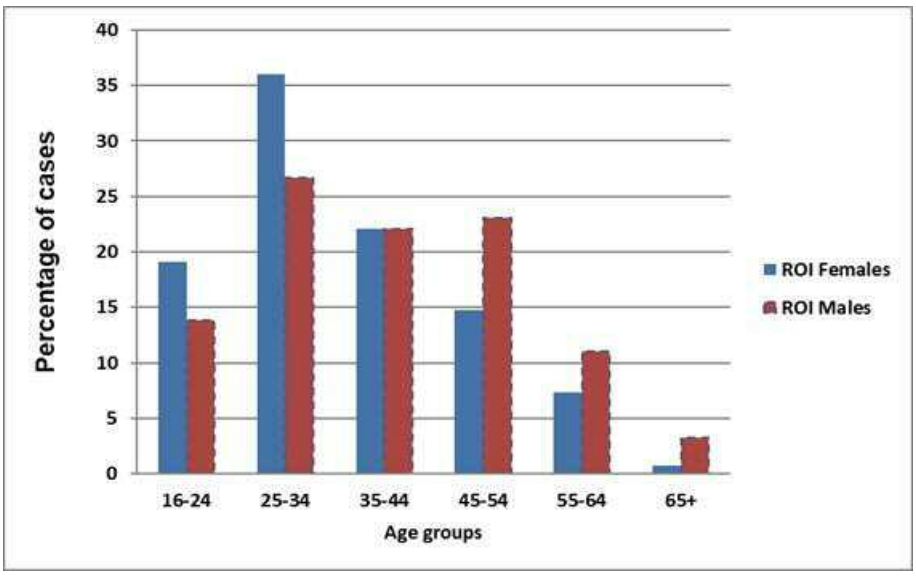
CD were females (55%), and females were younger than males (mean age; females 35 years, males 40 years) (Table 5).

Table 5 Age and sex of contact dermatitis diagnoses in EPIDERM-ROI (2005-2019)

DIAGNOSIS	MALES	FEMALES	ALL
Allergic CD			
Number of diagnoses (%)	138 (49.6%)	140 (50.4%)	278 (100%)
Mean age (years)	41	36	38
Age range (years)	15-81	17-64	15-81
Irritant CD			
Number of diagnoses (%)	64 (37.2%)	107 (62.2%)	172 (100%)*
Mean age (years)	37	33	34
Age range (years)	16-62	19-77	16-77
Mixed CD			
Number of diagnoses (%)	16 (38.1%)	26 (61.9%)	42 (100%)**
Mean age (years)	39	40	40
Age range (years)	19-54	17-65	17-65
All CD			
Number of diagnoses (%)	218 (44.3%)	273 (55.5%)	492 (100%)
Mean age (years)	40	35	37
Age range (years)	15-81	17-77	15-81

*1 diagnosis had no sex assigned. **Including one case that is unclear which type of CD it is

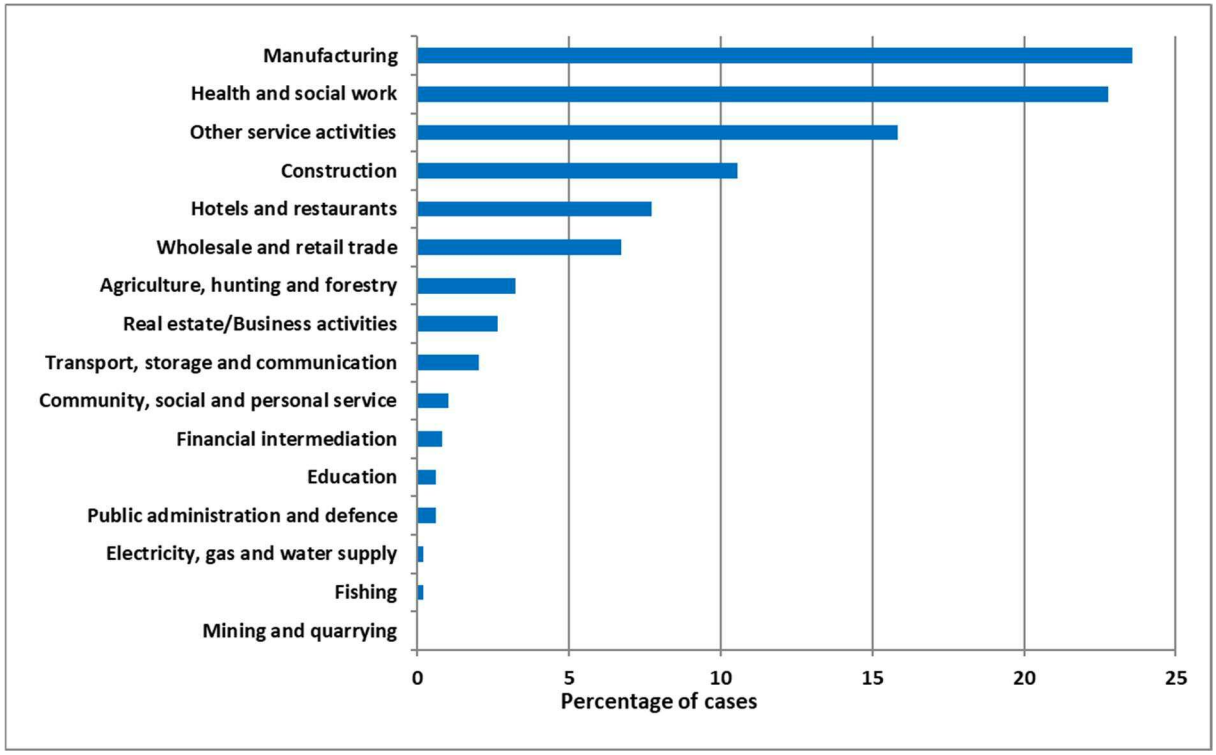
Figure 5 Proportion of cases of contact dermatitis reported to EPIDERM-ROI by age group and sex (2005-2019)



3.4.3 INDUSTRY AND OCCUPATION

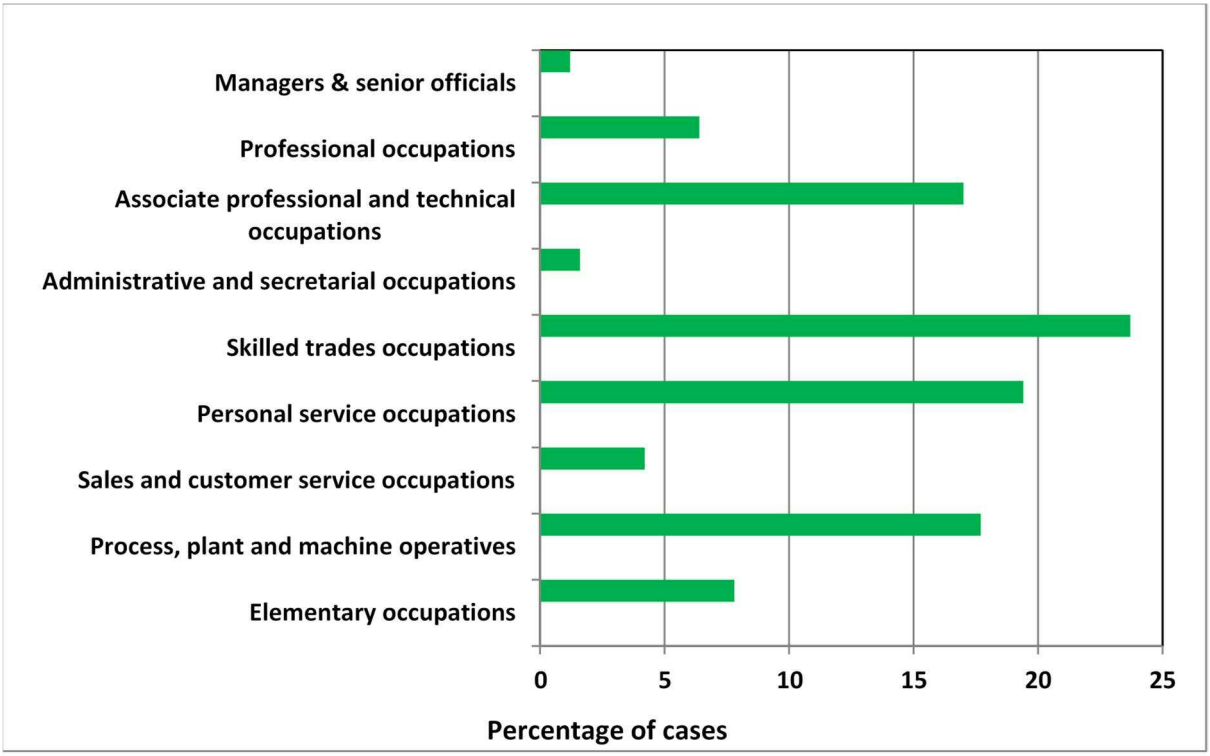
The most frequently reported industrial sector for cases of CD reported to ROI was manufacturing followed by health and social care and 'other service activities', which includes hairdressing and other beauty treatments (Figure 6).

