National Point Prevalence Survey of Healthcare Associated Infections, Device usage and Antimicrobial use in Long-Term Care Facilities 2023

HALT-4

Wales

Healthcare Associated Infection, Antimicrobial Resistance & Prescribing Programme (HARP)

The Healthcare Associated Infection, Antimicrobial Resistance & Prescribing Programme can be accessed via the Public Health Wales website: Antibiotics and Infections - Public Health Wales (nhs.wales)

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Survey characteristics and population in Welsh LTCFs 2023

- A total 1167 residents from 26 long-term care facilities (LTCFS) were included in the 2023 PPS (HALT-4).
- The types of LTCFs comprised of 12 mixed, 8 general nursing homes, 5 residential and 1 psychiatric LTCF.
- Residents over 85 years of age accounted for 51.1% of residents and 65.2% of residents were female.

Risk factors for infection in Wales 2023

- Risk factors collected for each resident included: over 85 in age, non-ambulant, disorientation, incontinence, presence of a urinary / vascular catheter, pressure sores, other wounds, or recent surgery.
- A total of 55.4% were non-ambulant; 60.9% were disorientated in time and/or space and 66.7% were incontinent of urine and/or faeces. A total of 2.1% of residents had pressure sores and 8.1% other wounds.

Characteristics of HAI in Welsh LTCFs 2023

- A total 89 residents had one or more HAIs reported with a prevalence of 7.6% (increase since 2017). The most common infections reported included RTI (58.7%), UTI (25.0%) and skin / soft tissue (13.0%) (comparable to those reported in the 2017 survey).
- No RTIs were reported as COVID-19, influenza, or pneumonia (more likely common cold / pharyngitis; other lower respiratory). The majority were attributed to females (83.3%) and residents over the age of 85 (68%).
- For UTIs, only 34.8% were confirmed cases. In general, 35% of all UTIs were diagnosed via a urine dipstick.
- UTIs were attributed mainly to female residents (65.2%) and to residents over the age of 85 (65.2%).
- A urinary catheter was present in 30.4% of residents identified with a UTI.

Device usage in LTCFs in Wales 2023

- Overall, 104 residents had an in-situ device (prevalence 8.9%), 99 residents specifically with a urinary catheter, giving a prevalence of 8.5%.
- Although the prevalence has increased since the 2017 survey (7.5%), this was not significant.

Antimicrobial usage in LTCFs in Wales 2023

- A total of 102 residents in LTCFs were prescribed one or more antimicrobials, giving an overall prevalence of 8.7% (compared with 10.2% in 2017).
- A total of 16 different antimicrobials were prescribed with approximately 81% and 19% prescribed for treatment and medical prophylaxis, respectively. Medical prophylaxis has halved since 2017.
- ***Antimicrobials for treatment of infection:*** Common reasons for treatment: RTI (62%), UTI (18%). Amoxicillin and trimethoprim were the commonest antimicrobial prescribed for an RTI (56.1%) and UTI (47.1%), respectively. Nitrofurantoin use has increased since the 2017 survey; trimethoprim use has declined (2023 survey, 50% of each prescribed, compared to 5-fold more trimethoprim versus nitrofurantoin in 2017).
- ***Antimicrobials for prevention of infection:*** Top three infections: UTI (38%), skin / wound infections (33%) and RTI (19%). Methenamine was the commonest drug prescribed (antiseptic) for prevention of UTIs.

Infection prevention and control practice / antimicrobial policy activities and written protocols

- IP&C practice and training was evident within LTCFs, some practice was variable but written protocols were available by most. Antimicrobial policy activities remain low, however written protocols are evident by the majority of LTCFs.
- Vaccination (COVID-19 / influenza): Only 18% of homes reported residents fully vaccinated (both infections), for staff this decreased to 12% for COVID-19 and no staff were fully vaccinated for influenza.

Recommendations

- Further reduce the burden of UTIs within care home residents (multi-modal approach).
- Explore the burden of RTIs, particularly in residents over 85 years within LTCFs.
- Explore further the duration of prescribing for RTIs and compliance with current all Wales prescribing guidelines.
- Determine in greater detail the types of skin and soft tissue infections within LTCFs including the appropriateness of prescribing both as treatment and prophylactic cover.
- Further establish vaccination rates within LTCFs and improve on vaccine uptake of residents and staff for COVID-19 and flu.
- Continue to provide education and guidance around IP&C activities and ensure LTCFS have adequate access to resource and learning material.
- Work with primary care colleagues, particularly pharmacists to improve on the knowledge and importance of antimicrobial stewardship within care homes.
- Develop and establish a programme of work within the care home sector to prevent / reduce HAIs and ensure appropriate prescribing. This should cover surveillance, quality improvement initiatives, education, and training – a whole systems approach.

1. Introduction

Prevention and control of healthcare-associated infections (HAIs) and antimicrobial resistance (AMR) in long-term care facilities (LTCFs) are of high priority for the National Health Service (NHS) and Public Health Wales (PHW). HAIs and AMR are a serious public health risk, particularly considering Wales's ageing population. There were estimated to be 673,740 people aged 65 years and over living in Wales in 2022 (Stats Wales 2022). In 2020 / 21, over 20,651 people aged 65 or over lived in a care home. This represents approximately 3.1% of people over the age of 65 in Wales, up from 2.4% in 2017-18 (Older People's Commissioner for Wales 2023). It is predicted that this will continue to rise globally in the next twenty-five years (Carey *et al*. 2020).

For elderly residents living in care homes, the onset of infection represents the most common cause of hospital admission and death, particularly if they evolve into sepsis (Yoshikawa *et al.* 2019). The vulnerable and elderly population are already more susceptible to infection due to chronic health problems and consequently their ability to fight infection is reduced (Carey *et al.* 2020). The HAIs in this elderly population are associated with a significant clinical and economic burden, from a patient and health-system perspective (Borodino *et al.* 2021). Unplanned hospital admissions cost the NHS over £11 billion a year (Carey *et al.* 2020). The most frequent endemic infections include urinary tract infections (UTI), respiratory tract infections (RTI) and skin and soft tissue infections (Jeffrey and Harrison 2018; Vicentini *et al.* 2023). A significant proportion of HAIs are preventable, and therefore can be a valuable marker of quality of resident care (Bordino *et al.* 2021; Umscheid *et al*. 2011). Previous research within care homes has found that antibiotics are often over-prescribed, increasing the development of antibiotic resistant infections in this susceptible group (Jeffrey and Harrison 2018; Vicentini *et al.* 2023; Hughes *et al.* 2020; Ripabelli *et al.* 2019). Point prevalence studies (PPS) in care homes show a high use of antibiotics, especially to treat RTIs and UTIs (Jeffrey and Harrison 2018; Sundvall *et al.* 2015; Thornley *et al.* 2019). Furthermore, antibiotics are frequently prescribed without the presence of infection or inappropriately (Thornley *et al.* 2019).

Healthcare Associated Infections in Long Term Care Facilities (HALT) is a project supported by the European Centre for Disease Prevention and Control (ECDC) (European Centre for Disease Prevention and Control 2023a). The project provides methodology for continued assessment of the prevalence of HAIs, antimicrobial use, infection prevention and control resources and antimicrobial activity in European LTCFs. Since 2010, other than the ECDC PPS in LTCFs across Europe (including Wales), data within the UK remains limited. Results from HALT 3 (2016 / 2017) estimated that at least 4.4 million HAIs occur each year in LTCFs in Europe (European Centre for Disease Prevention and Control 2023b). Many LTCFs do not have their own surveillance programmes or feedback mechanisms in place in respect of HAIs, antimicrobial prescribing, or AMR. Care home settings provide the opportunity for spread of infection in a population where vulnerable groups live together in proximity. The profile of residents is also changing in relation to healthcare processes. There is an increase in the level of care required for residents, because of earlier discharge from acute care hospitals (Umscheid *et al.* 2011). For these reasons infection prevention and control is a continuing challenge within the care home setting.

Between October and December 2023, the HARP programme in PHW carried out a PPS in LTCFs using the ECDC (2023a) HALT 4 method of HAI, device usage and antimicrobial use. The survey was supported by Infection Prevention & Control

colleagues within health boards in Wales. The results from this survey will provide an opportunity for PHW to review the current epidemiology of HAI and antimicrobial prescribing patterns and share findings with the participating LTCFs in Wales. Results from this survey will also inform advice to Welsh Government, Health Boards, and other public health colleagues on key priority areas of work around infection reduction, antimicrobial stewardship and quality improvement interventions required to reduce AMR and infections within LTCFs.

Aims and objectives

To conduct a PPS within a sample of LTCFs in Wales and report findings at a Wales level and with specific reports to LTCFs taking part. Specific objectives of the HALT-3 survey are to:

- Determine the HAI prevalence, including the type of infections causing the greatest burden of disease within LTCFs.
- Determine the prevalence of device usage and estimate device related infections.
- Measure antimicrobial prescribing and report on types and duration of antimicrobials prescribed.
- Evaluate and report on the coordination of medical care, infection prevention and control practice and antimicrobial policy within LTCFs in Wales.
- Evaluate the current support network and surveillance programmes for LTCFs in relation to IP&C and antimicrobial prescribing.
- Identify areas for intervention, training and/or additional IP&C / stewardship support, both at a local and all-Wales level to enhance the safety of healthcare for residents in LTCFs and the ageing Welsh population in general.

2. Methods

Study design

The HALT-4 PPS was undertaken in Welsh LTCFs across Wales between October 2023 and December 2023. Convenience sampling was used for recruitment of LTCFs to the survey with voluntary participation by LTCFs. The survey protocol in Wales was developed by PHW, HARP using the ECDC protocol for PPS for LTCFs (2023a) with some minor adaptations to antimicrobial data, in line with the all-Wales Primary Care antibiotic guidelines (All Wales Antimicrobial Pharmacist Group, All Wales Antimicrobial Guidance Group and All Wales Medicines Strategy Group. 2022). Members of health board Infection Prevention and Control teams collected the data with support from the HARP team. Each LTCF surveyed was completed within one day.

