



# Yellow Card Centre North West

## ANNUAL REPORT

TO THE MEDICINES AND HEALTHCARE  
PRODUCTS REGULATORY AGENCY

### 2019/20

# YELLOW CARD CENTRE NORTH WEST

## ANNUAL REPORT TO THE MEDICINES AND HEALTHCARE PRODUCTS REGULATORY AGENCY

**2019/20**

### 1. STAFF

Professor Sir Munir Pirmohamed – Director  
Christine Randall – Senior Medicines Information Pharmacist  
David Moloney – Medicines Information Technician  
Helen Edmondson – Medicines Information Technician  
Marian Madden – Administrative Assistant

### 2. EXECUTIVE SUMMARY

In 2019/20 a total of 4,859 Yellow Cards (YCs) were submitted by health professionals, patients and carers from the Yellow Card Centre North West (YCCNW) region. This is a 17.1% increase on 2018/19, reporting has increased by 37% over the last five years, with an overall 161% increase over the last 7 years.

Hospital pharmacists reported more YCs than any other group, 2,147 reports (44% of the total). Reporting increased this year by; hospital pharmacists 2,147 reports (up by 31%), pharmacy technicians/assistants 399 reports (up by 15%), GPs 342 reports (up by 12%), hospital nurses 234 reports (up by 23%) and radiographers 51 reports (up by 38%). Reporting by nurses (primary care) and community pharmacists also fell slightly this year. Patient/carer reporting fell for the first time, down by 3.4% in 2019/20 and accounting for 15% of reporting. The RIDR reporting pilot ended in February 2020, 11 reports were made in 2019/20 to then.

Serious adverse drug reactions (ADRs) accounted for 67% of all reports (56 reports [1.8% of serious reports] had a fatal outcome).

For the third year the top reported suspect drug was apixaban with 206 reports. Seven of the 2019/20 top ten suspect drugs also appeared in the 2018/19 top ten; apixaban, influenza vaccine, phenoxymethylpenicillin, rivaroxaban, aspirin, sertraline and omeprazole. New to the 2019/20 top ten are adalimumab, warfarin and ibuprofen.

Reporting of ADRs via YCs embedded in electronic healthcare systems now account for 27% of all our reports. Current systems in use in the North West are MiDatabank (pharmacy medicines information system) which contributed 953 reports (36.3% of hospital pharmacy reports), SystmOne (GP patient management system that is also used in prisons, custody centres and some hospices) which contributed 312 reports, up from 285 reports last year (9.5% increase), 26 EMIS (GP patient management system which went live for Yellow Card reporting during 2019/20) and 3 Vision (GP patient management system). 71% of North West GP reports were made using SystmOne, EMIS or Vision with 51% of those made by GPs working in the prison service.

The North West-wide network of Yellow Card Champions was set up in 2015 to share good practice, explore ideas and initiatives and lend support. The Champions meet twice a year and the group continues to expand. Secondary care and community or mental health trusts who sent representatives to meetings in 2019/20 (18 of 26 acute plus 4 of 8 community/mental health) contributed 2,806 reports in 2019/20 (58% of all reports, 84% of secondary care reports and 63% of community/mental health trusts). Nine of the top ten reporting secondary care trusts actively participated in the Champions network in 2019/20.

YCCNW continues support local reporters, health professionals, students and patients. In 2019/20 over 20 training sessions were provided addressing over 600 individuals. YCC North West attended the British Dental Association conference in 2019 (exhibitor and presentation) and the Superdrug conference in 2020 (exhibitor).

In 2019/20 YCCNW continued to support reporting to the Yellow Card Scheme:

- locally by providing quarterly feedback to NHS Trusts on their reporting.
- nationally by co-ordinating feedback of MiDatabank ADR reporting on behalf of the MHRA and UKMi via emails to the MiUK discussion group and posted on the Specialist Pharmacy Services website.

- nationally by contributing review of medication safety alerts, communications and publications for the monthly MSO WebEx event facilitated by NHS England.
- by updating the CPPE ADR e-learning programme assessment.
- by updating ADR information in the CPPE /NHS Medicines Safety App.
- on social media via our Twitter account @yellowcardnw,