Figure 6 Proportion of cases of contact dermatitis reported to EPIDERM-ROI by Standard Industrial Classification (SIC), 2005-2019



The most frequently reported occupations for cases of CD reported to EPIDERM-ROI were nurses (11.4% of the 492 CD cases) which fall under SOC group 3 'Associate professional and technical occupations' (Figure 7), chemical and related process operatives (7.7%) which fall under SOC group 8 'Process, plant and machine operatives' and hairdressers (7.3%) which fall under SOC group 6 'Personal service occupations'. Of the 10 non-CD cases reported to EPIDERM-ROI, 5 cases of contact urticaria were reported in a nurse, a cleaner, a carpenter, a dental student and a chef, 3 cases of nail disorder (1 with a co-diagnosis of oncholysis of finger nails) was reported in a beautician (2 cases) and a nail technician, and 1 case of (unspecified) infective disease was reported in an agricultural student.

Figure 7 Proportion of cases of contact dermatitis reported to EPIDERM-ROI by Standard Occupational Classification (SOC), 2005-2019



3.4.4 SUSPECTED AGENTS

Up to 6 suspected agents may be cited for each case report, and the agents most frequently associated with CD are shown in Table 6. The most frequently reported agents for the ROI were rubber chemicals and materials, wet work, nickel and preservatives.

For allergic contact dermatitis (ACD) rubber chemicals and materials were the agent most often associated with case reports in the ROI, in irritant contact dermatitis (ICD) the agent was wet work, while for mixed contact dermatitis, nickel was most frequently reported.

Table 6 Most frequently reported agents* for contact dermatitis, reported by dermatologists to EPIDERM-ROI (2005-2019) – number of cases and (percentage of total cases)

	Number	(%)
Rubber chemicals & materials	117	24
Wet work	71	14
Nickel & its compounds	66	13
Preservatives	57	12
Chromium & its compounds	45	9
Acrylics & acrylates	43	9
Cobalt & its compounds	28	6
PPE	27	6
Plants	25	5
Hairdressing chemicals	24	5
Resins	23	6
PPD	21	4
Perfumes/fragrance	18	4
Soaps & detergents	17	4
Drugs & medicaments	16	3
Food, additives and flavourings	16	3
Number of cases	**492**	

*Each case can have more than one reported agent. Therefore the percentage of cases with each agent may equal more than 100

The suspected agents associated with the 5 cases of contact urticaria reported to EPIDERM-ROI were fish, latex, cobalt chloride, nickel sulphate and wood shavings. The (unspecified) infective case was associated with 'coming into contact with infected animals' and the 3 nail cases attributed to methacrylate nail series, and nickel, plants and acrylics and acrylates.

3.5 SURVEILLANCE OF WORK-RELATED AND OCCUPATIONAL RESPIRATORY DISEASE (SWORD): 2005-2019

3.5.1 DIAGNOSES

The addition of the 13 cases reported in 2019 brings the total cases reported by chest physicians to SWORD-ROI (2005-2019) to 225 (1 domestic/non-occupational exposure case has been excluded). These produced 257 diagnoses, with 6 cases not being assigned a diagnosis (involving a labourer exposed to silica, a dentist exposed to adhesive/bonding agents, a machine operator exposed to urea formaldehyde, a labourer exposed to acid anhydrides, and a labourer and a tunnel worker - both exposed to asbestos). Diagnoses of asthma comprised the largest proportion of cases (34%) and the most of all diagnoses (30%) reported to SWORD-ROI (Table 7).

Table 7 Number and type of diagnoses reported by chest physicians to SWORD (2005-2019) in the Republic of Ireland

	Number	(%)
Asthma	77	30%
Inhalation accidents	17	7%
Allergic alveolitis	5	2%
Bronchitis/ emphysema	26	10%
Infectious disease	1	0%
Non-malignant pleural disease	53	21%
Mesothelioma	9	4%
Lung cancer	9	4%
Pneumoconiosis	41	16%
Other respiratory	19	7%
Total cases	**225**	
Total diagnoses	**257***	**100%**

***6 cases were not assigned to a diagnosis. However, information on occupation, industry and suspected agent was provided.

3.5.2 AGE AND SEX

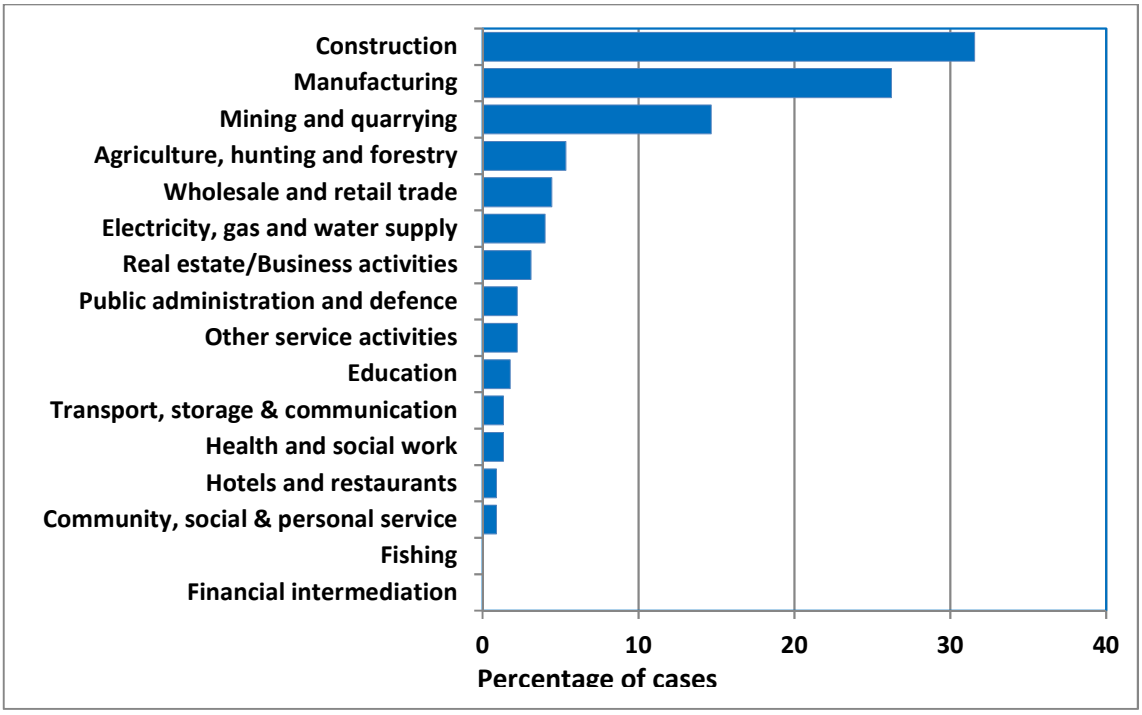
Case reports to SWORD-ROI were predominantly male (84%), with a mean age (male plus female combined) of 57 years (age range 19 - 87 years). Of these, 34 of the case reports were in the 75+ age group (all males), with 41 diagnoses: 22 non-malignant pleural disease, 8 pneumoconiosis, 3 asthma, 3 lung cancer, 2 mesothelioma, 1 bronchitis/emphysema and 2 'other' (diagnosed as asthma overlap syndrome and pleural effusion). The majority of these cases (27 out of 34) were attributed to asbestos exposure, with the remaining attributed to silica (4 cases), coal dust (2 cases) and animals.