Data capture in Wales was via a data collection tool developed in Microsoft Excel. The collection tool allowed for all required data fields to be collected and responses via drop down menus. Specific data was requested for all residents and further information was required for residents on a course of systemic antimicrobial(s) and/or presenting signs or symptoms of an active HAI on the day of the PPS. In addition, an institutional questionnaire could be completed (voluntary) by the care home manager during the visit. The latter was to collate data around medical care and coordination, infection prevention and control practice and antimicrobial policy within the LTCF.

Any suspected infections were confirmed by meeting ECDC (2023a) case definitions of infections (Annex 4 of the ECDC protocol). Data collection requirements and definitions, produced by HARP, were made available to data collectors prior to the visit and additional information around definitions was included within the data collection tool. This allowed for greater consistency on infection data across Wales.

Data was extracted from several sources available within each LTCF at the time of the survey. These included nursing and medical notes, observation charts, prescription charts, laboratory reports (microbiology results) and resident care plans. Data could also be collected by verbal communications with LTCF managers and other LTCF staff.

Training and support

In-house training for data collectors was provided by the HARP team PPS lead by means of a power point presentation and a question-and-answer session. A materials package was set-up for data collectors to assist with data collection on the day of the survey. Materials included the data collection tool, with instructions, data collection and definitions and detail around the institutional questionnaire. In addition, an e-learning training package was developed by the Training and Guidance team, PHW, containing all information required to recruit and conduct the PPS (Public Health Wales 2023a).

Inclusion and exclusion criteria

Eligibility criteria for LTCFs

To full-fill a national level PPS recruitment a minimum of 25 LTCFs were required to represent a 'good' sample size. Representation was required across Wales, if possible, with a typical home consisting of between 15 – 65 residents.

All types of LTCFs were eligible to participate, including:

- General nursing homes
- Residential homes
- Specialised LTCFs
- Mixed LTCFs

Health boards were encouraged to recruit some homes that had previously participated in the PPS (2017), if possible.

Eligible residents

All adult residents who lived full-time (24 hours a day) in the LTCF and were present at 08:00 AM on the day of the survey were included.

Data collection and management

Data collection

An appointment letter was emailed to recruited LTCFs detailing the agreed date of the PPS and consent to carry out the survey. In addition, an information sheet summarising the purpose of the survey and data collected was included. A total of 26 LTCFs were recruited.

Data were collected using a HARP data collection tool (Microsoft Excel) with built-in drop-down menus with all specific data requirements. Data on resident demographics, the presence of intrinsic and extrinsic risk factors, antimicrobial prescriptions and the presence of an infection were collected (as shown below):

Care home level:

- Care home identifier (initials of care home name), care home type
- Total number of resident rooms in the LTCF (available and occupied beds)

Resident level (all):

- General data (sex, date of birth)
- Possible risk factors (urinary catheter, vascular catheter, wounds (pressure sores), wounds (other), disorientation, mobility status, surgery in the last 30 days, incontinence (urinary and / or faecal)
- Signs/symptoms of infection, residents on antimicrobials

Resident level (those on antimicrobials and / or infection signs and symptoms):

- Length of stay at the care home (less or more than 1 year).

- Admission to hospital in the last 3 months.
- Antimicrobial data (name, administration route, antimicrobial prescribed for (provide type of infection), type of treatment (prophylactic / therapeutic), start date of treatment if prophylactic, duration of prescription (therapeutic and prophylactic), prescribed where? (LTCF / hospital).
- Signs and symptoms of infection based on ECDC HALT protocol (2023a) criteria and the definition sheets provided by HARP.
- If a UTI diagnosed, method of diagnosis (microbiologically / dipstick / blood)
- Other detail pertains to the infection – present on admission to the facility / date of onset / origin of infection (e.g., LTCF / hospital).
- Inclusion of microbiology available during the survey for the infection noted, including both a positive organism and a negative result.

Specific questions on coordination of medical care, infection prevention and control practice and antimicrobial policy were collected.

Data and statistical analysis

Data was managed, analysed and outputs produced using R (v4.3.3; R Core Team, 2024). The prevalence of HAIs, antimicrobials and devices was reported as the number of patients with one or more HAIs (or antimicrobials or devices) per 100 patients surveyed. Prevalence of individual HAI types, antimicrobial drugs or device types were also reported per 100 patients and 95% Wilson confidence intervals (CIs) were calculated using R (v4.3.3; R Core Team, 2024). Data were compared in the latest survey (2023) with the 2013 and 2017 PPS where applicable (European Centre for Disease Prevention and Control 2014; Jeffrey and Harrison 2018). A Chi-square test was performed to determine significance of results obtain where applicable using R (v4.3.3; R Core Team, 2024).

3. Results

Survey Characteristics

A total of 1,167 residents from 26 LTCFs were included in the 2023 survey (between October – December). The size of participating LTCFs ranged from 22 to 120 available beds with a median of 43. The total number of LTCFs, resident rooms and residents included in the 2023 HALT-4 PPS are described in Table 1. The types of LTCFs included in the 2023 survey comprised of 12 mixed LTCFs, 8 general nursing homes, 5 residential and 1 psychiatric LTCF (Table 2).

Table 1: *Total number of LTCFs, resident rooms, and residents surveyed HALT-4 (2023)*

No. LTCFs	Total resident rooms	Total residents
26	1,239	1,167

Table 2: *Types of Long Term Care Facility surveyed in HALT-4 (2023)*

LTCF type	Number
Mixed LTCF	12
General nursing home	8
Residential home	5
Psychiatric LTCF	1

Survey population and risk factors

Survey population

From the data supplied on 1,167 residents, there were 23 residents with an unknown age. Of the 1144 residents with an age noted, 51.1% were over 85 years, ranging from 36 to 106 years, with a median age of 85 years. The lower age group was attributed to one particular care home caring for younger adults and a psychiatric facility. Of note, there were two LTCFs surveyed housing younger residents and the age ranges within these facilities were 36-95 (one LTCF with a maximum age of 79). Overall, a total of 65.2% of residents were female and accounted for a larger proportion of residents over the age of 85 years (73.7%), reflecting similar trends to 2017. The age and sex distribution of the LTCF resident population for the 2023 survey is shown in Figure 1.

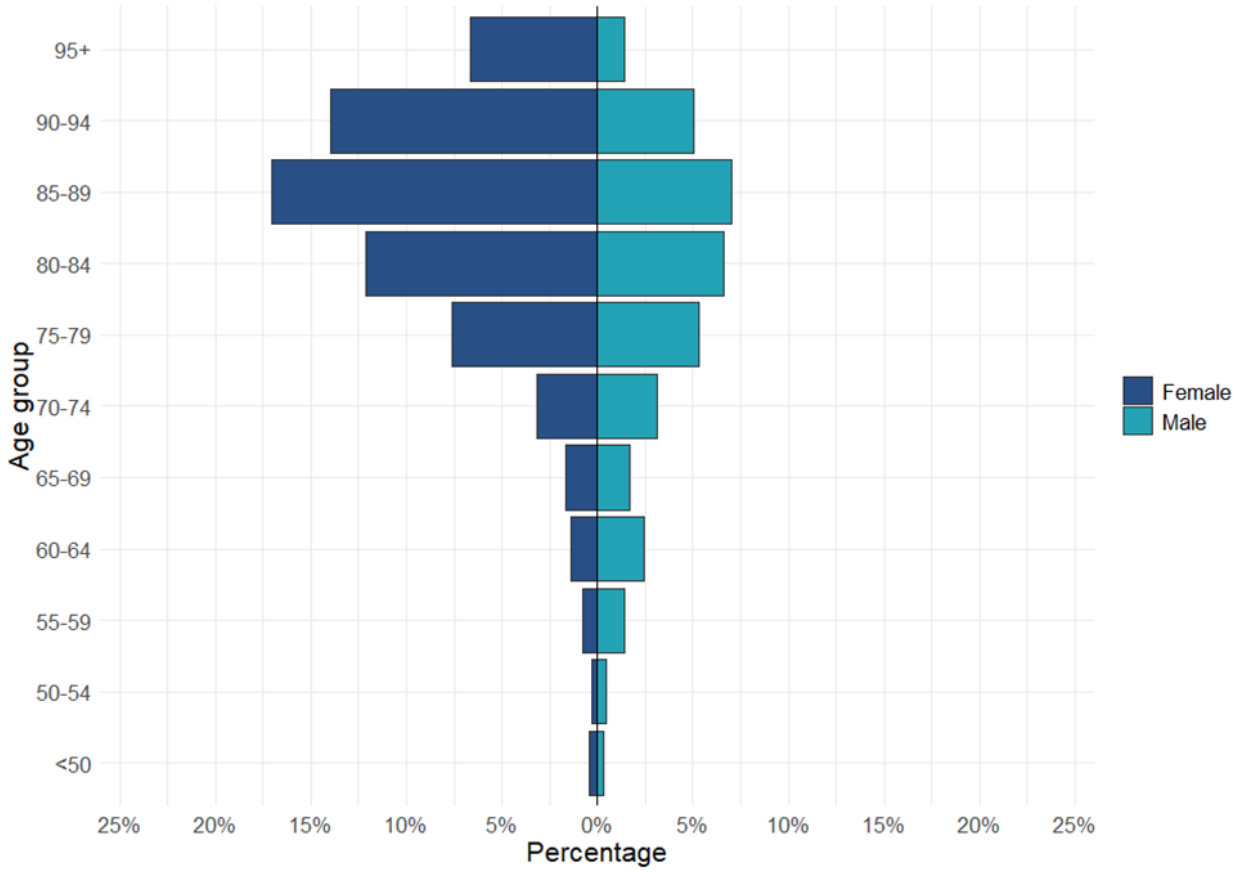


Figure 1: *Population pyramid for the LTCF resident population (2023)*

Risk factors

Risk factors collected for each resident included age (over 85 years), non-ambulant, disorientation, incontinence, presence of a urinary / vascular catheter, pressure sores, other wounds, or recent surgery. Figure 2 provides detail on the prevalence of risk factors noted and a comparison with 2023 / 2017 data. The tabulated data provides additional information on the confidence intervals around the prevalence for each risk factor. The graph allows for easier comparison between 2017 and 2023 data.