### 3. YELLOW CARD DATA

- **ADR reports received**

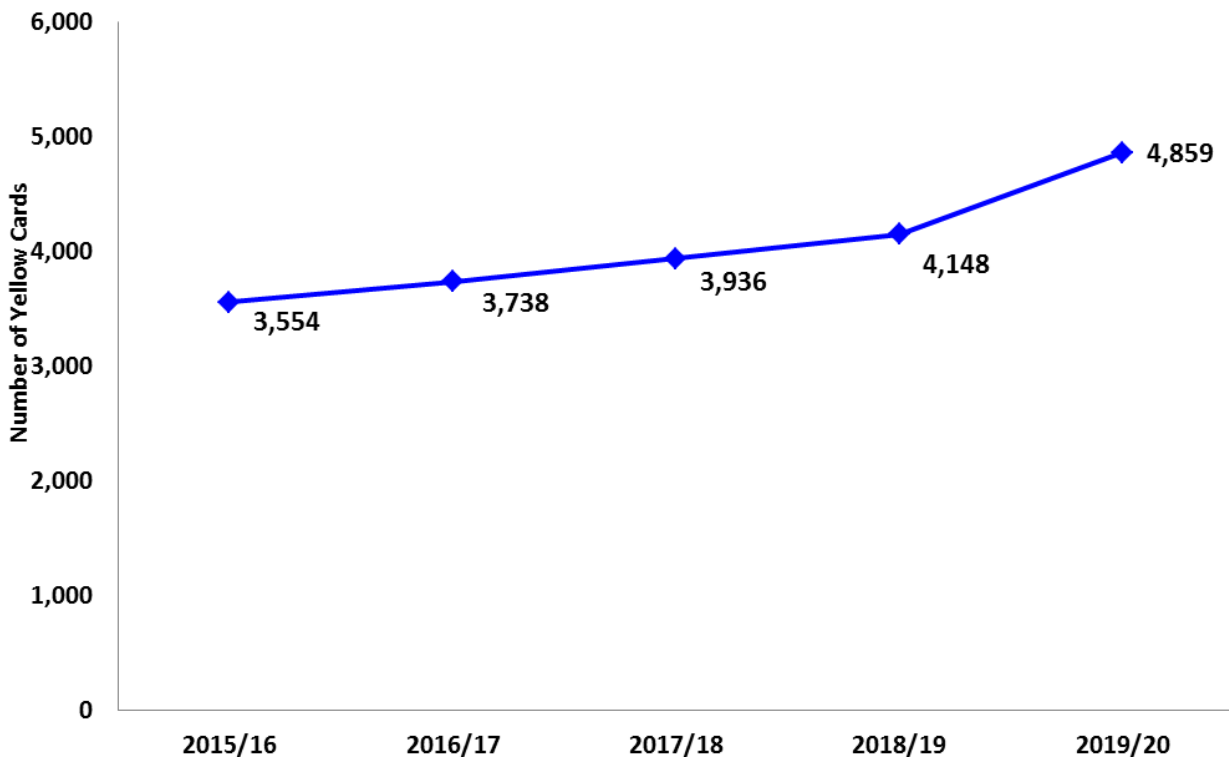
Overall 4,859 reports of suspected ADRs were made by healthcare professionals and patients/carers from the YCCNW region in 2019/20. Table 1 highlights the total number of reports originating from the YCCNW region for the past five years and Figure 1 is a graphical representation of this data. Figure 2 shows the split by reporter type for Yellow Card reports originating in the YCCNW region in 2019/20 and Figure 3 compares the number of reports for each reporter type received in 2019/20 with those received in previous years.

**Table 1. The total number of reports and percentage change over the last five years from the YCCNW region.**

Year	Number of reports	Percentage change on previous year
2019/20	4,859	+17.1%
2018/19	4,148	+5.4%
2017/18	3,936	+5.3%
2016/17	3,738	+5.1%
2015/16	3,554	+52.7%

Figure 1  
Line graph

summarising the total number of reports originating from the YCCNW region for the past five years.



**Figure 2. Percentage of Yellow Card reports that originated from the YCCNW region for each reporter group in 2019/20.**

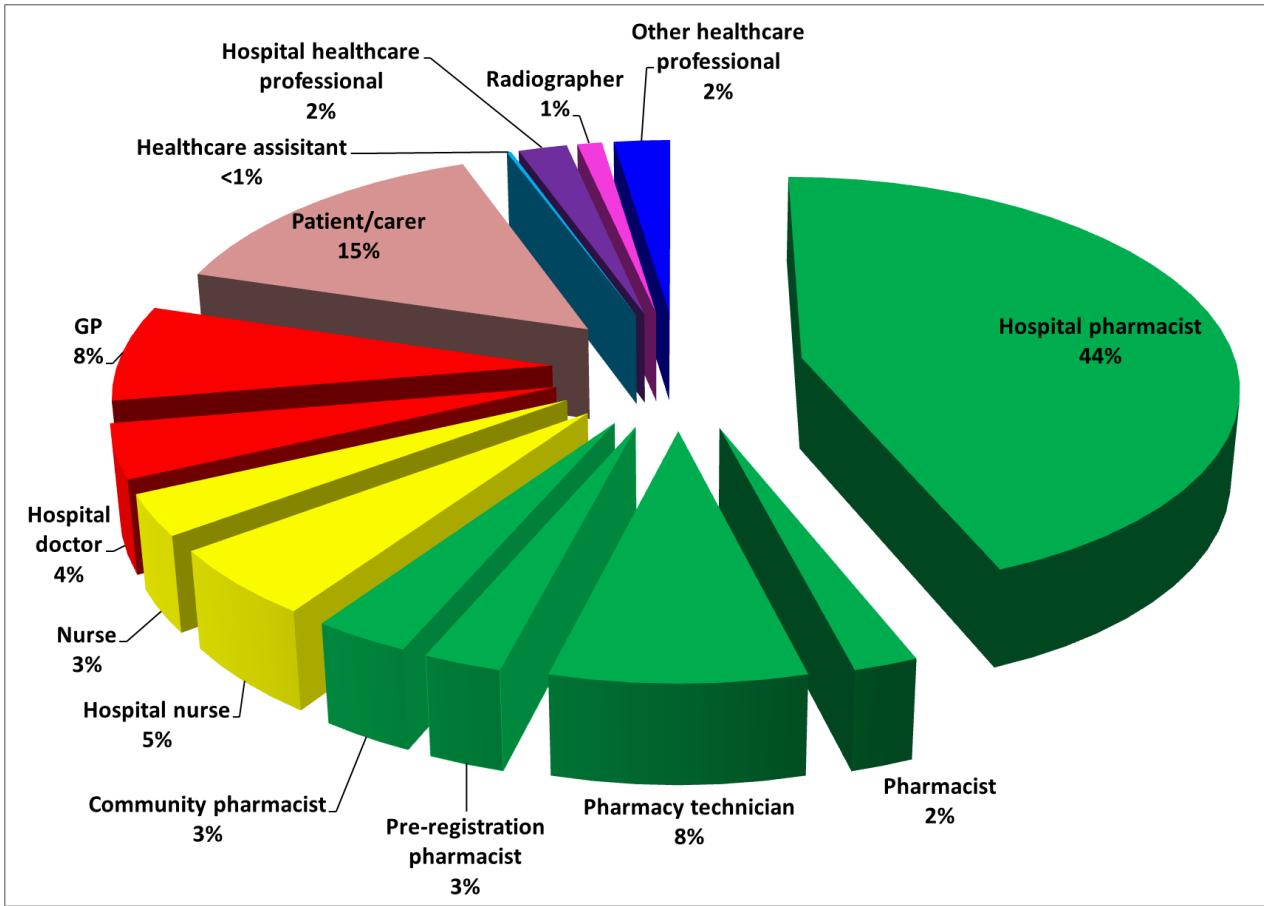
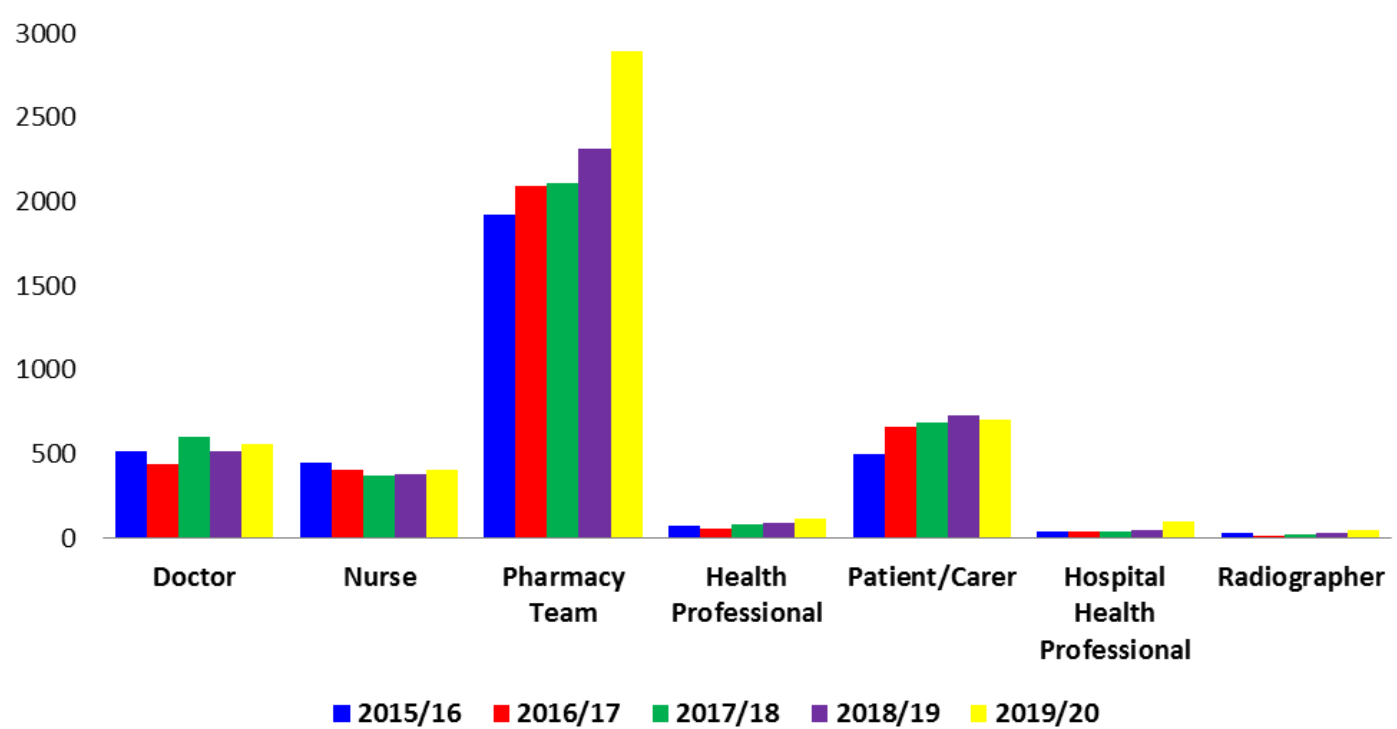