Of all asthma cases reported 69% were males with a mean age (male plus female combined) of 46 years (age range 19 - 79 years).

3.5.3 INDUSTRY AND OCCUPATION

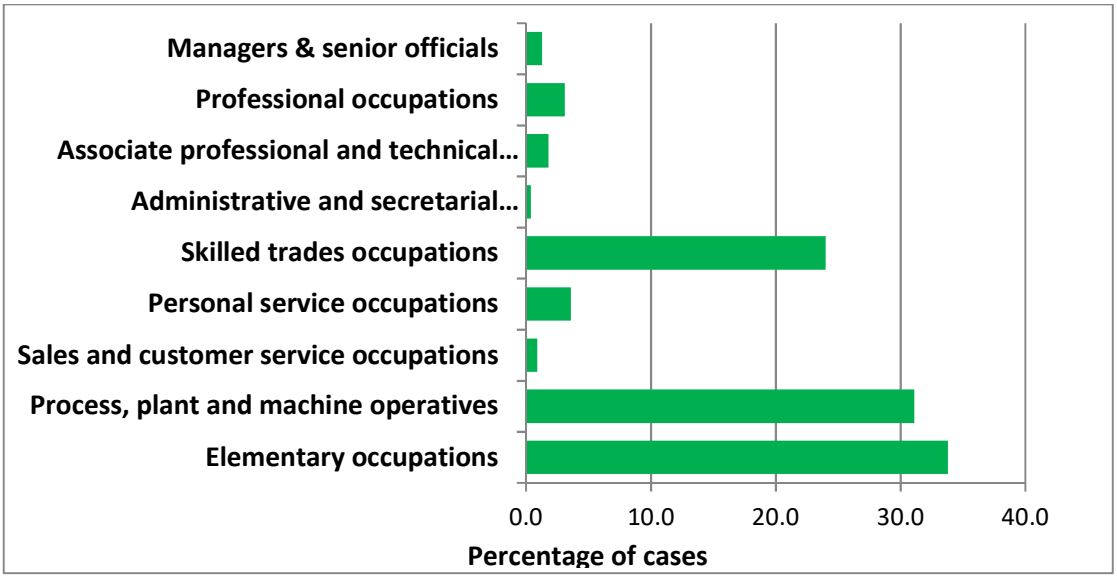
Cases of work-related respiratory disease were most frequently reported in the construction and manufacturing sectors (Figure 8). Within the manufacturing sector, cases in ROI were most frequently reported in the manufacture of food products and other non-metallic mineral products (for example, cement).

Figure 8 Proportion of cases of respiratory disease reported to SWORD-ROI by Standard Industrial Classification (SIC), 2005-2019



The most frequently reported occupations for cases reported in the ROI were labouring in building and woodworking trades (which fall under the major category of elementary occupations) and coal mine operatives (which fall under the major category of process, plant and machine operatives) (Figure 9).

Figure 9 Proportion of cases of respiratory disease reported to SWORD-ROI by Standard Occupational Classification (SOC), 2005-2019



3.5.4 SUSPECTED AGENTS

The agents associated with the respiratory diagnoses reported to SWORD-ROI are shown in Table 8. A total of 113 agents were associated with the 77 diagnoses of occupational asthma, with cement, fumes/gases, glues and adhesives and hypochlorites being the most frequently reported.

Asbestos and silica and were the most frequently reported agents (cited 13 and 12 times respectively) for cases of pneumoconiosis reported in the ROI. In total, 76 diagnoses were reported as being associated with asbestos; 53 of non-malignant pleural disease, 13 of pneumoconiosis, 9 of mesothelioma, 9 of lung cancer, 1 of bronchitis/emphysema,1 of asthma, and 1 of “other”.

Table 8 Suspected agents associated with cases of work-related respiratory disease most frequently reported to SWORD-ROI, (2005-2019)

DIAGNOSIS	SUSPECTED AGENTS (as recorded by the physician)
Asthma	Cement, plaster & masonry (8 cases), Fumes/gases (7 cases), Glues and adhesives, Hypochlorites, Exposure to dust/fumes, Wood/wood dust, Coal, Other creatures, Hairdressing products, Ammonia, Other gases and Toluene diisocyanate/TDI, Dyes and pigments, Inks, Soaps and detergents, Smoke, Oil/diesel fuel, Other ethers, Acetic acid, Zinc, Drugs & medicaments, Food, Fungi/moulds/yeast, Other biological substances, Epoxy resins and Other polymers
Inhalation accidents	Cleaning materials (2 cases), Sterilising agents & disinfectants (2 cases), Ammonia, and Other gases
Allergic alveolitis	Dusts, Pathogens & micro-organisms, Other veg, fungal agents & pollen, Food and Fungi/moulds/yeast
Bronchitis/emphysema	Coal (14 cases), Cement, plaster & masonry (11 cases), Exposure to dust/fumes, Fumes/gases, Wood/wood dusts, Smoking, Oils, Fungi/moulds/yeast
Infectious disease	Toxoplasma
Benign pleural disease	Asbestos

Mesothelioma	Asbestos
Lung cancer	Asbestos
Pneumoconiosis	Asbestos (13 cases), Silica (12 cases), Coal, Cement, plaster & masonry, Exposure to dust/fumes, Fumes/gases, Other metals, Oils, Other silicates
Other respiratory	7 cases reported as rhinosinusitis / sinusitis (urea/formaldehyde/ammonia, mix of damp fungi, wood dust, aspartame, oil mist), 2 diagnoses of rhinitis (Toluene di-isocyanate, and 'multiple possible agents'), and 1 diagnosis each of rhinorrhoea (a specified histamine H2-receptor antagonist), hyposmia (exhaust fumes), hard metal lung disease (tungsten) and sick building syndrome (agent not cited), emphysema/focal bronchiectasis (coal and blast fumes), bronchiolitis obliterans organising pneumonia, BOOP (mixed brick dust, cement dust, fungi, styrene beads and glues), nasopharyngeal malignancy (wood dust / varnishes), asthma overlap syndrome (coal dust / fungal antigen), pleural effusion (asbestos) and organic dust toxic syndrome (mushrooms)

3.6 OCCUPATIONAL PHYSICIANS REPORTING ACTIVITY (OPRA): 2007-2019

3.6.1 DIAGNOSES

A total of 1898 case reports (2042 diagnoses) were reported to OPRA-ROI between January 2007 and December 2019. A breakdown of the cases by major diagnostic group is provided in Table 9. The largest proportion of cases was for mental ill-health, followed by musculoskeletal disorders, with smaller proportions of skin and respiratory diagnoses.

Other work stress was the most frequently reported mental ill-health diagnosis reported to OPRA-ROI (58% of the 1117 diagnoses) whilst the most frequently reported musculoskeletal disorder was spine / neck / back disorders (55% of the 663 diagnoses). Diagnoses reported under 'other mental ill-health' included adjustment disorder, burnout, fatigue, overload, traumatic event, social phobia and mixed affective disorder; whilst 'other' musculoskeletal diagnoses were primarily injuries.