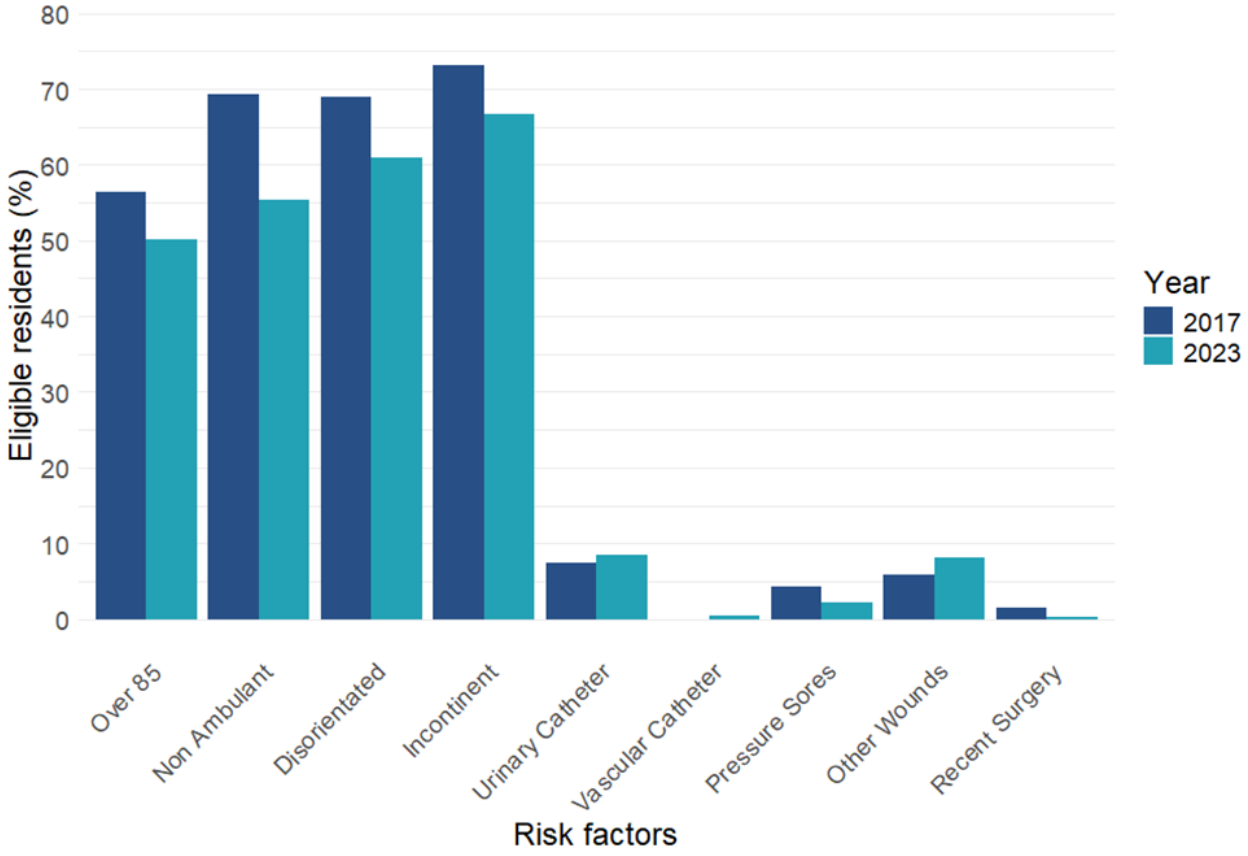


Figure 2: *Resident risk factors: comparison between HALT-3 (2017) and HALT-4 (2023) resident data*

Table 3: *Resident risk factors (2017 and 2023)*

	Eligible residents (%)	
Prevalence of risk factors	**2017**	**2023**
Over 85	56.4 (53.4-59.4)	51.1 (48.2-54.0)
Non Ambulant	69.4 (66.6-72.1)	55.4 (52.5-58.2)
Disorientated	69.0 (66.1-71.7)	60.9 (58.1-63.7)
Incontinent	73.1 (70.4-75.7)	66.7 (63.9-69.3)
Urinary Catheter	7.5 (6.1-9.3)	8.5 (7.0-10.2)
Vascular Catheter	0.0 (0.0-0.4)	0.5 (0.2-1.1)
Pressure Sores	4.2 (3.1-5.6)	2.1 (1.5-3.1)
Other Wounds	5.8 (4.5-7.4)	8.1 (6.7-9.9)
Recent Surgery	1.5 (0.9-2.5)	0.3 (0.1-0.8)

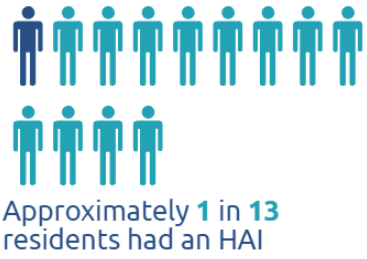
A total of 51.1% of residents were over 85 years in age. A total of 55.4% were non-ambulant; 60.9% were disorientated in time and/or space and 66.7% were

incontinent of urine and/or faeces. The percentage of residents who were non-ambulant, disorientated, or incontinent in the 2023 survey were less than the percentage noted in the 2017 survey with percentages of 69.4%, 69.0% and 73.1%, respectively (2017). The percentage decrease noted between the 2023 and 2017 results was significant ($p<0.05$). This downward trend was also noted when compared with the 2013 survey. In addition, a total of 2.1% of eligible residents in the 2023 survey were identified with a pressure ulcer, compared to 4.2% in 2017 survey, with a significant decrease noted ($p<0.05$). A significant decrease ($p<0.05$) in the percentage of residents who had recent surgery was noted in the 2023 survey compared with 2017 (0.3%, 1.5%, respectively).

A total of 8.1% of eligible residents were identified in the 2023 survey to have a wound (other) compared to 5.8% in the 2017 survey, with a significant increase noted ($p<0.05$). Eligible residents with an in situ catheter was greater in the 2023 survey (8.5%) compared with 2017 (7.5%). In addition, a small number of residents had a vascular catheter in situ compared with none in 2017.

Healthcare associated infections within long-term care facilities (LTCF) in Wales 2023

Prevalence of HAI in LTCFs 2023

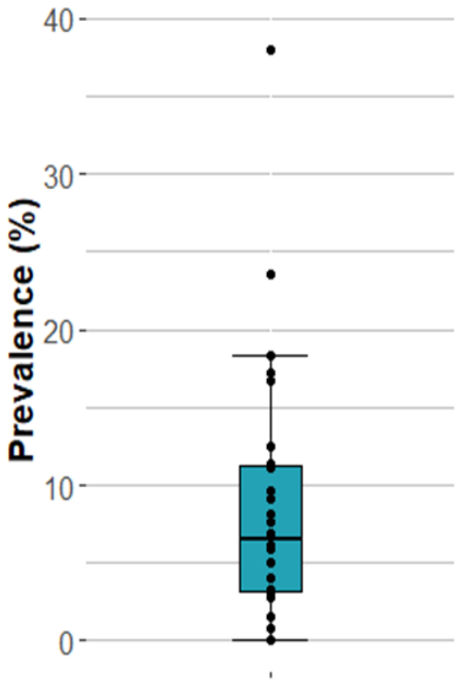


A total of 89 residents in LTCFs had at least one HAI at the time of the survey. The overall prevalence was 7.6% (95% CI: 6.2-9.3). The HAI prevalence in 2023 was higher than in 2017 (6.0%) and 2013 (3.8%). A significant increase in the prevalence ($p<0.05$) was only noted between 2023 and 2013 (Table 4).

Table 4: *Prevalence of HAI in LTCFs in Wales (2023) and comparison with (2017 and 2013)*

LTCF	No. residents	No. residents with HAI	HAI prevalence (%)		
			2023	2017	2013
All LTCFs	1,167	89	7.6 (6.2-9.3)	6.0 (4.7-7.6)	3.8 (3.1-4.6)

The prevalence of infection by LTCF ranged from 0% to 38%.



A total of 89 HAIs were reported during the 2023 survey. A box plot is shown in Figure 3, which details the distribution of infection prevalence by LTCF. Each dot represents a LTCF. The upper and lower lines represent data within 1.5 times the inter-quartile range. Any dots outside of the box plot show that a LTCF is an outlier. Two LTCFs were an outlier.

The median infection prevalence was 6.5% to take into consideration the outliers.

Figure 3: *Distribution of infection prevalence by LTCF in Wales (2023)*

Characteristics of HAI occurring in LTCFs 2023

Overall, 92 infections were reported during the 2023 survey. Specifically, 3 residents had a second infection reported, 1 resident with a RTI, 2 residents with a UTI as their second infection. The most common HAIs reported in the 2023 survey were respiratory tract infection (RTI) (58.7%), and urinary tract infections (UTI) (25.0%). This was similar to the 2017 survey, where the highest reported HAI type was RTI (46.0%), with UTI the second highest accounting for 39.7% of infections.

There was a significant increase in the RTI numbers reported in 2023 compared to 2017 ($p<0.05$). There was no significant difference between reported HAIs for UTI in 2023 compared to 2017 ($p>0.05$). Skin infections were the third highest infection noted in the 2023 survey, accounting for 13.0% of HAIs. This rate was similar to the 2017 survey.

Table 5 details the number, percentage, and prevalence of HAI by infection type for 2023. Figure 4 shows the distribution of HAI types in LTCFs in 2023 compared with 2017. Over 95% of HAIs identified were attributable to the LTCF in 2023 (3 were unknown, 1 attributed to a hospital).