Figure 3. Number of Yellow Card reports received from each reporter group in 2019/20 compared with the previous four years.



- **Serious reactions**

Total number of reports classified as serious that originated from the YCCNW region in 2019/20 and comparative data for previous years are shown in Table 2 and displayed graphically in Figure 4. A fatal outcome was reported on 56 Yellow Cards in 2019/20.

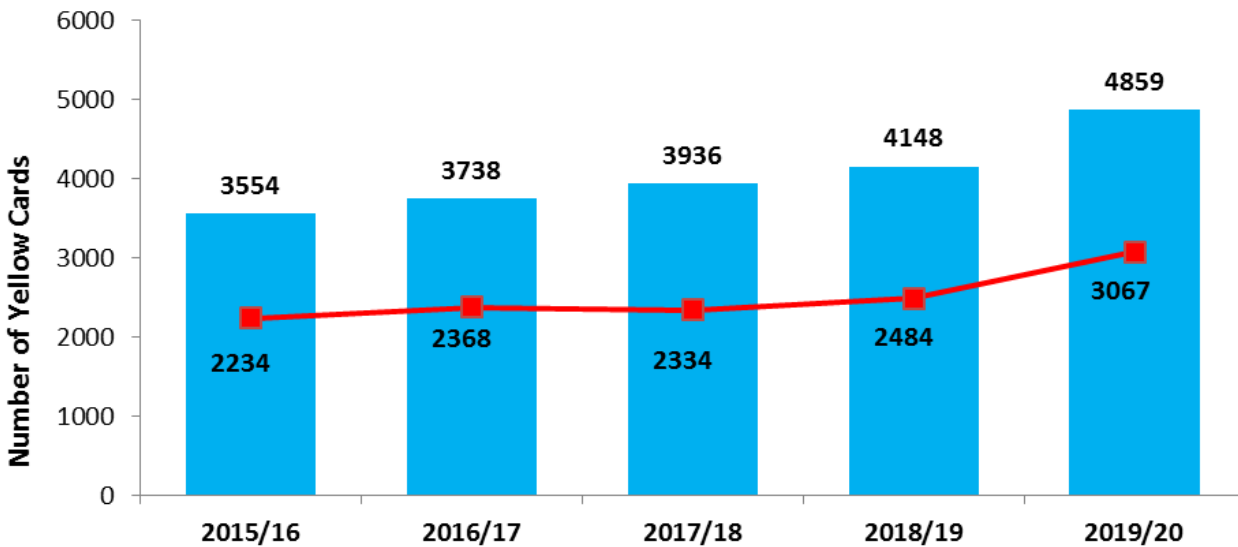
**Table 2**

Year	Number of serious reports	Percentage of total reports	Percentage change on previous year
2019/20	3,067	63%	23.5%
2018/19	2,484	60%	6.4%
2017/18	2,334	59%	-1.4%
2016/17	2,368	63%	+6%
2015/16	2,234	63%	+60.0%

Figure 4  
Serious Card as a

4. Yellow reports

proportion of total reports from 2015/16 to 2019/20 for the YCCNW region.



