



Enhanced Surveillance of Carbapenemase-Producing Enterobacterales (CPE) 2022



For more information on CPE,
including Factsheets, Case
Definitions and previous years
surveillance reports (pre-pandemic),
please go to
[Carbapenem Resistant
Enterobacteriaceae \(CRE\) - Health
Protection Surveillance Centre
\(hpsc.ie\)](#)



2022 Surveillance Report - Introduction

- Carbapenemase-producing Enterobacterales (CPE), sometimes referred to as carbapenem-resistant Enterobacterales (CRE), are a growing threat to public health due to very limited options for treatment of infection.
- Like most bacteria, CPE can cause a wide range of infections ranging from urinary tract infections (UTIs) and skin and soft tissue infections (SSTIs) to more severe invasive infections, such as bloodstream infections (BSIs).
- CPE, like all bacteria belonging to the Enterobacterales order, are known to colonise patients. Asymptomatic and often unrecognised colonisation contribute to the successful dissemination of CPE, particularly in healthcare settings.
- For more information on CPE, including Factsheets, Case Definitions and previous years surveillance reports (pre-pandemic), please go to [Carbapenem Resistant Enterobacteriaceae \(CRE\) - Health Protection Surveillance Centre \(hpsc.ie\)](https://www.hpsc.ie)





2022 Surveillance Report - Key Points

- Enhanced CPE surveillance was stopped in 2020 due to staff in participating laboratories and the Health Protection Surveillance Centre being re-deployed to other duties as a result of the COVID-19 pandemic. A revised version of CPE surveillance resumed in 2022
- The case definition for the purposes of this enhanced surveillance of CPE was amended to reflect the disease progression and to more accurately reflect the burden in different scenarios (e.g., screening, non-invasive infection, invasive infection).
- In 2022, **861 confirmed CPE isolates** were reported to this surveillance system from 31 of 37 microbiology laboratories. Three laboratories reported nil cases. Three additional laboratories were unable to submit data due to staffing issues.
- Approximately 88% of CPE were associated with colonisation, 10% with non-invasive infection and 2% with invasive infection
- **OXA-48** was the most common enzyme, accounting for **73%** of all CPE.





Summary of reported CPE cases by enzyme and pathogen type, 2022

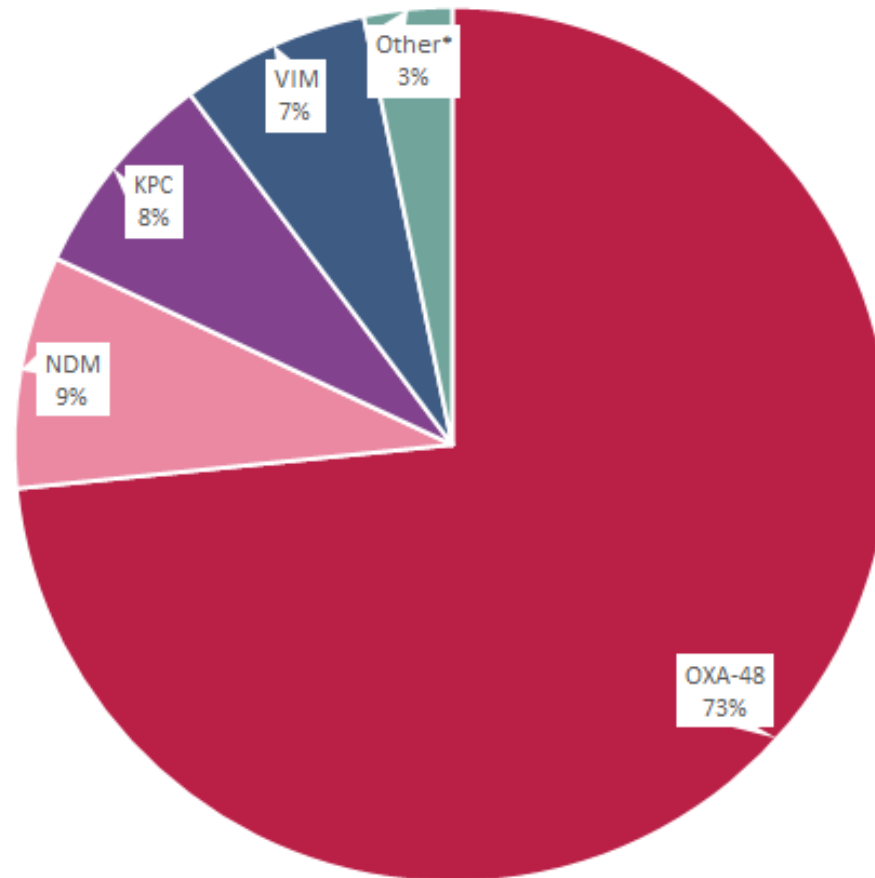
Pathogen	Enzyme					Total
	OXA-48	NDM	KPC	VIM	Other*	
<i>E. coli</i>	226	44	6	0	1	277
<i>E. cloacae</i>	127	6	4	47	8	192
<i>K. pneumoniae</i>	136	18	8	1	6	169
<i>C. freundii</i>	64	1	33	2	6	106
<i>K. oxytoca</i>	53	0	5	4	4	66
<i>Citrobacter</i> spp	10	2	7	0	1	20
Other	9	3	3	2	1	18
<i>Klebsiella</i> spp	2	0	1	4	0	7
<i>Enterobacter</i> spp	5	0	0	0	1	6
Total	632 (73%)	74 (9%)	67 (8%)	60 (7%)	28 (3%)	861 (100%)