Table 5: *Number and prevalence of HAIs by infection site in LTCFs in Wales (2023)*

Infection site	No. infections	% of HAIs	Prevalence (%)	95% CI
RTI	54	58.7	4.6	3.6-6.0
UTI	23	25.0	2.0	1.3-2.9
Skin	12	13.0	1.0	0.6-1.8
Ear, Eye, Nose and Mouth	1	1.1	0.1	0.0-0.5
Gastrointestinal Tract *	1	1.1	0.1	0.0-0.5
Other	1	1.1	0.1	0.0-0.5
Total	92	100.0	7.9	6.5-9.6

*The Gastrointestinal Tract infection had a positive microbiology result for *Clostridioides difficile.*

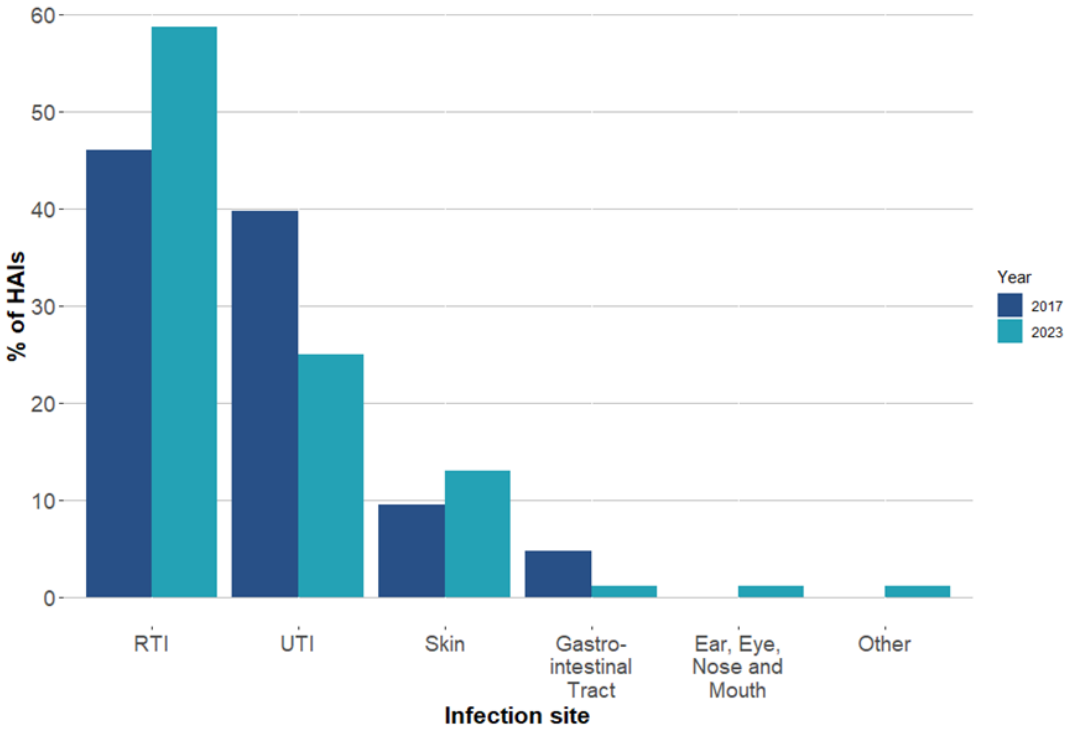


Figure 4: *Distribution of HAI types in LTCFs in Wales for 2023 in comparison to the previous survey in 2017*

Detail on the top two infections within LTCFs in Wales 2017

Respiratory tract infection (RTI)

A total of 54 out of 92 (58.7%) reported HAIs were identified as RTI. No influenza, pneumonia or COVID-19 were diagnosed. The infections were mainly attributed to female residents (83.3%). Over 68% of all RTI (37 infections) were in residents over 85 years old and 66.7% had been a resident at the LTCF for longer than 1 year. The percentage of RTIs in residents over 85 years in the 2023 survey was double the percentage in 2017, although the number of residents in the age category were similar. Over 94% of residents (51 of 54 residents) with RTIs were prescribed antimicrobials for treatment.

Of the 17 LTCFs that completed the questionnaire, 78.6% of LTCFs had therapeutic guidelines in place for RTIs and 94.1% had a written protocol for the management of RTIs. The increase in RTI noted during the 2023 survey may have been due to a great number of LTCFs being surveyed during December, compared with 2017.

Urinary tract infection (UTI)

A total of 25% (23 out of 92) of reported HAIs were identified as UTI. However, only 34.8% (8) were recorded as 'confirmed' infections with 60.9% (14) noted as 'probable' infection following the ECDC case definition for a UTI. One case did not

include the confirmation status. When comparing to the 2017 survey, the percentage of confirmed UTIs has decreased approximately by 20% and the percentage reported as 'probable' infections has increased. Confirmed UTIs required signs and symptoms of infection present, and a urine culture confirmed as positive. Probable UTIs included signs and symptoms present with no urine culture taken, or results were negative or unknown. It is important to note that of the 8 'confirmed' infections, the method of diagnosis of infection included 3 by microbiology only, 1 by dipstick and microbiology, 1 dipstick only and 3 'other'. The 'other' 'confirmed' reports are likely to be confirmation of a positive result by the GP in the residents' notes. For probable UTIs, 43% were diagnosed via a dipstick. In total, 35% of all UTIs were diagnosed via a urine dipstick, with all residents being over the age of 65.

UTIs were attributed mainly to female residents (65.2%). A total 65.2% of UTIs were in residents over 85 years of age and 34.8% had been a resident at the LTCF for longer than 1 year. The percentage of UTIs in residents over 85 years in the 2023 survey increased by approximately 17% compared with the 2017 survey, although the number of residents in the age category were similar. A urinary catheter was present in 7 out of 23 (30.4%) of residents identified with UTI, compared with 20% in 2017.

Of the 17 LTCFs that completed the questionnaire, over 71% of LTCFs confirmed that they had therapeutic guidelines in place for UTIs and over 88% had a written protocol available for the management of urinary catheters.

Microbiology results available in LTCFs

Microbiology results were available at the time of survey for 7 out of the 92 HAIs identified (7.6%). The microorganisms recorded were *Escherichia coli* (three UTIs), *Staphylococcus aureus* (one UTI and one skin infection), *Clostridioides difficile* (Gastrointestinal infection), Yeast (RTI). Availability of microbiology results have increased more than 2-fold since the 2017 survey where only 3.2% results were available.

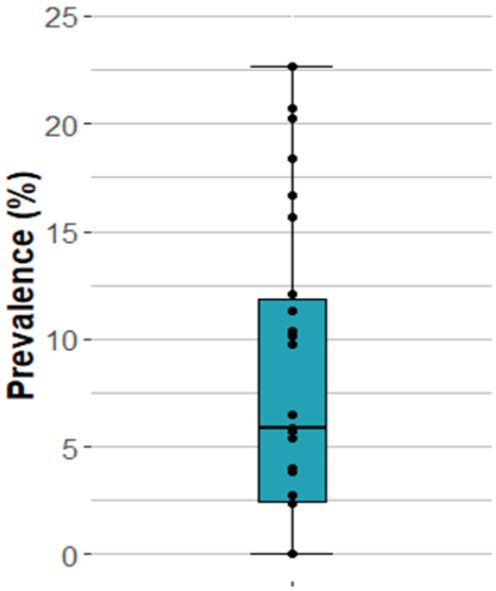
Prevalence of in situ devices within LTCFs in Wales 2023

A total of 104 residents in LTCFs had an in situ device during the survey. The overall prevalence was 8.9% (95% CI: 7.4-10.7) (Table 6).

Table 6: *Prevalence of urinary catheters within LTCFs in Wales (2023)*

2023 (Residents = 1167)			
In situ device	**No. residents**	**Prevalence (%)**	**95% CI**
Overall	104	8.9	7.4-10.7
Urinary catheter	99	8.5	7.0-10.2
Vascular catheter	6	0.5	0.2-1.1

Note, the overall prevalence in table 6 includes a resident with one or more devices in situ. Although one resident had both a urinary and vascular catheter in situ they would only be counted once in the overall prevalence figure for in situ devices. This accounts for the discrepancy between the overall number noted and the individual device numbers. The prevalence of in situ devices ranged from 0% - 22.6% within LTCFs.



A total of 104 residents were reported to have an in situ device during the 2023 survey. Figure 5 is a box plot, which shows the distribution of in situ device prevalence by LTCF. Any dots outside of the box plot show that a LTCF is an outlier when considering the in situ device prevalence for the survey. There were no outliers.

The median prevalence was 5.9%. The decrease noted was due to 6 LTCFs with no residents with an in situ catheter.

A urinary catheter was present in 7 out of 23 (30.4%) of residents identified with a UTI.

Figure 5: *Distribution of in situ device prevalence by LTCF in Wales (2023)*

The prevalence of urinary catheters in LTCFs 2023 was compared with the 2017 and 2013 surveys. Table 7 provides the prevalence for each survey year noted.

Table 7: *Prevalence of urinary catheters in LTCFs in Wales (2023) and comparison with (2017 and 2013)*

	Prevalence (%)		
No. residents with a urinary catheter	2023	2017	2013
99	8.5 (7.0-10.2)	7.5 (6.1-9.3)	5.4 (4.5-6.4)

The prevalence of urinary catheters in residents in LTCFs ranged from 8.5%, 7.5% and 5.4% in 2023, 2017 and 2103, respectively with a steady increase in usage since 2013. The difference noted in the prevalence between the 2023 and 2017 surveys was not significant ($p>0.05$). However, a significant difference was noted between the urinary catheter prevalence for 2023 and 2013 ($p<0.05$).