CD was the most frequently reported skin diagnosis to OPRA-ROI (86% of the 167 diagnoses) and 'other' respiratory disease was the most frequently reported respiratory diagnosis (38% of the 39 diagnoses). These diagnoses included sinusitis (5 diagnoses), tuberculosis (2 diagnoses), smoke inhalation, 'upper respiratory tract irritation', reactive airways / bronchial hyper-reactivity, persistent / dry cough and respiratory rhinitis.

Table 9 Number and type of cases / diagnoses reported by occupational physicians to OPRA-ROI (2007-2019)

	Number	(%)
Skin	**167**	**8.2**
• **Contact dermatitis**	144	86
• **Other dermatoses**	23	14
Respiratory	**39**	**1.9**
• **Asthma**	12	31
• **Inhalation accidents**	7	18
• **Infectious disease**	2	5
• **Bronchitis/emphysema**	3	8
• **Other respiratory**	15	38
Musculoskeletal	**663**	**32.5**
• **Upper limb**	240	36
• **Spine / neck / back**	366	55
• **Lower limb**	38	6
• **Other musculoskeletal**	19	3
Mental ill-health	**1117**	**54.7**
• **Anxiety and depression**	279	25
• **Adjustment disorder**	128	11
• **PTSD**	26	2
• **Psychotic episode**	1	<1%
• **Other work stress**	648	58
• **Other mental ill-health**	35	3
Total other cases/diagnoses	**56**	**2.7**
Total cases	**1898**	
Total diagnoses	**2042**	**100%**

Note: A case can have more than one diagnosis so the sum of the sub-categories may be greater than the total cases (both by category and overall)

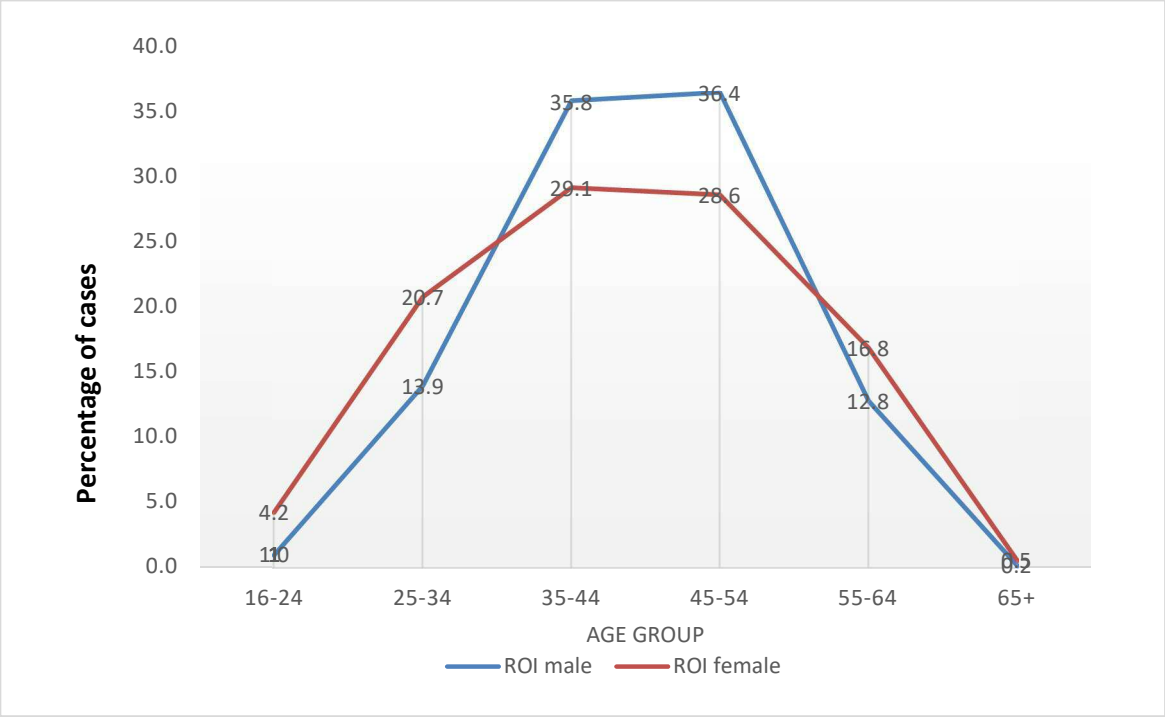
The 56 diagnoses in the 'other' category (OPRA-ROI) were reported as 'assault' (15 cases), noise induced hearing loss (7 cases), sleep problems (5 cases), eye injury (4 cases), latex allergy (2 cases), needle stick injury (2 cases), dry eyes (2 cases), tinnitus (2 cases), blindness, bladder neck injury, ethanol sensitivity, eye irritation, lead toxicity, chemical splash, conjunctivitis, ear pain, hepatitis C, chest pain, hernia, concussion,

well-being affected by commute, headache, sleep problems, influenza A and 'shift work disorder' (each reported once).

3.6.2 AGE AND SEX

The proportions of cases reported to OPRA-ROI by age and sex are shown in Figure 10. Cases were most frequently reported in the 35-44 years of age group for females and 45-54 for males.

Figure 10 Proportion of cases of work-related ill-health reported to OPRA-ROI by age and sex, 2007-2019



3.6.3 INDUSTRY AND OCCUPATION

The majority (76%) of the cases reported to OPRA-ROI were reported in health and social care (Figure 11) with cases also frequently reported in transport, storage and communication (12%). These data need to be interpreted cautiously. Some industry sectors such as health and social care may have better provision of occupational

health services than other industry sectors in general. A relatively large proportion of physicians participating from one sector may therefore bias the results. The most frequently reported occupations (Figure 12) were nurses (23%), nursing auxiliaries and assistants (8%) and bus drivers (6%).

Figure 11 Proportion of cases of work-related ill-health reported to OPRA-ROI by Standard Industrial Classification (SIC), 2007-2019