*Includes 2 IMI, 2 IMP, 6 KPC and OXA-48 combination, 7 NDM and OXA-48 combination and 10 OXA-48 and VIM combination





Summary of reported CPE cases by enzyme type, 2022



- Almost 3 in 4 (73%) of CPE isolates were OXA-48



*Includes 2 IMI, 2 IMP, 6 KPC and OXA-48 combination, 7 NDM and OXA-48 combination and 10 OXA-48 and VIM combination



Summary of reported CPE cases by enzyme and infection type, 2022

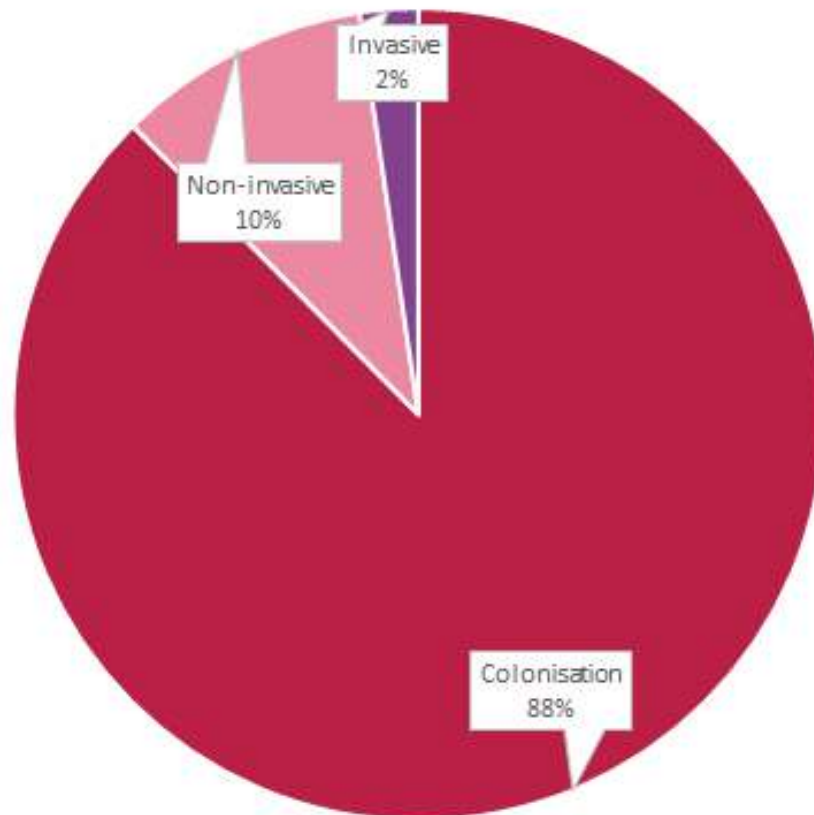
Enzyme	Colonisation	Non-invasive	Invasive	Total
OXA-48	545	69	18	632
NDM	64	10	0	74
KPC	62	2	3	67
VIM	57	3	0	60
Other*	25	3	0	28
Total	753 (88%)	87 (10%)	21 (2%)	861 (100%)