Antimicrobial usage in LTCFs in Wales 2023

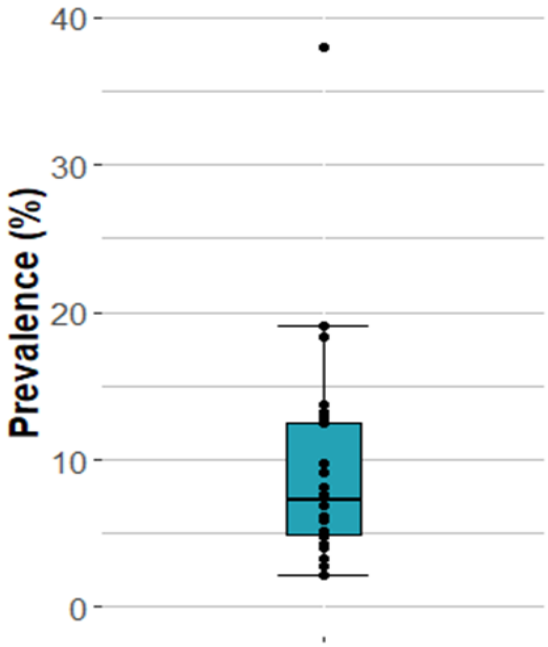
Prevalence of antimicrobial prescribing in LTCFs 2023

A total of 102 residents in LTCFs were prescribed one or more antimicrobials at the time of the survey. The overall prevalence was 8.7% (95% CI: 7.3- 10.5). (Table 8) This was lower than 2017 but not significantly ($p>0.05$).

Table 8: *Prevalence of antimicrobial usage in LTCFs (2023) compared with (2017 and 2013)*

LTCF type	No. residents	No. residents on AMs	Prevalence (%)		
			2023	2017	2013
All LTCFs	1,167	102	8.7 (7.3-10.5)	10.2 (8.5-12.2)	7.5 (6.5-8.6)

The prevalence of antimicrobial prescribing by LTCF ranged from 2.2% to 37.9% in the 2023 survey. Antimicrobial usage significantly increased in the 2017 survey compared to 2013 ($p<0.05$) but the usage declined again by the 2023 survey.



A total of 102 residents within LTCFs in Wales (2023) were prescribed one or more antimicrobials during the survey. Figure 6 is a box plot, which shows the distribution of antimicrobial prevalence by LTCF. Any dots outside of the box plot show that a LTCF is an outlier when considering the antimicrobial prevalence for the survey. One LTCF was an outlier.

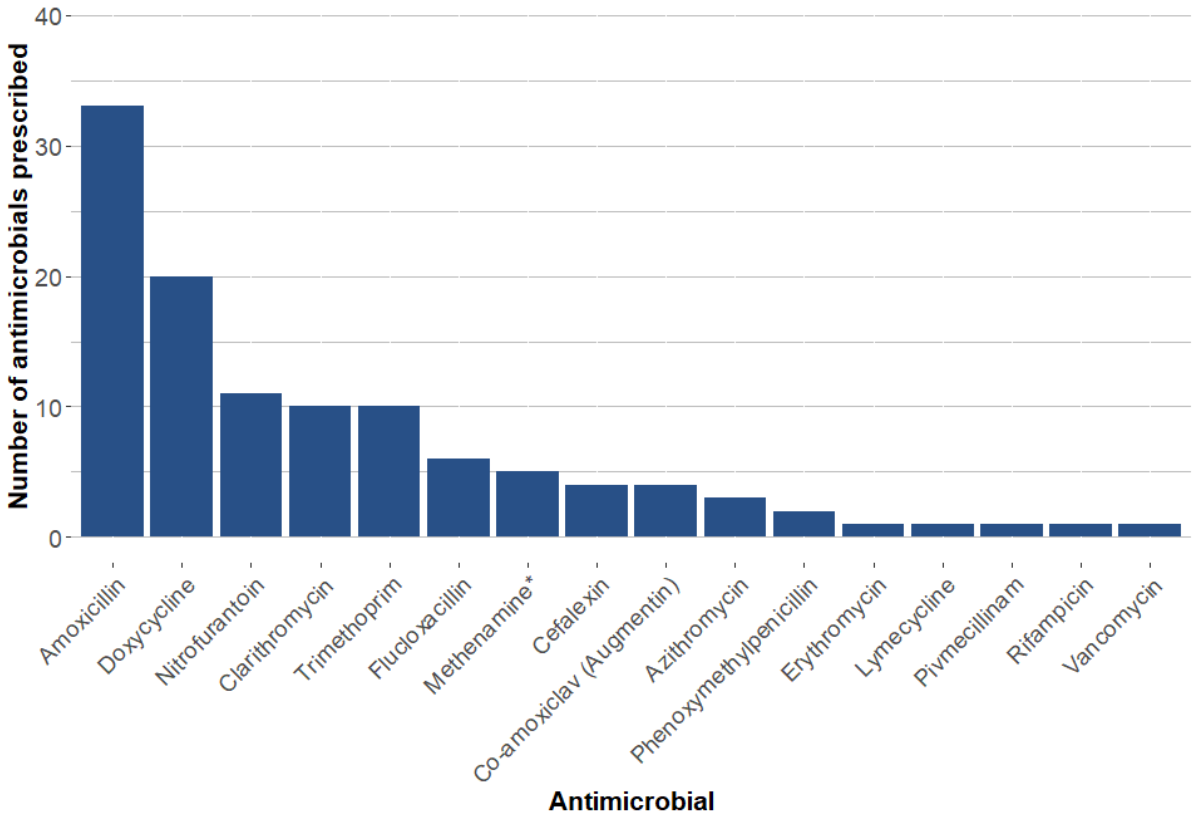
The median antimicrobial prevalence was 7.3% to take into consideration the outlier.

Figure 6: *Distribution of antimicrobial prevalence by LTCF in Wales (2023)*

A total of 113 antimicrobials were prescribed at the time of the survey with 90.2% (92) residents receiving one antimicrobial and 8.8% (9) residents receiving two antimicrobials (table 9). In the 2017 survey, 109 antimicrobials were prescribed with 98% residents receiving one antimicrobial. Details of the prescribed antimicrobials (including treatment and prophylaxis) is noted in Figure 7. The proportion of antimicrobials used for treatment and prophylaxis is noted in table 10.

Table 9: *Number of antimicrobials prescribed per resident (2023)*

2023 (Residents = 102)	
Number of antimicrobials prescribed per resident	**Frequency**
Only one	92
Two	9
Three	1



**Urinary antiseptic drug*

Figure 7: *Number of antimicrobials prescribed for the treatment and prophylaxis of infection in Wales (2023)*

Table 10: *Number and proportion of antimicrobials prescribed for treatment and prophylaxis of infection (2023)*

All antimicrobials		
Antimicrobial	**Number of antimicrobials prescribed**	**Proportion (%)**
Amoxicillin	33	29.2
Doxycycline	20	17.7
Nitrofurantoin	11	9.7
Clarithromycin	10	8.8
Trimethoprim	10	8.8
Flucloxacillin	6	5.3
Methenamine	5	4.4
Co-amoxiclav (Augmentin)	4	3.5
Cefalexin	4	3.5
Azithromycin	3	2.7
Phenoxymethylpenicillin	2	1.8
Lymecycline	1	0.9
Erythromycin	1	0.9
Pivmecillinam	1	0.9
Vancomycin	1	0.9
Rifampicin	1	0.9

The most prescribed antimicrobial was amoxicillin (29.2%) followed by doxycycline (17.7%) and nitrofurantoin (9.7%). Amoxicillin and doxycycline accounted for approximately 46.9% of all antimicrobials prescribed. The top three antimicrobials differed during the 2017 survey with trimethoprim (29.4%) followed by amoxicillin (22.0%) and cefalexin (12.8%) being the three most common antimicrobials prescribed. Of note was the increase in nitrofurantoin usage in the 2023 survey and methenamine. The vancomycin prescribed was for the treatment of one resident with Clostridioides difficile.

Characteristics of antimicrobials prescribed in LTCFs in Wales 2023

A total of 16 different antimicrobials were prescribed during the 2023 HALT-4 survey in Wales. Approximately 81% of antibiotics prescribed were for the treatment of infections and 19% for medical prophylaxis. The ratio between prescribing for treatment versus prophylaxis is approximately 80:20 in 2023, compared to approximately 60:40 in the 2017 survey. Noticeably, prescribing of prophylactic antibiotics has halved since the survey in 2017.

Antimicrobials for treatment in LTCFs 2023

A total of 92 antimicrobials (81.4%) were prescribed for the treatment of infection in LTCFs in Wales. Figure 8 provides the most common reason for treatment of infection in LTCFs (2023).

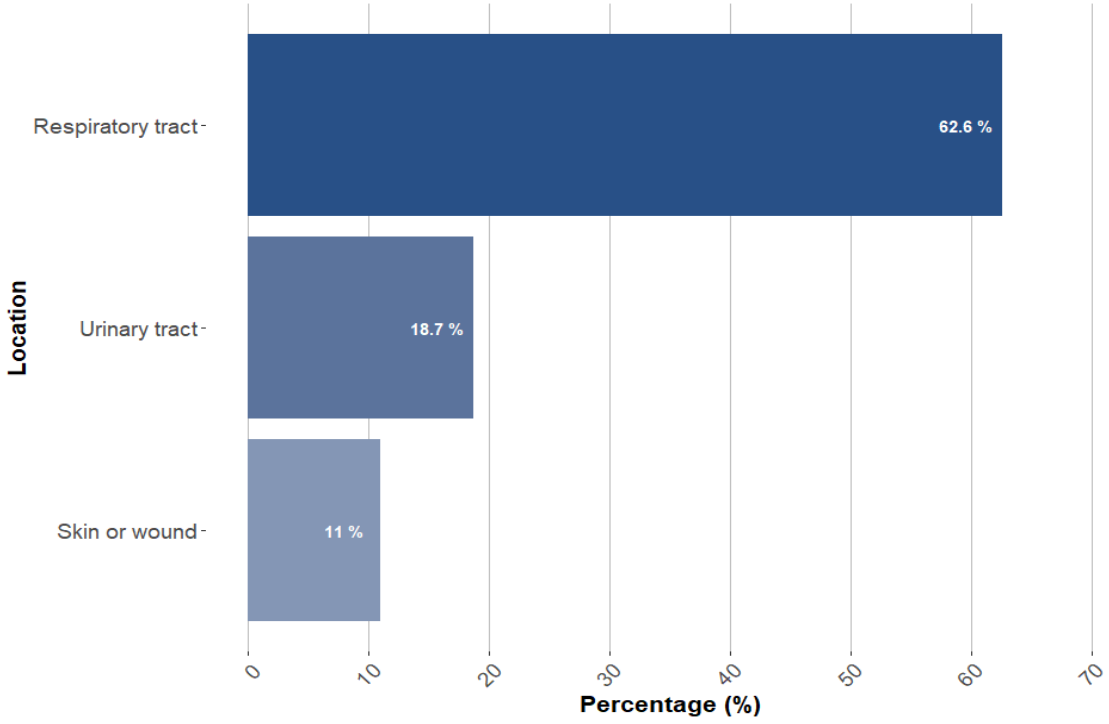


Figure 8: *Most common reasons for antimicrobial treatment of infections in LTCFs (2023)*

RTIs accounted for approximately 62% of antimicrobials being prescribed. Treatment of UTI with antimicrobials accounted for approximately 18% of all prescriptions and skin / wounds, 11%. Table 11 provides further detail of the antimicrobials prescribed for treatment of RTI, UTI and skin infections.