- **Fatal reports**

Total number of fatalities that were reported from within the YCCNW region in 2019/20 and comparative data from previous years are shown in Table 3.

**Table 3**

Year	Number of fatal reports	Percentage change on previous year
2019/20	56	+3.7
2018/19	54	-12.9%
2017/18	62	+67%
2016/17	37	-13.9%
2015/16	43	+7.5%

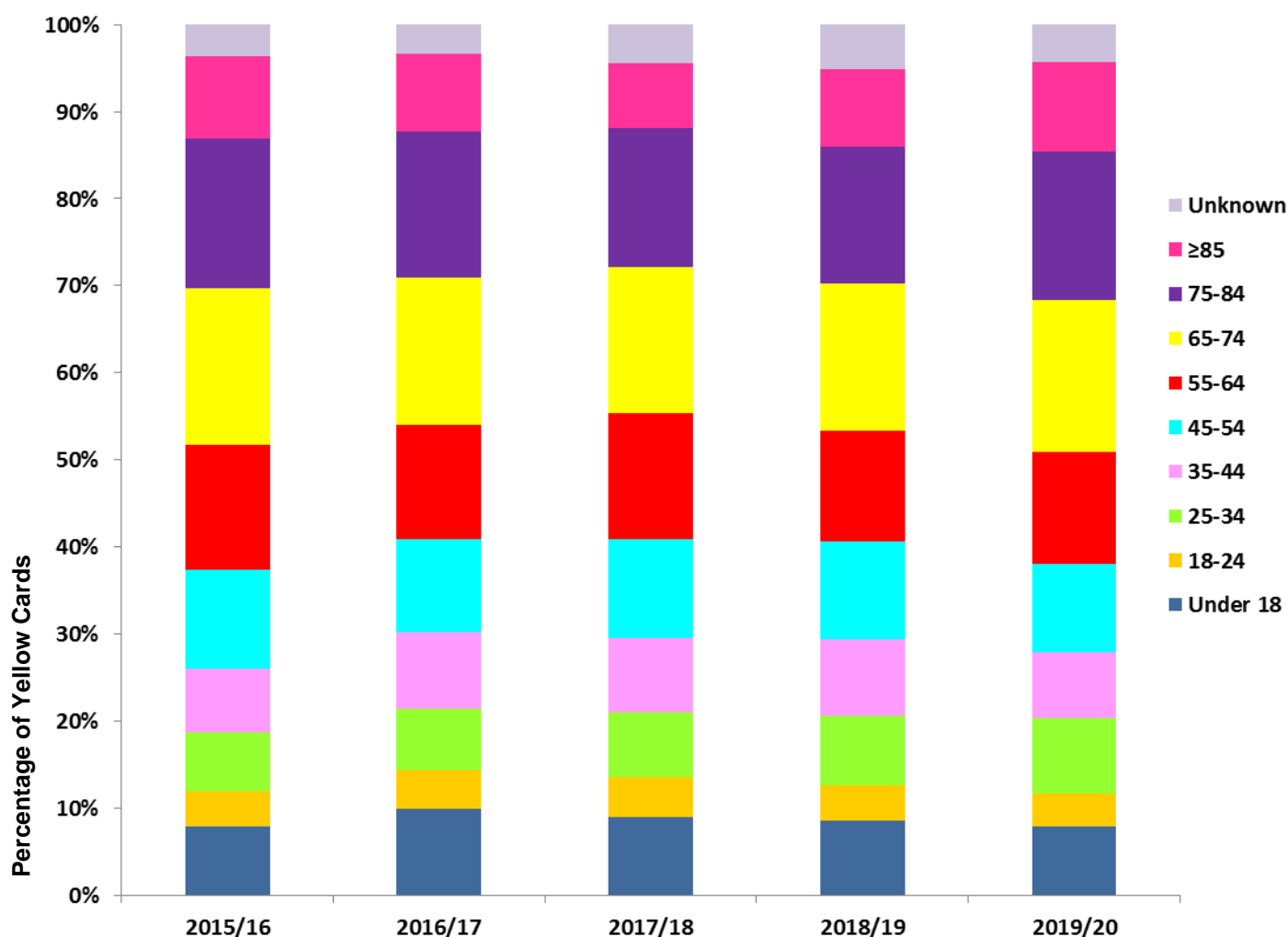
- **Age breakdown**

Table 4 shows the number of Yellow Cards originating from within the YCCNW region stratified by patient age at time of reaction, 2015/16 to 2019/20. Figure 5 is a graphical representation of this data.

Table 4

Age band (years)	2015/16	2016/17	2017/18	2018/19	2019/20
Under 2	93	91	95	98	102
2-6	38	101	77	89	88
7-12	44	67	68	71	79
13-17	102	111	110	97	112
18-24	146	166	183	165	183
25-34	240	262	293	334	424
35-44	263	332	338	367	367
45-54	400	397	445	464	492
55-64	513	493	569	525	625
65-74	636	631	661	704	849
75-84	612	625	627	653	827
≥85	340	338	296	371	502
Unknown	127	124	174	210	209
<b>Total</b>	<b>3,554</b>	<b>3,738</b>	<b>3,936</b>	<b>4,148</b>	<b>4,859</b>

Figure 5. Percentage of Yellow Card reports that originated from the YCCNW region, stratified by age group from 2015/16 through to 2019/20.