*Includes 2 IMI, 2 IMP, 6 KPC and OXA-48 combination, 7 NDM and OXA-48 combination and 10 OXA-48 and VIM combination





Summary of reported all CPE cases infection type, 2022



- Almost 9 in 10 (88%) of CPEs were associated with colonisation (patients carrying CPE harmlessly in their guts without any signs or symptoms of infection)
- 1 in 10 cases were from patients with non-invasive infections
- Just 2% of cases were from patients with invasive infections





Heatmap of reported CPE cases by enzyme and age group, 2022

Age Group	Total	OXA-48	KPC	NDM	VIM	Other*
0-4	6	2	0	4	0	0
5-9	5	1	0	4	0	0
10-14	4	0	1	3	0	0
15-19	5	2	0	2	1	0
20-24	7	2	0	4	0	1
25-34	29	16	1	10	1	1
35-44	47	32	2	10	3	0
45-54	66	46	3	5	6	6
55-64	97	69	12	7	6	3
65+	594	461	48	25	43	17
Total*	860	631	67	74	60	28



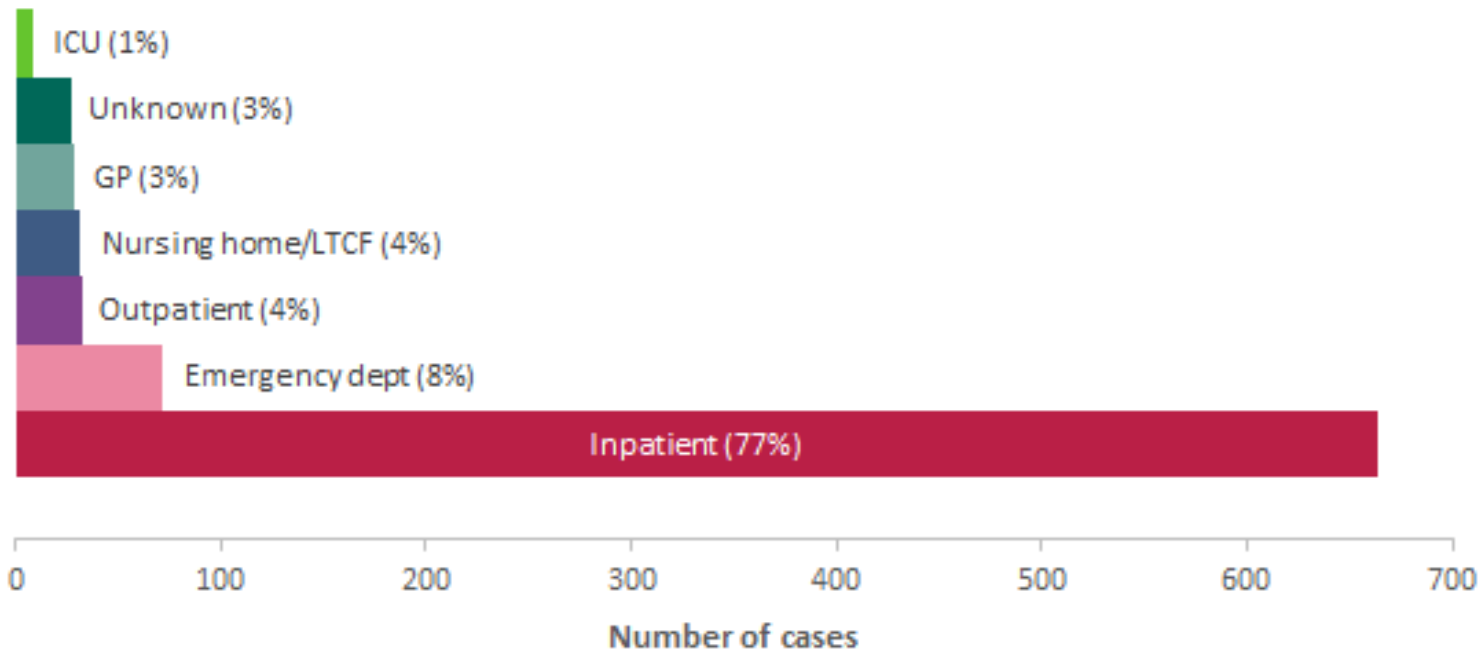
- Over 2 in 3 of all CPEs were reported in older adults (aged 65 years and older)