Table 11: *Most frequently prescribed therapeutic antimicrobials in relation to respiratory tract (RTI), urinary tract (UTI) and skin / wound, for LTCFs in Wales (2023)*

Residents on antimicrobial therapy for RTI	
Antimicrobial	**Therapeutic number (%)**
Amoxicillin	32 (56.1)
Doxycycline	14 (24.6)
Clarithromycin	8 (14.0)
Co-Amoxiclav (Augmentin)	2 (3.5)
Erythromycin	1 (1.8)
Residents on antimicrobial therapy for UTI	
Antimicrobial	**Therapeutic number (%)**
Trimethoprim	8 (47.1)
Nitrofurantoin	7 (41.2)
Cefalexin	1 (5.9)
Pivmecillinam	1 (5.9)
Residents on antimicrobial therapy for skin infection	
Antimicrobial	**Therapeutic number (%)**
Flucloxacillin	5 (50.0)
Doxycycline	3 (30.0)
Clarithromycin	1 (10.0)
Co-Amoxiclav (Augmentin)	1 (10.0)

Amoxicillin was the most common antimicrobial prescribed for the treatment of RTIs and flucloxacillin was the most common prescribed for the treatment of skin infections. The results noted were similar to the 2017 survey. Trimethoprim, followed by nitrofurantoin was the most common antimicrobials prescribed for a UTI. Although trimethoprim was commonly used for treatment of UTIs, nitrofurantoin use has increased since the 2017 survey and trimethoprim use has declined. In the 2023 survey, the use of nitrofurantoin and trimethoprim for antimicrobial therapy was 50% each, compared to trimethoprim being prescribed approximately 5-fold more than nitrofurantoin in the 2017 survey. A comparison of trimethoprim versus nitrofurantoin use for UTI treatment is shown in figure 9.

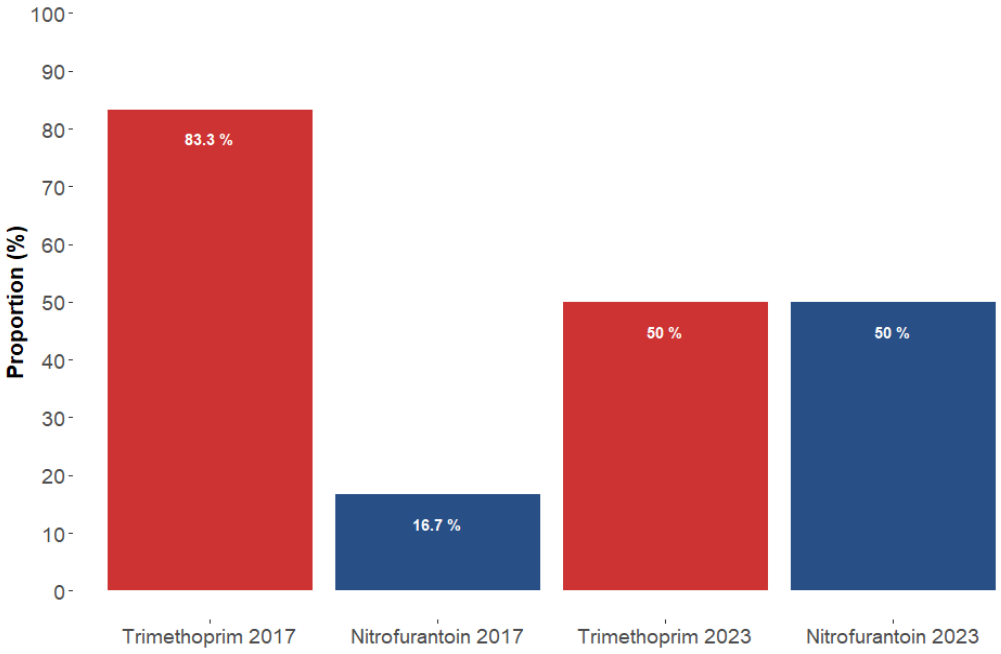


Figure 9: *Comparison of the use of therapeutic nitrofurantoin and trimethoprim for UTIs, 2017 vs. 2023*

Duration of antimicrobials for treatment of infections in LTCFs, 2023

The duration of therapeutic antimicrobials prescribed for RTIs, UTIs and skin or wound infections was captured in the 2023 survey. The number of days prescribed was based on common prescription durations with the option of 'other' where antimicrobials were given outside of these options.

Table 12 details the number and percentage of antimicrobials prescribed for RTI, UTI and skin / wound infections per each duration noted. Each table has a highlighted column providing the recommended number of days of treatment by antimicrobial based on primary care antimicrobial guidelines (All Wales Antimicrobial Pharmacist Group, All Wales Antimicrobial Guidance Group and All Wales Medicines Strategy Group 2022).

Table 12: *Duration of therapeutic antimicrobials prescribed for respiratory tract (RTI), urinary tract (UTI) and skin / wound infections in LTCFs in Wales (2023)*

	Duration of antimicrobial therapy for RTI (days)					
Antimicrobial	**3**	**5**	**7**	**10**	**14**	**Other**
Amoxicillin	1 (3.1)	11 (34.4)	17 (53.1)	-	1 (3.1)	2 (6.2)
Doxycycline	-	3 (21.4)	8 (57.1)	1 (7.1)	1 (7.1)	1 (7.1)
Clarithromycin	-	5 (62.5)	3 (37.5)	-	-	-
Co-Amoxiclav (Augmentin)	-	-	2 (100.0)	-	-	-
Erythromycin	-	-	1 (100.0)	-	-	-
	Duration of antimicrobial therapy for UTI (days)					
Antimicrobial	**3**	**5**	**7**	**10**	**14**	**Other**
Trimethoprim	1 (12.5)	-	7 (87.5)	-	-	-
Nitrofurantoin	2 (25.0)	-	6 (75.0)	-	-	-
Cefalexin	-	-	1 (100.0)	-	-	-
Pivmecillinam	-	-	1 (100.0)	-	-	-
	Duration of antimicrobial therapy for skin or wound infection (days)					
Antimicrobial	**3**	**5**	**7**	**10**	**14**	**Other**
Clarithromycin	-	-	1 (100.0)	-	-	-
Co-Amoxiclav (Augmentin)	-	-	-	-	1 (100.0)	-
Doxycycline	-	-	3 (100.0)	-	-	-
Flucloxacillin	-	-	3 (60.0)	-	-	2 (40.0)

Highlighted columns represent the recommended number of days treatment as per the All Wales Antimicrobial Pharmacist Group, All Wales Antimicrobial Guidance Group and All Wales Medicines Strategy Group (2022)

From table 12, the recommended number of days of antimicrobial therapy for RTI is 5 days. Although the first line treatment of amoxycillin meets the guidelines for the majority of lower RTI (and doxycycline as second), greater than 50% of

prescribing was for a duration of 7 days rather than 5 days. The majority of treatment did not meet the recommended guidelines. The recommended number of days treatment for a UTI within the guidelines is 3 or 7 days. This covers both uncomplicated (3 days) and complicated (7 days) UTIs. In addition, the duration is dependent on the type of UTI, the age, sex, and risk factors for resistance. All antimicrobials prescribed for treatment of a UTI met the recommended guidelines, both as treatment and in duration. The recommended days of treatment for a skin/ wound infection is typically 7 days. The majority of antimicrobials prescribed for treatment of a skin / wound infection met the recommended guidelines, both as treatment and in duration.

Antimicrobials for prevention of infection

Medical prophylaxis

Figure 10 provides the most common reasons for prescribing antimicrobials for the prevention of infection in LTCFs (2023). UTIs were the top reason for prophylaxis (38.1%), followed by skin / wound infection (33.3%) and RTI (19%).