- **Top ten drugs**

Table 5 lists the top ten reported suspect drugs originating from within the YCCNW region for 2019/20. Overall there were 5,593 suspect drugs reported on 4,859 Yellow Cards (some Yellow Card reports had more than one suspect drug). The top ten suspect drugs accounted for 18% of total suspect drugs reported on a Yellow Card. Table 6 contains the top ten reported suspect drugs originating from within the YCCNW region for 2018/19; these drugs accounted for 18% of total suspect drugs reported on a Yellow Card in 2018/19.

**Table 5. The top ten reported suspect drugs for Yellow Cards that originated from the YCCNW region in 2019/20.**

Drug name	Number of times reported as a suspect drug (2019/20)
Apixaban	206
Influenza virus (some <sup>▼</sup> )	105
Rivaroxaban ▼	102
Phenoxymethylpenicillin	101
Adalimumab (some <sup>▼</sup> )	98
Aspirin	94
Sertraline	94
Warfarin	82
Omeprazole	76
Ibuprofen	68
<b>Total</b>	<b>1026</b>

**Table 6. The top ten reported suspect drugs for Yellow Cards that originated from the YCCNW region in 2018/19.**

Drug name	Number of times reported as a suspect drug (2018/19)
Apixaban	179
Influenza virus (some <sup>▼</sup> )	113
Phenoxymethylpenicillin	101
Rivaroxaban ▼	91
Sertraline	86
Omeprazole	74
Aspirin	73
Meningococcal group B vaccine ▼	73
Ramipril	66
Flucloxacillin	60
<b>Total</b>	<b>916</b>

- Source of reports

Table 7 Number of Yellow Cards originating from within the YCCNW region stratified by reporter type from 2017/18 to 2019/20.

Reporter	2017/18		2018/19		2019/20	
	Number	% of total	Number	% of total	Number	% of total
Carer	42	1.1%	35	0.8%	36	0.7%
Parent	95	2.4%	96	2.3%	127	2.6%
Patient	553	14%	603	14.5%	543	11.2%
Community Pharmacist	169	4.3%	151	3.6%	140	2.9%
Hospital Pharmacist	1,608	40.9%	1,636	39.4%	2,147	44.2%
Pharmacist	95	2.4%	111	2.7%	95	2.0%
Pharmacy Technician/assistant	114	2.9%	346	8.4%	399	8.2%
Pre-reg pharmacist	129	3.3%	78	1.9%	122	2.5%
Hospital Nurse	185	4.7%	191	4.6%	234	4.8%
Nurse	188	4.8%	193	4.7%	172	3.5%
GP	382	9.7%	306	7.4%	342	7.0%
Hospital Doctor	208	5.3%	216	5.2%	217	4.5%
Physician	10	0.3%	3	0.07%	5	0.10%
Coroner	1	0.02%	1	0.02%	1	0.02%
Dentist	5	0.1%	2	0.05%	9	0.2%
Midwife	3	0.1%	5	0.1%	8	0.2%
Optometrist	2	0.05%	1	0.02%	3	0.1%
Paramedic	4	0.1%	1	0.02%	3	0.1%
Radiographer	24	0.6%	37	0.9%	51	1.0%
Hospital Healthcare Professional	41	1%	49	1.2%	88	1.8%
Healthcare Assistant	28	0.7%	1	0.002%	9	0.2%
Other Healthcare Professional	48	1.2%	82	2%	107	2.2%
Medical Student	1	0.02%	6	1%	2	0.04%
Other	1	0.02%	0	0%	0	0%
<b>Total</b>	<b>3,936</b>	<b>100%</b>	<b>4,148</b>	<b>100%</b>	<b>4,859</b>	<b>100%</b>

Green – increasing figures  
 Red – decreasing figures  
 Black – no changes



- **Type of report**

Table 8 shows the method used to report an ADR to the Yellow Card Scheme in 2019/20.

**Table 8. Number of Yellow Card reports from each reporting method originating from the YCCNW region in 2019/20.**

	<b>Number of reports</b>	<b>Percentage of total reports</b>
Electronic Yellow Card	3364	69.2%
MiDatabank (Pharmacy medicines information)	953	19.6%
SystemOne (Patient management system)	312	6.4%
Paper	180	3.7%
APP	21	0.4%
Vision (Patient management system)	3	<0.1%
EMIS (Patient management system)	26	0.5%
RIDR (Report Illicit Drug Reactions scheme) (ended = February 2020)	11	0.2%

#### 4. INTERPRETATION OF REPORTING FIGURES

Yellow Card reports originating from the YCCNW region continues to increase, up 17.1% in 2019/20 compared with 2018/19, bringing the increase over the last five years to 37%.

Hospital pharmacists reported more YCs than any other group, 2,132 reports up by 30% and accounting for 44% of the total, 45% of these were made using MiDatabank. This high percentage and increase reflects the commitment and enthusiasm of the pharmacy teams in our top ten reporting trusts who engage with the Champions network. This level of commitment is supported and encouraged by the Chief Pharmacists.

Reporting also increased this year by; pharmacy technicians/assistants 395 reports (up by 14%), GPs 342 reports (up by 12%), hospital nurses 253 reports (up by 32%) and radiographers 51 reports (up by 38%). Patient/carer reporting fell for the first time, down by 3.4% in 2019/20 and accounting for 15% of reporting. Reporting by nurses (primary care) and community pharmacists also fell slightly this year.

The RIDR (Report Illicit Drug Reactions) pilot ended in February 2020, 11 reports were made in 2019/20 to then.