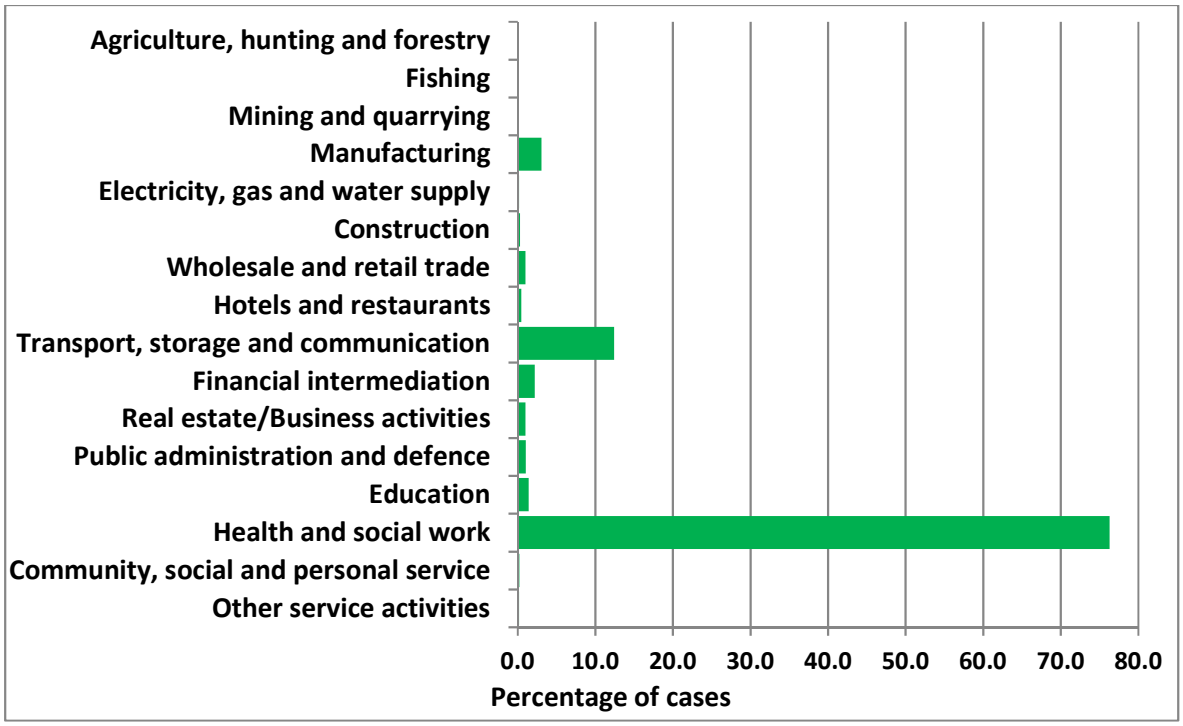
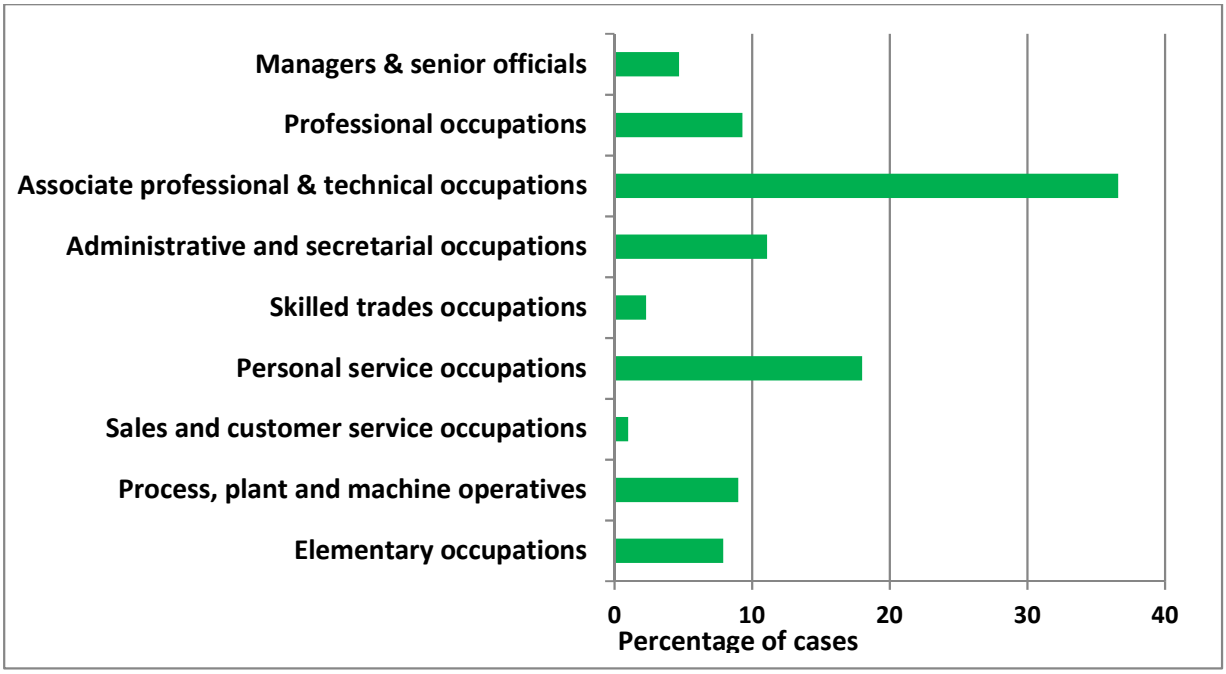


Figure 12 Proportion of cases of work-related ill-health reported to OPRA-ROI by Standard Occupational Classification (SOC), 2007-2019

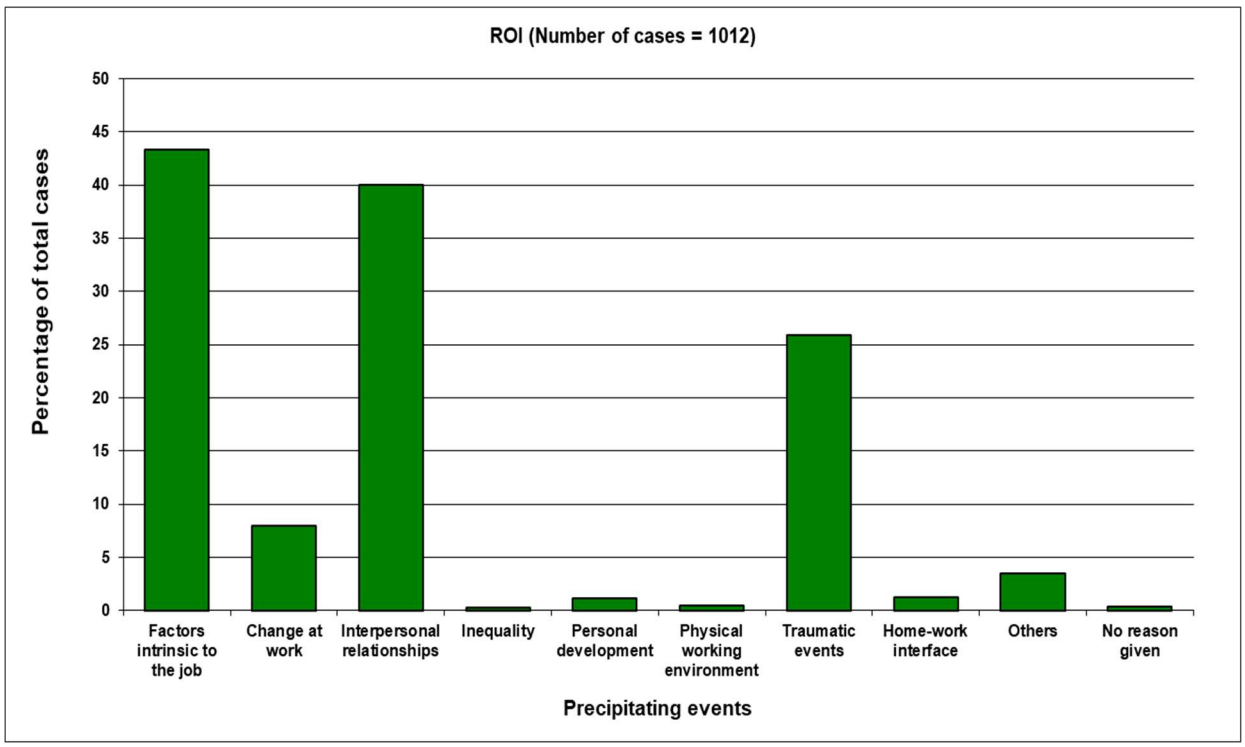


3.6.4 SUSPECTED AGENTS

The most frequently associated precipitating events associated with the 1012 mental ill-health case reports were classified as 'factors intrinsic to the job' (43%) which included 'workload', 'travel', and 'organisational factors'; and 'interpersonal relationships' (40%) which included perceived bullying and difficulties with manager/staff/clients etc. (Figure 13). Other precipitating events reported to OPRA-ROI included 'traumatic events' (26%), for example, assaults at work / verbal abuse at work / witnessing of suicides on railway tracks and 'changes at work' (8%) for example changes in work content and reduction of resources.

The most frequently associated task for the 643 musculoskeletal cases reported to OPRA-ROI was 'lifting/carrying/pushing/pulling' (34%) whilst the most frequently associated movement was 'materials handling' (45%), with a further 32% of cases reported as 'accidents' (Table 10).