*Date of birth unknown for one case





Summary of reported CPE cases by location, 2022

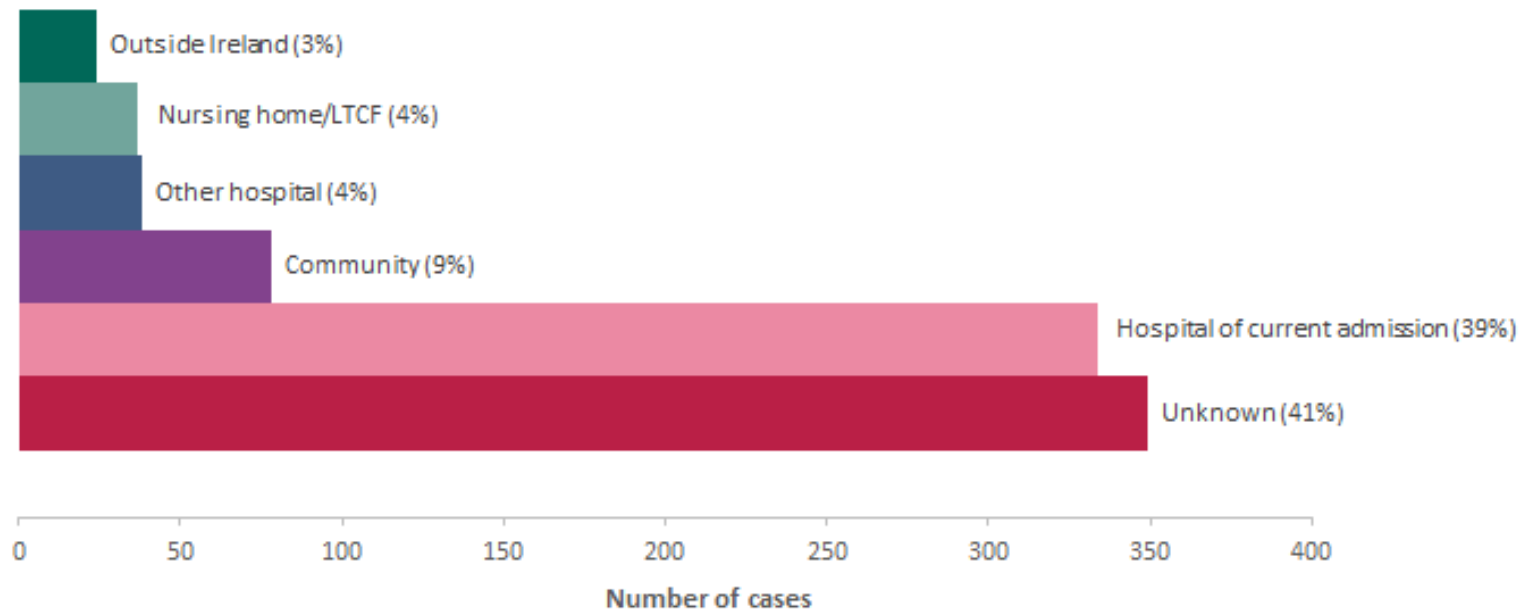


- The majority of CPE cases (90%) are associated with hospitals, including hospital outpatients
- 4% are associated with residents in nursing homes and long-term care facilities
- 3% are from GP patients