Reporting via electronic healthcare systems with embedded YCs continues to increase and they now contribute 27% of all YCCNW reports (1,294 YC reports), contributions from each are:

- 953, MiDatabank (pharmacy medicines information system),
- 312 SystemOne (GP patient management system). Also used in prisons, custody suites, minor injuries units and hospices.
- 26 EMIS (GP patient management system). EMIS introduced an integrated Yellow Card in February 2020. There is now huge scope for GPs, practice pharmacists and other practice staff who use EMIS, the most prevalent GP management system in the North West to engage more easily with the YCS.
- 3 Vision (GP patient management system).
- 71% of North West GP reports were made using SystemOne, EMIS or Vision with 51% of those made by GPs working in the prison service.

Reporting via the APP remains low with only 21 reports in 2019/20, up by nine compared to 2018/19. Nine APP reports were made patients/parents.

For the third year the top reported suspect drug was apixaban with 206 reports. Five reports were fatalities. Seven of the 2019/20 top ten suspect drugs also appeared in the 2018/19 top ten; apixaban, influenza vaccine, phenoxymethylpenicillin, rivaroxaban, aspirin, sertraline and omeprazole. New to the 2019/20 top ten are adalimumab (50 reports) warfarin and ibuprofen.

Over 80% of reports for phenoxymethylpenicillin come from prisons; all these reports were made via SystemOne. Of these over 90% described a symptom of hypersensitivity including one fatal allergic reaction.

Serious adverse drug reactions (ADRs) accounted for 63% of all reports (56 reports [1.8% of serious reports] had a fatal outcome). Black triangle drugs in the top ten include the oral anticoagulant rivaroxaban and some influenza vaccines.

331 reports related to children under the age of 18 years, 38% of these reports related to vaccines and 12% related to antimicrobials.

Observations and associations in 2019/20:

- 206 reports listed apixaban as the suspect drug, 66% of these reports were made by hospital pharmacists and 16% made by pharmacy technicians, the pharmacy team accounted for 91% of apixaban reports. The apixaban reports included 105 of suspected haemorrhage/bleeding reactions and 28 suspected to be associated with a thromboembolic event.
- 40 (20%) of 150 community pharmacist reports were to vaccines, including 27 for influenza vaccines. Probably a reflection of the increasing role of community pharmacists in delivering vaccinations.
- Of 342 reports made by GPs 150 (44%) were to antimicrobials with 82 of these for phenoxymethylpenicillin which all came via SystmOne. GPs also made 22 reports associated with NSAIDs, 19 to vaccines, 14 diabetes medicines and 11 involving antidepressants.
- Radiographers made 51 reports of which 5 described anaphylactic/anaphylactoid reactions and a further 6 described hypersensitivity/allergy related symptoms.
- Eleven cases of serious skin reactions were reported; three of toxic epidermal necrolysis (co-trimoxazole, erythromycin, pembrolizumab) and eight of erythema multiforme (nitrofurantoin, vinorelbine, atelizumab, fluconazole, cefuroxime, gabapentin, influenza vaccine, Symkemvi)
- 22 reports were for ECG QT interval prolongation suspected to be associated with medication, these included; 5 citalopram, 2 amitriptyline, 2 sertraline and 2 clarithromycin.
- 126 reports were for acute kidney injury these included: 17 loop diuretics, 12 NSAIDs, 10 ACE inhibitors, 9 thiazide diuretics, 7 SGLT2 inhibitors,
- Of 706 patient/carer reports 21% listed a vaccine as the suspect drug.
- Drug Safety Update provides warnings and reminders to prescribers about ADRs:
  - In September 2019 prescribers were reminded about the risk of neuropsychiatric reactions associated with montelukast - in 2019/20 we had 18 reports listing montelukast as the suspect drug of which 11 related to neuropsychiatric reactions.
  - In March 2020 prescribers were reminded that patients taking SGLT2 inhibitors should have ketones monitored during treatment interruption for surgical procedures or acute serious medical illness. In 2019/20 we had 87 reports concerning SGLT2 inhibitors of which 42 listed ketoacidosis as the suspected reaction.
- 76% of pharmacy technician reports in acute trusts came from three trusts (34% from Wirral, 26% from Warrington, Wigan and Leigh and 14% from St Helens and Knowsley).

## 5. PROMOTIONAL ACTIVITIES

### • Training delivered

Training carried out during 2019/20 in relation to ADRs and reporting to the Yellow Card Scheme is documented in Tables 9, 10 and 11. Table 9 contains data relating to training of healthcare professionals, table 10 contains data relating to training undergraduates and table 11 relates to presentations given to patients.

**Table 9. Training provided to healthcare professionals in 2019/20**

Audience type	Session type	Duration (hours)	Number of sessions	Total audience numbers	Total hours training
Dentists	Lecture	0.33 hours	4	150	2
Dentists – foundation trainees	Lecture	0.5 hours	5	50	2.5
MRC fellows	Lecture	0.75 hours	1	12	0.75
MSc HCPs	Lecture	1.0 hours	1	30	1
Non-medical prescribers	Lecture	1.25 hour	2	90	2.5
Pre-registration pharmacists	Lecture	1 hour	1	25	1
YCCNW Yellow Card Champions	Presentation	1.5 hours	2	45	3
<b>Totals</b>			<b>16</b>	<b>402</b>	<b>12.75</b>

**Table 10. Training provided to undergraduates in 2018/19**

Audience type	Session type	Duration	Number of sessions	Total audience numbers	Total hours training
Dental undergraduates	Lecture	0.5 hours	1	80	0.5
Nurse undergraduates	Lecture	1.5 hours	2	60	3.0
Pharmacy undergraduates (with YCC N&Y)	Workshop	6 hours	1	25	6.0
Medical students*	Lecture (introduction to personalised medicine)	1 hour	1	360	1
Medical students*	Lecture (prescribing in renal impairment)	1 hour	1	360	1
Medical students*	Lecture (ADRs and interactions)	1 hour	1	360	1
Medical students*	Lecture (drug overdose)	1 hour	1	360	1
Medical students*	Lecture	1 hour	14	360	14
Medical students*	Tutorial ( safe prescribing and harms of medicines)	1.5 hours	8	360	12
Medical students	Lecture (YYC NW/ ADRs)	1.0	1	200	1
<b>Totals</b>			<b>29</b>	<b>2525</b>	<b>40.5</b>

\*These lectures are delivered by clinical pharmacologists who are affiliated with YCCNW through links with The University of Liverpool's department of Clinical Pharmacology and Therapeutics. Lecture topics include: Introduction to analgesic drugs; How do drugs cause harm?; Introduction to interindividual variation; Prescribing safety in pregnancy; Pharmacology and movement disorders; Antidepressants; Therapeutic drug monitoring; Immunosuppressants; Ten ways to kill a patient; Drugs for diabetes; Biologics and biosimilars; Paediatric pharmacology; Cancer chemotherapeutics and Management of epilepsy. All of these lectures have adverse drug reactions as a learning outcome.