Figure 13 Proportion of actual cases of mental ill-health reported to OPRA-ROI by precipitating event, 2007-2019



The most frequently associated agents associated with the 166 skin cases reported to OPRA-ROI were wet work (44%), protective clothing (24%), sterilising and disinfecting agents (22%), soaps and detergents (13%) and rubber chemicals and materials (9%). The agents associated with the 37 respiratory cases included dusts, cleaning materials, sterilising agents & disinfectants, smoke, sick building syndrome, hot work, IPA/ IMS, acetic Acid, other acids, chromium, chlorine, other biocides, pathogens & micro-organisms, enzymes, wood dust, grain and flour.

Table 10 Proportion of musculoskeletal cases reported to OPRA-ROI (2007-2019) by task and movement

Task / movement	Number	(%)
TASK		
Keyboard work	69	11%
Screwing, cutting	2	<1%
Hammering, chopping, sawing	0	0
Guiding or holding tool	14	2%
Meat boning or filleting	0	0
Packing or sorting	2	<1%
Assembly	2	<1%
Materials manipulation	122	19%
Machine operation	14	2%
Lifting/carrying/pushing/pulling	212	33%
Coordinated whole body movement	1	<1%
Driving	5	1%
Accidents	206	32%
Other	31	5%
Not stated/uncodeable	15	2%
MOVEMENT		
Fine hand	19	3%
Forceful upper limb/grip	23	4%
Torque upper limb	2	<1%
Lifting	30	5%
Carrying	3	<1%
Pushing	1	<1%
Pulling	7	1%
Forceful leg movement	1	<1%
Overhead work	5	1%
Materials handling n.e.c.	288	45%
Bending	1	<1%
Sitting	4	1%
Standing/walking	6	1%
Kneeling	2	<1%
Twisting	2	<1%
Postural n.e.c.	71	11%
Accidents	209	33%
Other	43	7%
Not stated/uncodeable	15	2%
Total cases	**643**	

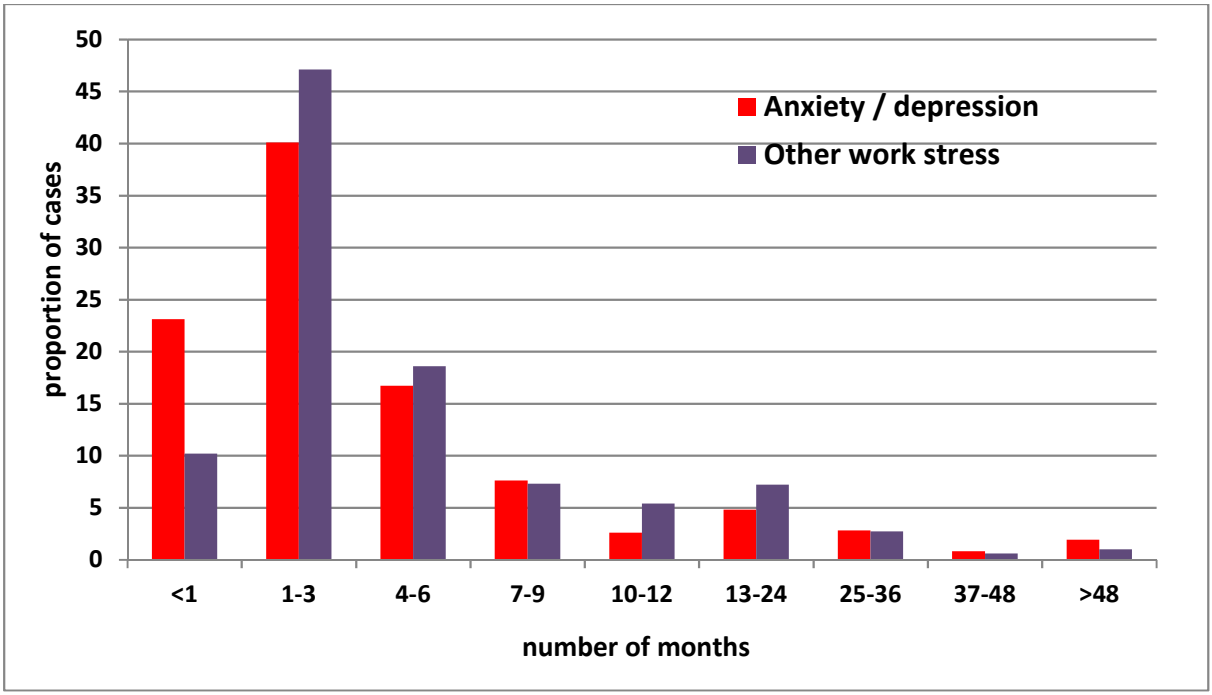
3.6.5 SYMPTOM ONSET

Physicians can report the month and year of the onset of symptoms for each case reported. Data reported to OPRA are sufficiently large enough in number (92% of cases reported have eligible symptom onset data provided) to be able to look at this in relation to the proportional time lapse between symptom onset for main diagnostic categories and when the case was reported to the scheme.

In ROI, for cases of anxiety and depression, 63% of cases were most frequently seen by OPs reporting to OPRA-ROI 1 to 3 months after the onset of symptoms. The proportion is slightly less for other work stress with 57% of cases seen within 1 to 3 months of symptom onset (Figure 14). The median number of months in ROI was 2 for anxiety and depression and 3 for other work stress.

For the musculoskeletal cases reported in the ROI, the majority of upper limb disorders were also reported within 1 to 3 months after symptom onset, with a median of 2 months (Figure 15). For spine / neck / back disorders a slightly different pattern was observed with cases in the ROI reported slightly sooner (median of 1 month).

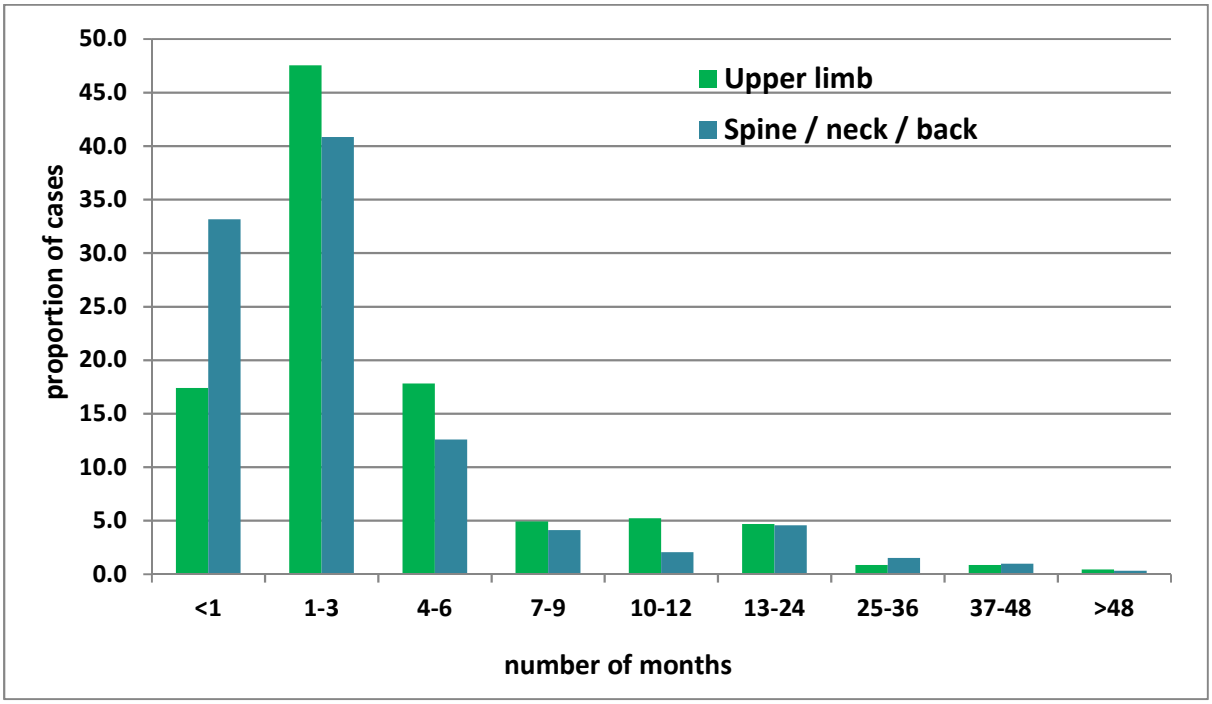
Figure 14 Time lapse between month of symptom onset and reporting month for actual cases of work-related anxiety / depression and other work stress reported to OPRA-ROI (2007-2019)



*NB Physicians can provide full (month, year) or part (year only) data for symptom onset.