Most likely origin of reported CPE cases, 2022



- The most likely origin of CPE cases (where known) was in the hospital of current admission (39%) or another hospital (4%)
- 4% originated in nursing homes or LTCFs
- Almost one in 10 cases (9%) acquired their infection in the community
- 3% of cases were reported to have originated from outside Ireland
- The origin was unknown for over 4 in 10 cases (41%)



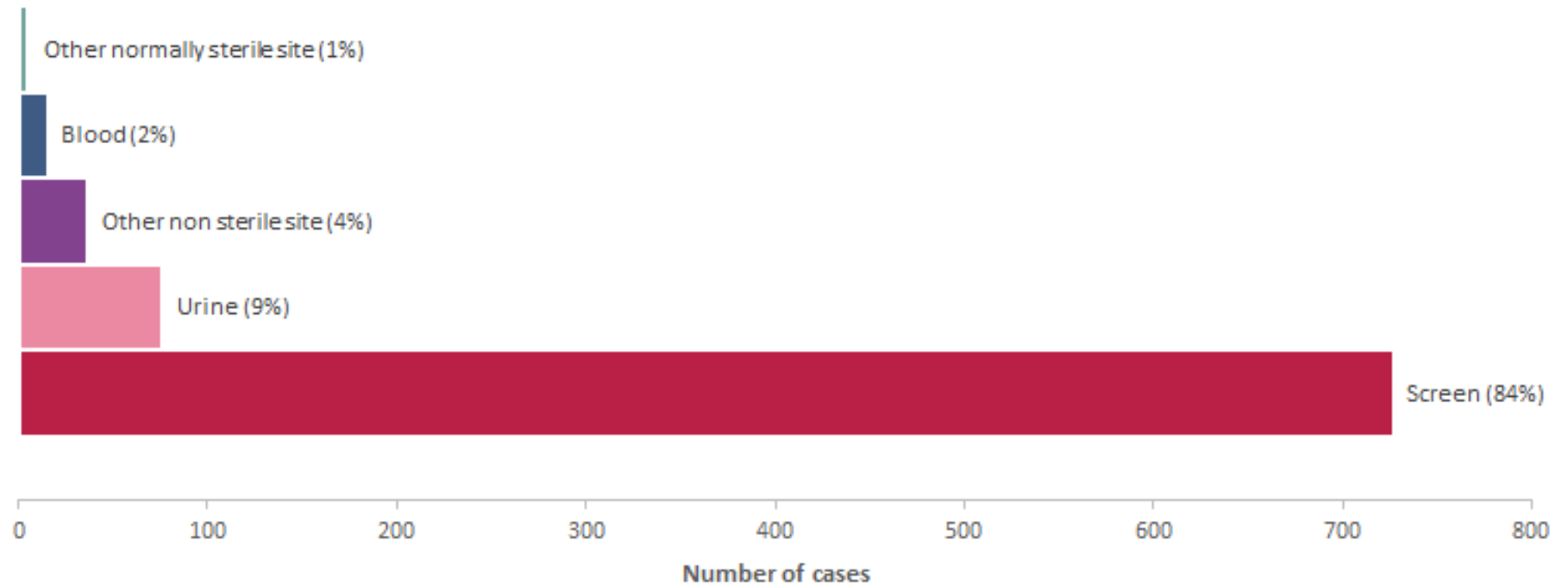


Summary of reported CPE cases by specimen type, 2022

Specimen Type	Colonisation	Non-invasive	Invasive	Total
Screen	727	0	0	727
Urine	15	61	0	76
Other non sterile site	11	26	0	37
Blood	0	0	16	16
Other normally sterile site	0	0	5	5
Total	753 (88%)	87 (10%)	21 (2%)	861 (100%)