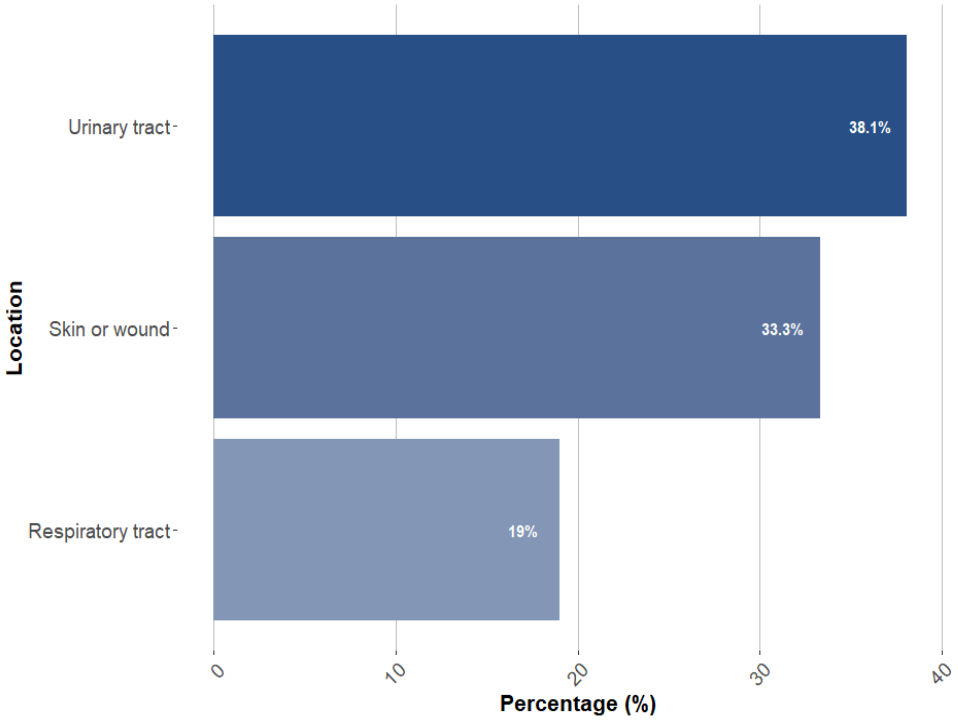


Figure 10: *Most common reasons for prescribing antimicrobials for prevention of infections in LTCFs (2023)*

Approximately 18.6% of antimicrobials were prescribed for medical prophylaxis in the 2023 survey (table 13). Compared to the 2017 survey, only a small number of antimicrobials were prescribed for prophylactic purposes, 21 (2023) compared with 45 (2017). Methenamine was the commonest antimicrobial (antibacterial) prescribed for prophylaxis (23.8%) in the 2023 survey. Cefalexin, doxycycline and azithromycin were prescribed as medical prophylaxis in 14.3% of cases each. Of the 21 prophylactic antibiotics prescribed, 8 (38%) were for UTI prevention. Other

prophylaxis use was for skin and wound infections (7), RTI (4), genital tract (1) and COPD (1). In the 2017 HALT-3 survey 90.8% of the total prophylactic antimicrobials prescribed were for UTI prevention showing prophylactic use for UTIs has greatly reduced since the last survey. Prescribing of trimethoprim for prophylaxis purposes has reduced in the 2023 survey accounting for only 9.5% of prescriptions compared with 37.8% in 2017.

Table 13: *Antimicrobials for medical prophylaxis in LTCFs (2023)*

Antimicrobial	Number	%
Methenamine	5	23.8
Cefalexin	3	14.3
Doxycycline	3	14.3
Azithromycin	3	14.3
Trimethoprim	2	9.5
Amoxicillin	1	4.8
Lymecycline	1	4.8
Phenoxymethylpenicillin	1	4.8
Clarithromycin	1	4.8
Rifampicin	1	4.8

Duration of antimicrobials for prevention of infection in LTCFs, 2023

The duration of antimicrobial prophylaxis prescribed for prevention of RTIs, UTIs and skin or wound infections was captured in the 2023 survey. The number of months prescribed was based on common prescription durations.

Table 14 details the number and percentage of prophylaxis antimicrobial prescribed for RTI, UTI and skin / wound infections per each duration noted. Each table has a highlighted column providing the recommended number of months of prophylactic treatment by antimicrobial based on primary care antimicrobial guidelines (All Wales Antimicrobial Pharmacist Group, All Wales Antimicrobial Guidance Group and All Wales Medicines Strategy Group 2022).

Table 14: *Duration of prophylactic antimicrobials prescribed for respiratory tract (RTI), urinary tract (UTI) and skin / wound infections in LTCFs in Wales (2023)*

	Duration of antimicrobial prophylaxis for RTI			
Antimicrobial	**0-3 months**	**4-6 months**	**More than 6 months**	**Unknown**
Doxycycline	-	-	1 (100.0)	-
Azithromycin	1 (50.0)	-	1 (50.0)	-
Amoxicillin	1 (100.0)	-	-	-
	Duration of antimicrobial prophylaxis for UTI			
Antimicrobial	**0-3 months**	**4-6 months**	**More than 6 months**	**Unknown**
Methenamine	1 (25.0)	-	3 (75.0)	-
Cefalexin	-	-	-	2 (100.0)
Trimethoprim	-	-	-	2 (100.0)
	Duration of antimicrobial prophylaxis for skin or wound infection			
Antimicrobial	**0-3 months**	**4-6 months**	**More than 6 months**	**Unknown**
Doxycycline	-	-	2 (100.0)	-
Cefalexin	-	-	-	1 (100.0)
Clarithromycin	1 (100.0)	-	-	-
Lymecycline	1 (100.0)	-	-	-
Phenoxymethylpenicillin	-	-	1 (100.0)	-
Rifampicin	-	-	-	1 (100.0)

Highlighted columns represent the recommended number of months treatment as per the All Wales Antimicrobial Pharmacist Group, All Wales Antimicrobial Guidance Group and All Wales Medicines Strategy Group (2022)

From table 14 a range of antimicrobials were prescribed prophylactically with small numbers noted for each prescribed (1-3 prescriptions). The recommended duration of prophylactic prescribing for prevention of the included infections would be 0-3 months, in the first instance. Methenamine and phenoxymethylpenicillin can be prescribed for longer durations but should be reviewed at 6 months. The majority of prophylactic antimicrobials prescribed were for more than 6 months. The results would indicate a lack of appropriate review of the prophylaxis within

LTCFs. To note, the sensitivities to particular antibiotics were unknown in the data collected, thus this may have affected the choice and duration of the prescribed antimicrobials.

Use of antimicrobials associated with an increased risk of *Clostridioides difficile* infection in LTCFs in Wales

A total of 6 broad spectrum antimicrobials associated with an increased risk of *Clostridioides difficile* infection were prescribed during the 2023 survey. The number has decreased since the 2023 survey, where 19 were prescribed. The antimicrobials prescribed (number and percentage) are described in Table 15.

A resident was identified with *C. difficile* infection during the survey, compared to no residents in the 2017 survey. The resident was treated with vancomycin for 14 days. The data provided would indicate that this is appropriate first- and second-line treatment of *C. difficile*, although the duration of treatment recommended would be 10 days (All Wales Antimicrobial Pharmacist Group All Wales Antimicrobial Guidance Group and All Wales Medicines Strategy Group 2022a). No fluoroquinolones were prescribed during the survey. Guidance by MHRA do not recommend prescribing such antibiotics unless other commonly recommended antibiotics are inappropriate (HM Government 2024a). As a minimum, written guidelines should be available within the LTCFs around antimicrobial stewardship. Only 47.1% of facilities had written guidelines for appropriate antimicrobial use (good practice). Only 35.3% of facilities had a system to remind healthcare workers of the importance of microbiological samples to inform the best antimicrobial choice.

Table 15: Distribution of broad-spectrum antimicrobials associated with an increased risk of *C. difficile* in LTCFs in Wales (2023)

Antimicrobial group	Antimicrobial	No. of antimicrobials	% of antimicrobials
Penicillins, combinations inc. B-lactamase inhibitor	Co-amoxiclav	4	3.5
Fluoroquinolones	Ciprofloxacin	0	0.0
	Levofloxacin	0	0.0
	Fleroxacin	0	0.0
	Moxifloxacin	0	0.0
Cephalosporins (1st gen)	Cefalexin	4	3.5
	Total	8	7.0

NB: There were no antimicrobials prescribed under the antimicrobial groups Lincosamides, Cephalosporins (2nd gen) and Cephalosporins (3rd gen)

Institutional Questionnaire

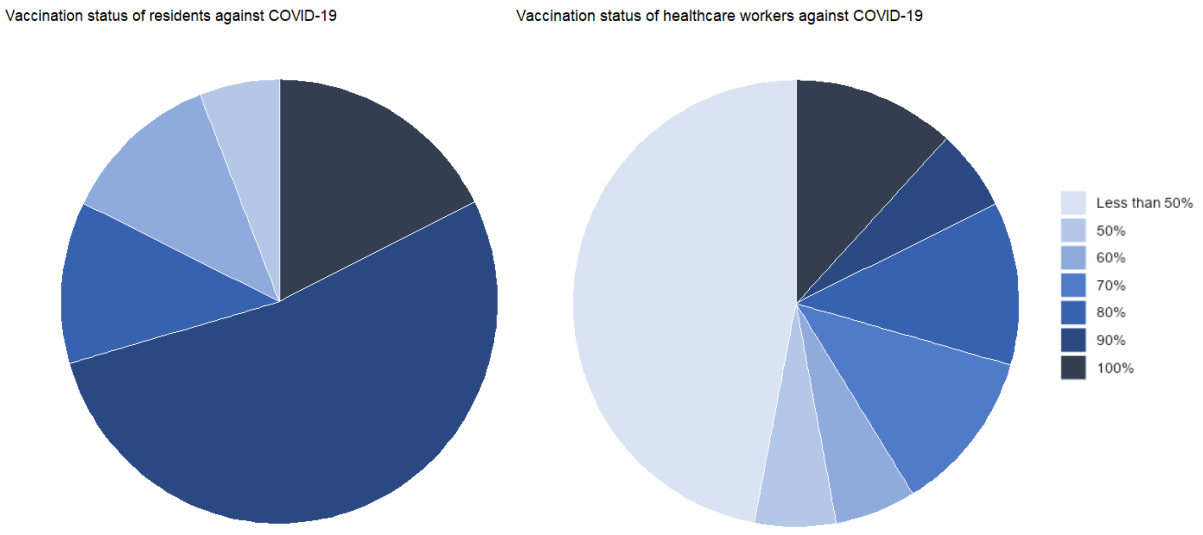
Each participating LTCF was given the opportunity to complete an institutional questionnaire. The purpose of the questionnaire was to gain an insight into the medical / nursing care, infection prevention and control practices and antimicrobial policies within the institutions. A total of 17 questionnaires were completed, providing a 65% response rate.