	MONTHS				
	Number	Minimum	Maximum	Mean	Std. Dev
Anxiety / depression	264	0	87	5.6	11.3
Other work stress	590	0	62	5.5	8

Figure 15 Time lapse between month of symptom onset and reporting month for actual cases of work-related upper limb disorders and spine / neck / back disorders reported to OPRA-ROI (2007-2019)



*NB Physicians can provide full (month, year) or part (year only) data for symptom onset.

	MONTHS				
	Number	Minimum	Maximum	Mean	Std. Dev
Upper limb	225	0	61	4.4	7.1
Spine / neck /	338	0	100	3.8	8.5

3.7 THE HEALTH AND OCCUPATION RESEARCH NETWORK IN GENERAL PRACTICE (THOR-GP): 2015-2019

3.7.1 OVERVIEW

General practitioners have reported 35 cases (35 diagnoses) of WRI since the scheme commenced data collection in 2015 – 15 (43%) musculoskeletal, 8 (23%) mental ill-health, 6 (20%) 'other' WRI, 5 (14%) skin disease and 1 hearing loss (Table 11). 54% of the cases were reported in the ROI were females with a mean age of 43 years (all cases; age range 19-79 years). The sectors reported for these were as follows: accommodation and food service (8 cases); retail trade (7 cases), construction; health and social care; land transport and manufacturing (3 cases each), agriculture; and education (2 cases each), electricity, gas and water supply; real estate activities; public administration and defence; other service activities (1 case each).

The suspected agents recorded for the skin disease reported by GPs in ROI were wet work, cleaning agents, trauma to skin, hairdressing and micro-organisms. The tasks associated with the musculoskeletal cases reported were heavy lifting /carrying /pushing /pulling and other (cited 3 times each), guiding or holding tools, accidents and materials handling (all cited twice); and assembly of small parts, light lifting and keyboard work (once each). The precipitating events for the mental ill-health cases reported were workload/pressure of work (cited 5 times), bullying (cited twice); and shift work, interpersonal difficulties and inequality (once each). The agents reported for the cases of 'other' WRI reported were accidents (cited 3 times); noise; assault; foreign object in eye, and dog bite.

Table 11 Number and type of diagnoses reported by general practitioners to THOR-GP-ROI (2015-2019)

	Number	(%)
Skin	**5**	**14%**
• **Contact dermatitis**	4	80%
• **Other dermatoses**	1	20%
Respiratory	0	0%
Musculoskeletal	**15**	**43%**
• **Upper limb**	8	53%
• **Neck / spine / back**	3	20%
• **Lower limb**	3	20%
• **Other musculoskeletal**	1	7%
Mental ill-health	**8**	**23%**
• **Anxiety and depression**	3	38%
• **Other work stress**	5	63%
• **Other mental ill-health**	1	13%
Other cases/diagnoses	**7**	**20%**
• **Hearing loss**	1	14%
• **Lacerations**	4	57%
• **Bites**	1	14%
• **Other**	1	14%
Total cases	**35**	
Total diagnoses	**35**	**100%**

4 DISCUSSION

This is the latest report providing an overview of the incidence of WRI in the ROI, based on case reports by participating physicians to the THOR-ROI surveillance scheme. A total of 111 cases (121 diagnoses) were added to the THOR-ROI database during 2019 (excluding one historic domestic exposure case). Of these, 81 cases were reported by OPs to OPRA-ROI, 13 were reported by chest physicians to SWORD-ROI, 14 were reported by dermatologists to EPIDERM-ROI, and 3 cases of WRI were reported by GPs. In comparison, 221 cases (232 diagnoses) were reported in 2018 (OPRA-ROI: 171 cases; SWORD-ROI: 24; EPIDERM-ROI: 24; THOR-GP-ROI: 2). Three 2018 cases that have been reported after last year report was compiled have been added to the analysis of this year. The three are all asthma cases with one in construction and another two in pharmaceutical manufacturing. A total of 2669 incident cases have now been reported to THOR-ROI between 2005-2019, of which 71% were reported by OPs (2007-2019) with smaller proportions from dermatologists (19%) chest physicians (8%) and GPs (1%).

A total of 69 physicians (26 OPs, 20 GPs, 13 dermatologists and 10 chest physicians) were enrolled in THOR-ROI in 2019, with numbers remaining fairly stable since the inception of the schemes. The rates of physicians actively participating (the total number of cases and nil returns to be divided by the number of active reporters who have reported at least one case or one nil return) in THOR-ROI in 2019 are as follows: 30% of ROI chest physicians, 31% of dermatologists, 31% of OPs and 20% of GPs.

Following on from the report submitted to HSA in previous years, this report again contains estimates of incidence rates for ROI. As before, this comparison is restricted

to SWORD and EPIDERM data. The addition of a further year of data (2019) has had little impact on the overall rates (the number of cases reported in the ROI is currently too small to permit the calculation of incidence rates based on a single year of data). Previously the estimated ROI incidence rates have been compared with skin and respiratory rates for GB and NI.[1] and have been shown to be generally similar, or slightly lower in the ROI compared to GB and NI.

Two different rates are again presented: 'adjusted' and 'unadjusted'. In the former, the numerator is adjusted for participation (the proportion of the total dermatologists or chest physicians in the ROI participating in THOR) and response (the proportion of participating physicians actively responding each month).[26] However, this makes the assumption that non-participating or non-responding physicians would behave in the same way as participating or responding physicians, which may not be accurate. In addition, adjusting for non-response assumes that non-responders had cases to report but didn't, rather than the absence of reportable cases during their reporting month. In this latter case, reporters are encouraged to respond with 'I have no cases to report'. As such the two rates provided in Table 2 ('unadjusted' and 'adjusted') might be considered as the possible upper and lower bounds of estimated incident cases of WRI.

The trends in incidence analysis first provided in last years' report has been repeated here with the addition of another full calendar year of data. In the present analyses, trends were estimated based on reports from OPs to OPRA-ROI and for total WRI, mental ill-health, musculoskeletal and skin only (numbers for other reporter groups and other diagnoses are currently too few to permit meaningful analysis). The results suggest an overall, annual average decrease in incidence of total WRI of

approximately 4% with a slightly larger decrease observed for musculoskeletal disorders and skin disease (~5 - 6%) compared to mental ill-health (~4%). However, it appears that during the last 3 years that incidence of total WRI has remained more or less the same. It should be noted that these results should be interpreted with caution. Since some industry sectors such as health and social care may have better provision of occupational health services than other industry sectors the observed trends may be more reflective of some industries compared to others.

Case reports by dermatologists in the ROI continued to be almost exclusively CD. The most frequently reported industrial sectors were manufacturing and health and social care. Restricting the analyses to diagnoses of CD, frequently reported industries included the health and social care sector, manufacturing and other service activities (which includes hairdressing), whilst frequently reported occupations included nurses and hairdressers. The most frequently suspected agents reported by dermatologists in ROI for CD were rubber, wet work, nickel, preservatives and chromium.