Summary of reported CPE cases by specimen type, 2022





Comparison of CPE data for 2022 with the previous CPE report in 2018



- Numbers of CPE (all cases) reported **increased by 60%** between 2018 (when last complete year's data were collected) and 2022*

* only comparing only data from labs reporting data in both years

- The breakdown of cases by colonisation/infection type is relatively unchanged:
 - Colonisation, 88%
 - Non-invasive infection, 10%
 - Invasive infection, 2%





Summary of reported CPE outbreaks, 2022



- There were 26 outbreaks of CPE colonisation reported in 2022.
- All occurred in healthcare settings - hospitals (n=22) and nursing homes/long term care facilities (n=4)
- An enzyme was reported for 6 outbreaks: all OXA-48-like

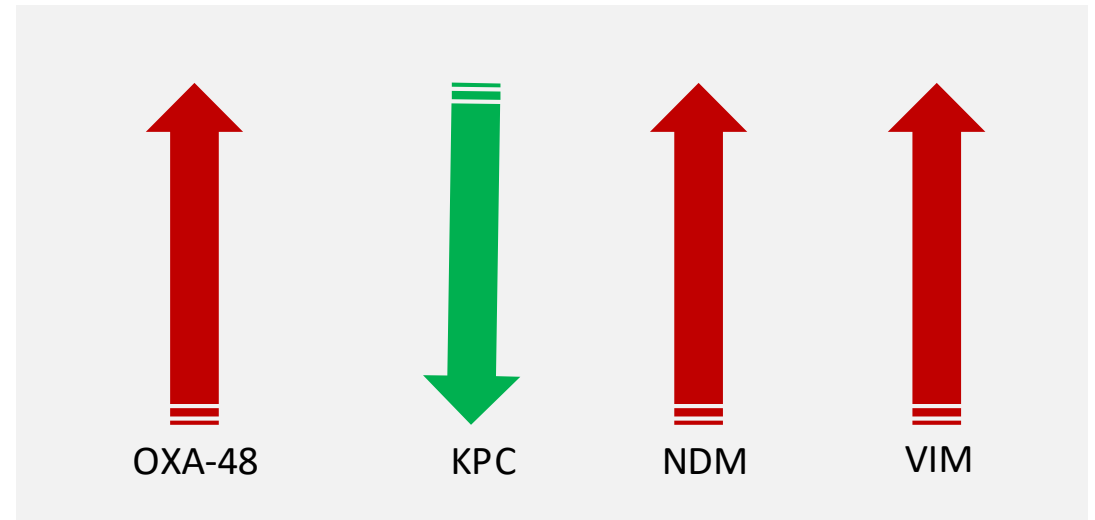




Comparison of CPE data for 2022 with the previous CPE report in 2018



- OXA-48-like enzymes predominated accounting for 73-74% of all CPE in both years.
- Between 2018 and 2022, there has been a change in the numbers of the main enzymes associated with CPE:
 - OXA-48 **increased** by 12%
 - KPC **decreased** by 25%
 - NDM **increased** by 185%
 - VIM **increased** by 200%





Summary of invasive CPE cases reported on CIDR, 2022

The following slides relate to cases of invasive CPE which have been notified to HPSC via CIDR (Computerised Infectious Disease Reporting System).





Summary of invasive CPE cases reported on CIDR, 2022



- On CIDR, there were **27** cases of invasive CPE reported with an epidemiological date in 2022 (of which 18 were notified in 2022 and 9 in 2023).
- 21 cases were isolated from blood culture, accounting for almost 3 in 4 invasive cases; other normally sterile sites (bone – 2; fluid, including ascitic – 3; tissue – 1) comprised the remainder.
- **OXA-48** was the predominant enzyme associated with invasive CPE accounting for 24 cases (89%, or 8 in 9 of all cases); with KPC comprising the remainder.