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**Table 11. Training provided to patients in 2019/20**

None in 2019/20

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In collaboration with Yellow Card Centre Northern and Yorkshire YCC North West developed and ran a one day workshop on Adverse Drug Reactions, pharmacovigilance and reporting to the Yellow Card Scheme for pharmacy undergraduates at the University of Bradford. Our experiences were presented as a poster at the Medicines Information Conference in September 2019. Subsequently the material used has been shared with other YCCs.

- **Meetings attended**

**British Dental Conference** – in May 2019 the Yellow Card Centres (YCC Wales, YCC West Midlands and YCC North West) were exhibitors at the BDA in Birmingham. YCC Wales and YCC North West co-presented a short presentation about ADRs and reporting to the Yellow Card Scheme.

**Superdrug Conference** – in February YCC North West exhibited at the national Superdrug conference in Manchester and participated in the conference quiz.

- **Lectures delivered (invited)**

Prof. Pirmohamed spoke on ADRs, pharmacovigilance and personalised medicine at 15 national and 9 international meetings and conferences throughout 2019/20.

- **Materials developed/maintained to promote YCS**

CPPE e-learning programme ADRs – review and updating of assessment questions.

Christine Randall contributes to updating the NHS Medicines Safety App. The app is a quick way for healthcare professionals to test their knowledge on high risk areas for medicines safety incidents. It provides a quiz with a series of ten multiple choice questions chosen randomly from a bank of questions for each topic or mixed up in a 'lucky dip'.

Training materials used to deliver educational sessions on ADRs and the Yellow Card scheme continue to be updated, with PowerPoint presentations tailored to the audience type.

## 6. PUBLICATIONS (2019/20)

1. The longitudinal NIHR ARC North West Coast Household Health Survey: exploring health inequalities in disadvantaged communities. Giebel C, McIntyre JC, Alfirevic A, Corcoran R, Daras K, Downing J, Gabbay M, **Pirmohamed M**, Popay J, Wheeler P, Holt K, Wilson T, Bentall R, Barr B. *BMC Public Health*. 2020 Aug 18;20(1):1257.
2. Combined analysis of transcriptomic and genetic data for the identification of loci involved in glucocorticosteroid response in asthma. Hernandez-Pacheco N, Gorenjak M, Jurgec S, Corrales A, Jorgensen A, Karimi L, Vijverberg SJ, Berce V, Schieck M, Acosta-Herrera M, Kerick M, Samedy-Bates LA, Tavendale R, Villar J, Mukhopadhyay S, **Pirmohamed M**, Mc Verhamme K, Kabesch M, Hawcutt DB, Turner S, Palmer CN, Burchard EG, Maitland-van der Zee AH, Flores C, Potočnik U, Pino-Yanes M; PiCA, SysPharmPedia consortia. *Allergy*. 2020 Aug 12.
3. HLA DRB1\*15:01-DQB1\*06:02-restricted human CD4+ T-cells are selectively activated with amoxicillin-peptide adducts. Taylor A, Meng X, Adair K, Farrell J, Waddington J, Daly A, **Pirmohamed M**, Dear G, Park BK, Naisbitt DJ. *Toxicol Sci*. 2020 Aug 10:kfaa128
4. Generating evidence for precision medicine: considerations made by the Ubiquitous Pharmacogenomics Consortium when designing and operationalizing the PREPARE study. van der Wouden CH, Böhringer S, Cecchin E, Cheung KC, Dávila-Fajardo CL, Deneer VHM, Dolžan V, Ingelman-Sundberg M, Jönsson S, Karlsson MO, Kriek M, Mitropoulou C, Patrinos GP, **Pirmohamed M**, Rial-Sebbag E, Samwald M, Schwab M, Steinberger D, Stingl J, Sunder-Plassmann G, Toffoli G, Turner RM, van Rhenen MH, van Zwet E, Swen JJ, Guchelaar HJ; Ubiquitous Pharmacogenomics Consortium. *Pharmacogenet Genomics*. 2020 Aug;30(6):131-144.
5. Correction: Pharmacogenomic associations of adverse drug reactions in asthma: systematic review and research prioritization. King C, McKenna A, Farzan N, Vijverberg SJ, van der Schee MP, Maitland-van der Zee AH, Arianto L, Bisgaard H, Bønnelykke K, Berce V, Potočnik U, Repnik K, Carleton B, Daley D, Chew FT, Chiang WC, Sio YY, Cloutier MM, Den Dekker HT, Duijts L, de Jongste JC, Dijk FN, Flores C, Hernandez-Pacheco N, Mukhopadhyay S, Basu K, Tantisira KG, Verhamme KM, Celedón JC, Forno E, Canino G, Francis B, **Pirmohamed M**, Sinha I, Hawcutt DB. *Pharmacogenomics J*. 2020 Jul 23.