Asthma is reported most frequently by chest physicians in the ROI with the most frequently reported industries being manufacturing and construction. The asthma cases reported were also predominantly male, and cement was the most frequently reported agent. SWORD in ROI continues to report proportionally less asbestos-related diseases, and this is consistent with the explanation that there may have been less exposure to asbestos in the ROI historically.[27]

The case mix reported by OPs in ROI continues its pattern noted in previous annual reports with the largest proportion being mental ill-health diagnoses, followed by

musculoskeletal, with fewer skin and respiratory diagnoses; health and social care continues to be the industry sector from which most cases are reported by OPs.

Information provided by OPs in OPRA regarding the length of time between onset of symptoms and consultation with an OP was again included in this report. The overall pattern observed for the main diagnostic categories reported was similar to that reported on last year and showed that most cases were reported within 1 to 3 months after onset of symptoms.

In conclusion, THOR-ROI continues to provide the best overall source of data relating to medically attributed occupational disease incidence in the ROI with nearly 2700 cases reported since the inception of the schemes. With continued funding and increased enrolment/participation in all of the THOR-ROI schemes, aided by steps such as the introduction of EELAB, and a renewed focus from the HSA, case numbers will increase, enabling both comparisons with UK data and more sophisticated analyses in general. Similarly, as the number and types of cases reported to THOR-ROI increases overall, the various determinants of risk e.g. causal agent, precipitating event (mental ill-health) and task/movement (musculoskeletal) will continue to be analysed and reported upon, thus providing useful information for the HSA and ROI.

Dissemination

In terms of dissemination of ROI data, Dr Peter Noone (OPRA-ROI champion) attended the 2019 Annual Advisory Committee meeting on the 12th June; presentations of the 2018 ROI summary statistics were given at the meeting. Dr. Ana Barradas (THOR researcher) attended the Irish Thoracic Society Meeting in 2019 in Galway to present respiratory-ROI data and promote chest physicians to participate in

SWORD-ROI. Dr Peter Noone and Mr Kieran Sludds (HAS) also remain the ROI representatives in the Modernet consortium.[28]

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http://www.coeh.man.ac.uk/u/ire-sword

http://www.coeh.man.ac.uk/u/ire-epiderm

http://www.coeh.man.ac.uk/u/ire-opra

REFERENCES

1. Money A, Carder M, Noone P, et al. Work-related ill-health: Republic of Ireland, Northern Ireland, Great Britain 2005–2012. *Occupational Medicine* 2015; **65**(1): 15-21.
2. The Health and Occupation Research network in the Republic of Ireland (THOR-ROI) http://research.bmh.manchester.ac.uk/epidemiology/COEH/research/thor/schemes/ireland (accessed 30 March 2020 2020).
3. THOR - The Health and Occupation Reporting network. http://research.bmh.manchester.ac.uk/epidemiology/COEH/research/thor/ (accessed 30 March 2020 2020).
4. Meredith SK, Taylor VM, McDonald JC. Occupational respiratory disease in the United Kingdom 1989: a report to the British Thoracic Society and the Society of Occupational Medicine by the SWORD project group. *British Journal of Industrial Medicine* 1991; **48**(5): 292-8.
5. Meyer JD, Chen Y, Holt DL, Beck MH, Cherry NM. Occupational Contact Dermatitis in the UK: A Surveillance Report from EPIDERM and OPRA. *Occupational Medicine* 2000; **50**(4): 265-73.
6. Cherry NM, McDonald JC. The incidence of work-related disease reported by occupational physicians, 1996–2001. *Occupational Medicine* 2002; **52**(7): 407-11.
7. Hussey L, Turner S, Thorley K, McNamee R, Agius R. Work-related ill health in general practice, as reported to a UK-wide surveillance scheme. *British Journal of General Practice* 2008; **58**(554): 637-40.
8. Turner S, Carder M, Hussey L, Zarin N, Agiue R. The incidence of occupational skin and respiratory disease as reported to the The Health and Occupation Reporting network by physicians in the Irish Republic between 2005 and 2006: Unpublished, 2007.
9. Turner S, Carder M, Money A, Agius R. The incidence of occupational disease as reported to The Health and Occupation Reporting (THOR) network by physicians in the Republic of Ireland between 2005 and 2007: Unpublished, 2008.
10. Money A, Carder M, Turner S, Agius R. The incidence of occupational disease as reported to The Health and Occupation Reporting (THOR) network by physicians in the Republic of Ireland between 2005 and 2008: Unpublished, 2009.
11. Carder M, Money A, Turner S, Agius R. The incidence of occupational disease as reported to The Health and Occupation Reporting (THOR) network by physicians in the Republic of Ireland between 2005 and 2009: Unpublished, 2010.
12. Carder M, Money A, Turner S, Agius R. The incidence of occupational disease as reported to The Health and Occupation Reporting (THOR) network by physicians in the Republic of Ireland between 2005 and 2010: Unpublished, 2011.
13. Carder M, Money A, Turner S, Agius R. The incidence of occupational disease as reported to The Health and Occupation Reporting (THOR) network by physicians in the Republic of Ireland between 2005 and 2011: Unpublished, 2012.
14. Money A, Carder M, Agius R. The incidence of occupational disease as reported to The Health and Occupation Reporting (THOR) network by physicians in the Republic of Ireland between 2005 and 2012: Unpublished, 2013.
15. Money A, Carder M, Agius R. The incidence of occupational disease as reported to The Health and Occupation Reporting (THOR) network by physicians in the Republic of Ireland between 2005 and 2013: Unpublished, 2014.

16. Money A, Carder M, Agius R. The incidence of occupational disease as reported to The Health and Occupation Reporting (THOR) network by physicians in the Republic of Ireland between 2005 and 2014.: Unpublished, 2015.
17. Money A, Carder M, Agius R. The incidence of occupational disease as reported to The Health and Occupation Reporting (THOR) network by physicians in the Republic of Ireland between 2005 and 2015: Unpublished, 2016.
18. Money A, Carder M, Agius R. The incidence of occupational disease as reported to The Health and Occupation Reporting (THOR) network by physicians in the Republic of Ireland between 2005 and 2016: Unpublished, 2017.
19. Money A, Carder M, van Tongeren M, Agius R. The incidence of occupational disease as reported to The Health and Occupation Reporting (THOR) network by physicians in the Republic of Ireland between 2005 and 2017: Unpublished, 2018.
20. Money A, Carder M, Seed M, van Tongeren M. The incidence of occupational disease as reported to The Health and Occupation Reporting (THOR) network by physicians in the Republic of Ireland between 2005 and 2018: Unpublished, 2019.
21. ONS. Standard Occupational Classification. Norwich: The Stationery Office, Office for National Statistics; 2000.
22. Office CS. Indexes to the Standard Industrial Classification of Economic Activities 1992. London: HMSO; 1993.
23. Organisation WH. International Statistical Classification of Diseases and Related Health Problems (ICD-10), 10th edition. Geneva: WHO; 1992.
24. QNHS. Quarterly National Household Survey. Dublin: Central Statistics Office; 2006.
25. McNamee R, Carder M, Chen Y, Agius R. Measurement of trends in incidence of work-related skin and respiratory diseases, UK 1996–2005. *Occupational and Environmental Medicine* 2008; **65**(12): 808-14.
26. Carder M, McNamee R, Turner S, Hussey L, Money A, Agius R. Improving estimates of specialist-diagnosed, work-related respiratory and skin disease. *Occupational Medicine* 2010; **61**(1): 33-9.
27. Cancer Trends No.17 Mesothelioma. Dublin: National Cancer Registry Ireland, 2012.
28. Monitoring trends in Occupational Diseases and tracing new and Emerging Risks in a NETwork. 2014. https://www.modernet.info/about-us/ (accessed 30 April 2020.