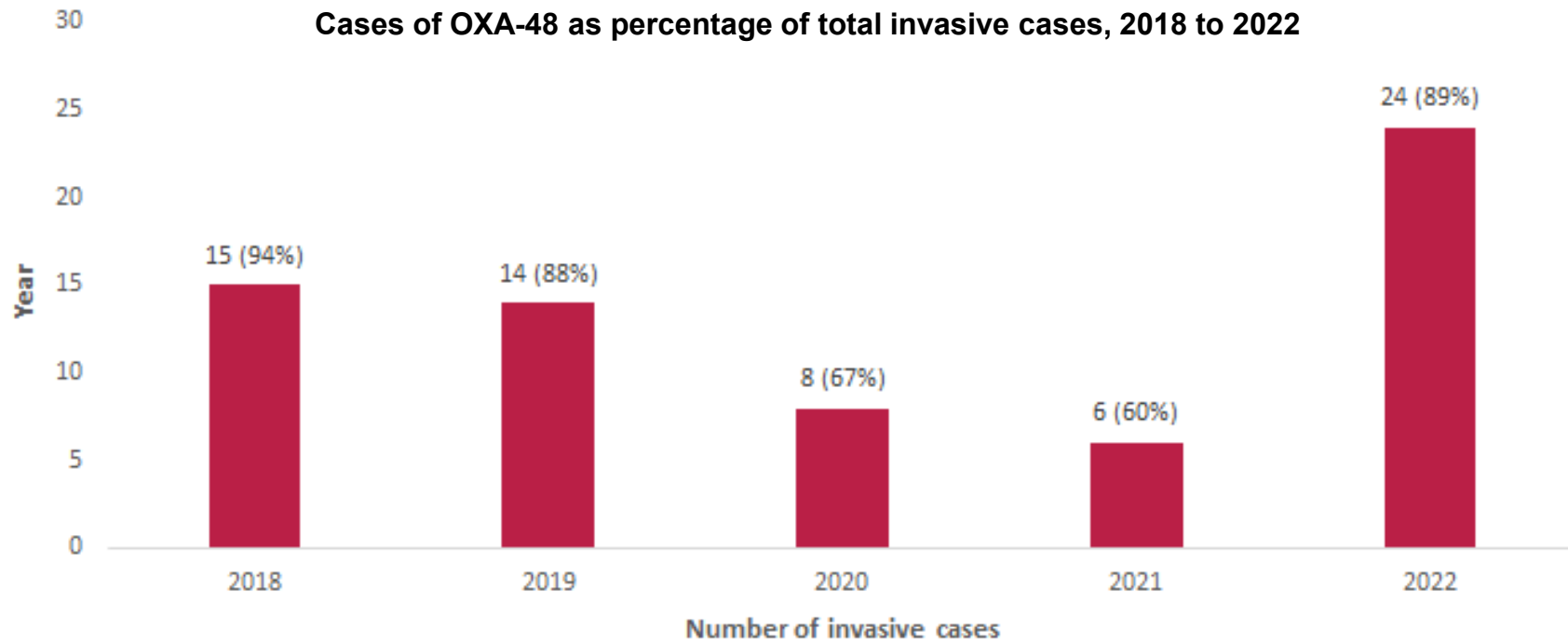
Summary of invasive CPE cases reported on CIDR, 2018 to 2022

Year	Enzyme				Total
	OXA-48	KPC	NDM	VIM	
2018	15	0	0	1	16
2019	14	2	0	0	16
2020	8	2	2	0	12
2021	6	2	1	1	10
2022	24	3	0	0	27
Total	67 (83%)	9 (11%)	3 (4%)	2 (2%)	81 (100%)





Summary of invasive CPE cases reported on CIDR, 2018 to 2022



 **Acknowledgements**

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