6. Safety perspectives on presently considered drugs for the treatment of COVID-19. Penman SL, Kiy RT, Jensen RL, Beoku-Betts C, Alfirovic A, Back D, Khoo SH, Owen A, **Pirmohamed M**, Park BK, Meng X, Goldring CE, Chadwick AE. *Br J Pharmacol*. 2020 Jul 17;10.1111/bph.15204.
7. A call for the appropriate application of clinical pharmacological principles in the search for safe and efficacious COVID-19 (SARS-COV-2) treatments. Baker EH, Gnjidic D, Kirkpatrick CMJ, **Pirmohamed M**, Wright DFB, Zecharia AY. *Br J Clin Pharmacol*. 2020 Jun 8.
8. Pharmacogenomics of anticancer drugs: Personalising the choice and dose to manage drug response. Carr DF, Turner RM, **Pirmohamed M**. *Br J Clin Pharmacol*. 2020 Jun 5.
9. Alcohol-related brain injury: An unrecognized problem in acute medicine. Thompson A, Richardson P, **Pirmohamed M**, Owens L. *Alcohol*. 2020 Jun 2;88:49-53.
10. Has the introduction of direct oral anticoagulants (DOACs) in England increased emergency admissions for bleeding conditions? A longitudinal ecological study. Alfirovic A, Downing J, Daras K, Comerford T, **Pirmohamed M**, Barr B. *BMJ Open*. 2020 May 30;10(5):e033357.
11. Genetic Association of Co-Trimoxazole-Induced Severe Cutaneous Adverse Reactions Is Phenotype-Specific: HLA Class I Genotypes and Haplotypes. Sukasem C, Pratoomwun J, Satapornpong P, Klaewsongkram J, Rerkpattanapipat T, Rerknimitr P, Lertpichitkul P, Puangpetch A, Nakkam N, Konyoung P, Khunarkornsiri U, Disphanurat W, Srisuttiyakorn C, Pattanacheewapull O, Kanjanawart S, Kongpan T, Chumworathayi P, Saksit N, Bruminhent J, Tassaneeyakul W, Chantratita W, **Pirmohamed M**. *Clin Pharmacol Ther*. 2020 May 26.
12. Serotonin re-uptake transporter gene polymorphisms are associated with imatinib-induced diarrhoea in chronic myeloid leukaemia patients. Davies A, Rodriguez-Vicente AE, Austin G, Loaiza S, Foroni L, Clark RE, **Pirmohamed M**. *Sci Rep*. 2020 May 21;10(1):8394.
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## Poster

Daniel Hill, Yellow Card Centre Northern & Yorkshire. **Christine Randall**, Yellow Card Centre North West. Hadar Zaman & Babir Malik, University of Bradford. *Student Yellow Card Champions Scheme – a University of Bradford pilot*. Presented at the UKMI Professional Development Seminar, September 2019. <https://www.ukmi.nhs.uk/noncms/conferencedb2019/documents/presentations/posters/Hill%20D%20%20YCC%20Champions%20%20UKMI%20PDS%202019.pdf>

## 7. YCC WEBSITE

### Website updates

Hosting issues are still being investigated at the moment with the merge of two prominent trusts in Liverpool limiting our ability to update the website. The planned move to a new server and access to new software is still our goal and research into the best providers is still on going.

### Number of website hits

We are unable to obtain this information, however this should become available once the hosting issues are resolved.

### Twitter presence

In October 2018 we created a twitter account, @yellowcardnw, by April 2020 we had 160 followers with a moderate engagement on average of 4.4k. It is currently used to raise local and national awareness around safety in health and medicines, reporting ADRs as well as promoting our learning days and champions meetings. This year has been subject to various politically charged trends on social media and as such has limited both our reach and ability to positively engage.

## 8. RESEARCH AND ONGOING INITIATIVES

### North West Coast CLAHRC

The North West Coast Collaboration for Leadership in Applied Health Research and Care (CLAHRC) are developing four projects related to adverse drug reactions as part of their Delivering Personalised Health and Care theme.

The aims of the projects are:

Project 1 - Evaluate implementation of the Liverpool ADR Causality Assessment Tool in clinical practice. The Royal Liverpool (adult) and Alder Hey (paediatric) are selected sites for this evaluation.

Project 2 - Establish a biobank to investigate factors (genetic and non-genetic) underlying the onset of new ADRs.

Project 3 - Evaluate effectiveness of an educational programme in improving awareness of junior doctors to adverse drug reactions, and methods of reporting.

### YCCNW Champions network

The North West-wide network of Yellow Card Champions was set up in 2015 to share good practice, explore ideas and initiatives and lend support. The Champions meet twice a year and the group continues to expand. Secondary care and community or mental health trusts who send representatives to meetings (18 of 26 acute plus 4 of 8 community /mental health) contributed 2,806 reports in 2019/20 (58% of all reports, 84% of secondary care reports and 63% of community/mental health trusts). Nine of the top ten reporting secondary care trusts actively participated in the Champions network in 2019/20.

Presentations at Champions meetings:

- Strategies to improve the detection and reporting of adverse drug reactions - Anita Hanson, Lead research nurse at the Wolfson Centre, University of Liverpool.
- Cutaneous Toxicity from Immune Checkpoint Inhibitors: Experience from a Specialist Dermatology Unit - Dr Vincent Yip, Clinical Lecturer in Clinical Pharmacology & Dermatology, University of Liverpool.
- Medicines Related Admission, Identifying and reducing medicines related harm across Salford - Dr Sam Ravenscroft, Foundation Doctor & Hilary Belither, Clinical Pharmacist for Medicines Safety, Salford Royal Foundation Trust.

## 9. CONCLUSION

In 2019/20 4,859 Yellow Cards were submitted by health professionals, patients and carers from the YCCNW region. This is a 17.1% increase compared to 2018/19. Hospital pharmacists continued to be the highest reporting group (2,147 reports (44% of the total)). This continuing high level of hospital pharmacy reporting correlates well with attendance at North West-wide Champion network meetings. The highest percentage increase in reporting in 2019/20 came from radiographers (38% increase) and hospital pharmacists (31% increase) again confirming that attendance at North West-wide Champion network meetings is impacting on reporting behaviours.