Medical and Nursing Care coordination

Medical resident care (including antimicrobial prescribing) was provided by the residents' personal general Practitioner (GP) or group practices for 15 out of 17 (88.2%) LTCFs. One LTCF noted that the medical care for residents was provided by medical staff employed by the facility only (5.9) and one LTCF noted by both personal GPs / group practices and medical doctors employed by the facility (5.9%)

Vaccination of residents and healthcare workers

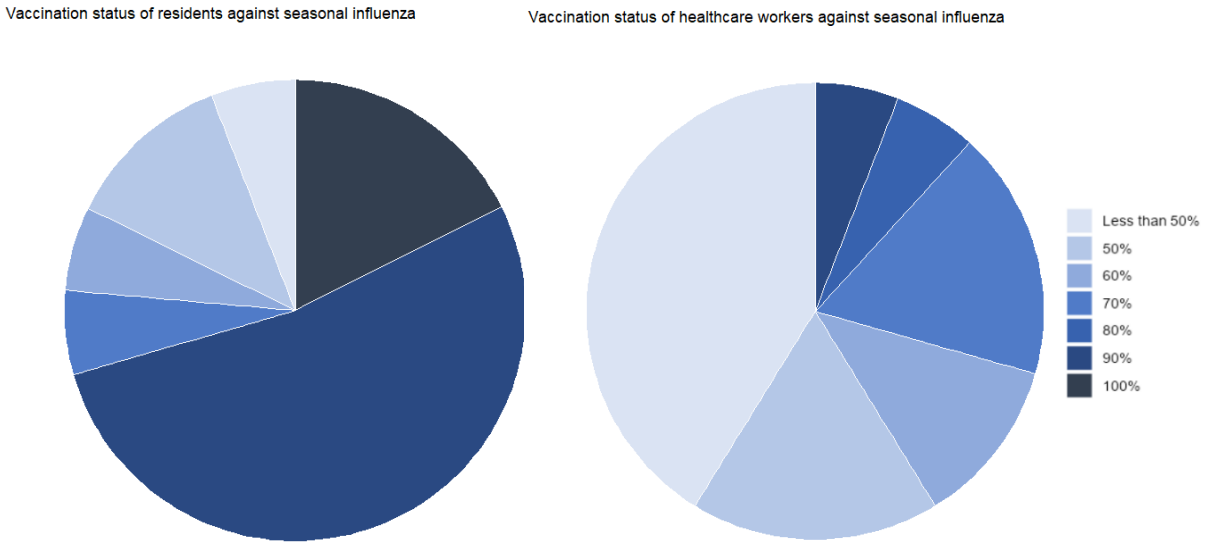
The vaccination status of residents and healthcare workers against COVID-19 and seasonal influenza was captured. The data reported on COVID-19 vaccination uptake is shown in figure 11. In summary, in all 17 LTCFs, 50% or more of residents were fully vaccinated against Covid-19. However, only 3 LTCFs reported that all residents were fully vaccinated (17.6%) and 9 LTCFs 90% fully vaccinated (53%). In comparison, almost 50% of LTCFs reported less than 50% of their workers were fully vaccinated against COVID-19. Only 2 LTCFs reported all staff as fully vaccinated.



No LTCFs responded 'less than 50%' or '70%' for the percentage of residents fully vaccinated against COVID-`19.

Figure 11: *Vaccination status of LTCF residents and healthcare workers against COVID-19 (2023)*

The data reported on seasonal influenza vaccination uptake is shown in figure 12. In summary, 16 LTCFs reported 50% or more of residents were fully vaccinated against seasonal influenza. However, only 3 LTCFs reported that 100% of residents were fully vaccinated (17.6%) and 9 LTCFs 90% fully vaccinated (53%). In comparison, approximately 41% of LTCFs reported less than 50% of their workers were fully vaccinated against seasonal influenza. No LTCFs reported staff as fully vaccinated and only 1 LTCF reported 90% of staff as fully vaccinated.



No LTCFs responded '80% for the percentage of residents fully vaccinated against season influenza or '100%' for the percentage of healthcare workers fully vaccinated against season influenza.

Figure 12: *Vaccination status of LTCF residents and healthcare workers against seasonal influenza (2023)*

Interestingly, only 82% of LTCFs offered a booster immunization for COVID-19 to all residents and an offer of annual immunization for flu to all residents (data not shown).

Infection Prevention and Control Practice

Information was gathered on infection prevention and control activities within the LCTFs. Details of the responses are shown in figure 13. A total 16 of 17 LTCFs (94.1%) had persons with training in infection prevention and control (internal and / or external) available to the staff of the facility. Approximately 94% of those with training in infection control / prevention were nurses. One LTCF noted both a doctor and nurse were available. Most LTCFs responded that the facility could ask for help and expertise from external infection control teams on a formal basis (82.4%).

The majority of LTCFs (14 out of 17) noted infection prevention and control training of the nursing / care staff, the development of care protocols and had a designated person responsible for the reporting and management of outbreaks. Approximately 77% of LTCFs noted that in the facility there is organisation, control and feedback by auditing infection policies and procedures on a regular basis and similarly on hand hygiene. Over 70% of LTCFs noted they make decisions on isolation and additional precautions for residents colonised with resistant microorganisms, similarly, supervision of disinfection and sterilization of medical

and core material. Only approximately half of the facilities (58.8%) held a registration of residents colonised / infected with multi-resistant microorganisms. Feedback on surveillance results to nursing / care staff was noted in 58.8% of LTCFs. Interestingly, 3 out of 17 LTCFs noted that they did not have any of the above-mentioned infection prevention and control practices in their facilities.

The institutional questionnaire included questions pertaining to infection control committees (internal / external). Approximately 70% of LTCFs noted they did not have an infection control committee. Of the 5 facilities that responded 'yes' to this question, 40% noted that the number of meetings organized in the previous year were between 3 and 4. Of the other 3 responses, 1 facility noted 1-2 meeting, 1 facility 5-6 meetings and 1 facility above 6 (data not shown).

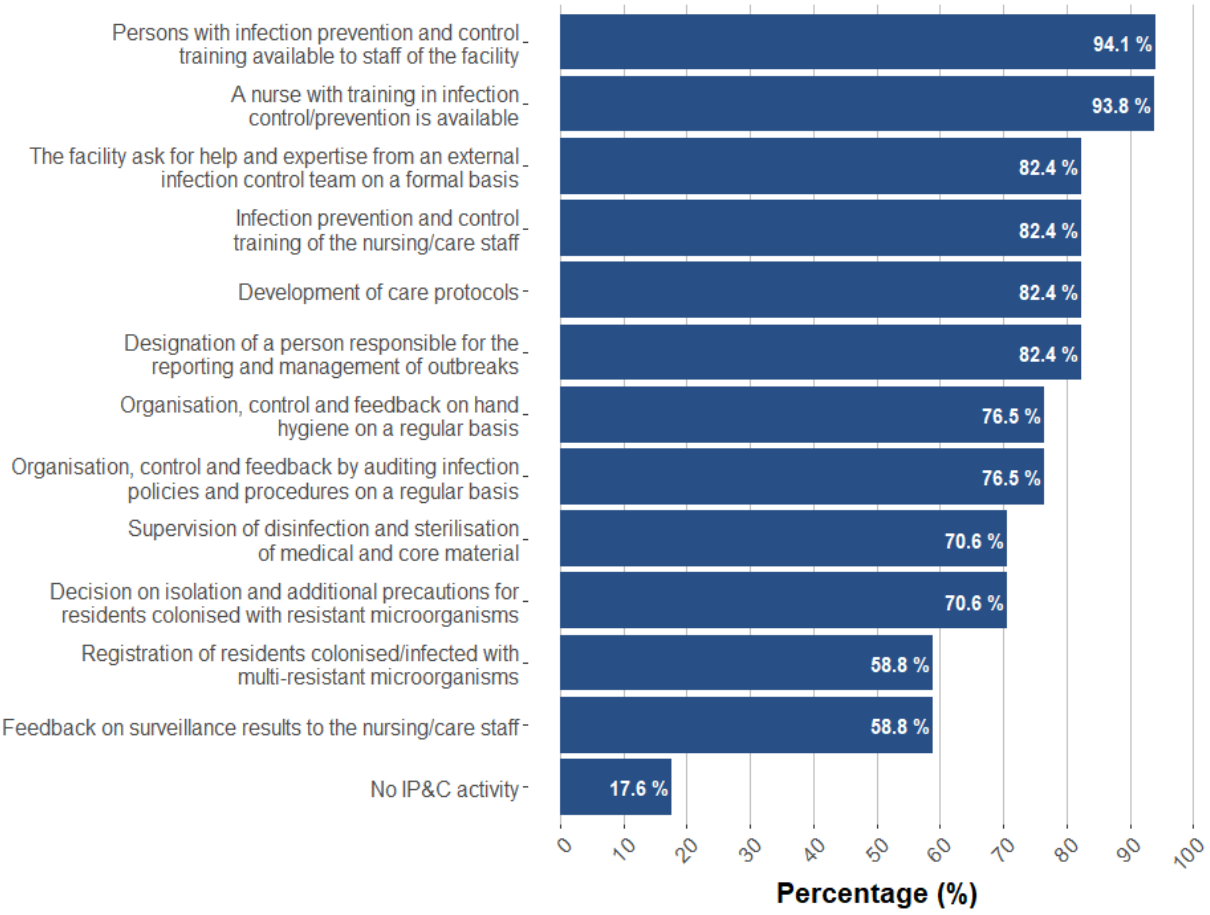


Figure 13 *Details on infection prevention and control activities within LTCFs (n=17) (2023)*

Hand hygiene practices were variable within the 17 LTCFs with 41% of facilities noting hand hygiene method most frequently used (when hands were not soiled) as hand washing with water and a non-antiseptic soap. Approximately 35% washed hands with water and an antiseptic soap and approximately 24% with hand disinfection with an alcohol rub solution. The majority of LTCFs had in the previous year hand-hygiene training sessions for healthcare professionals (88.2%) (see figure 14).

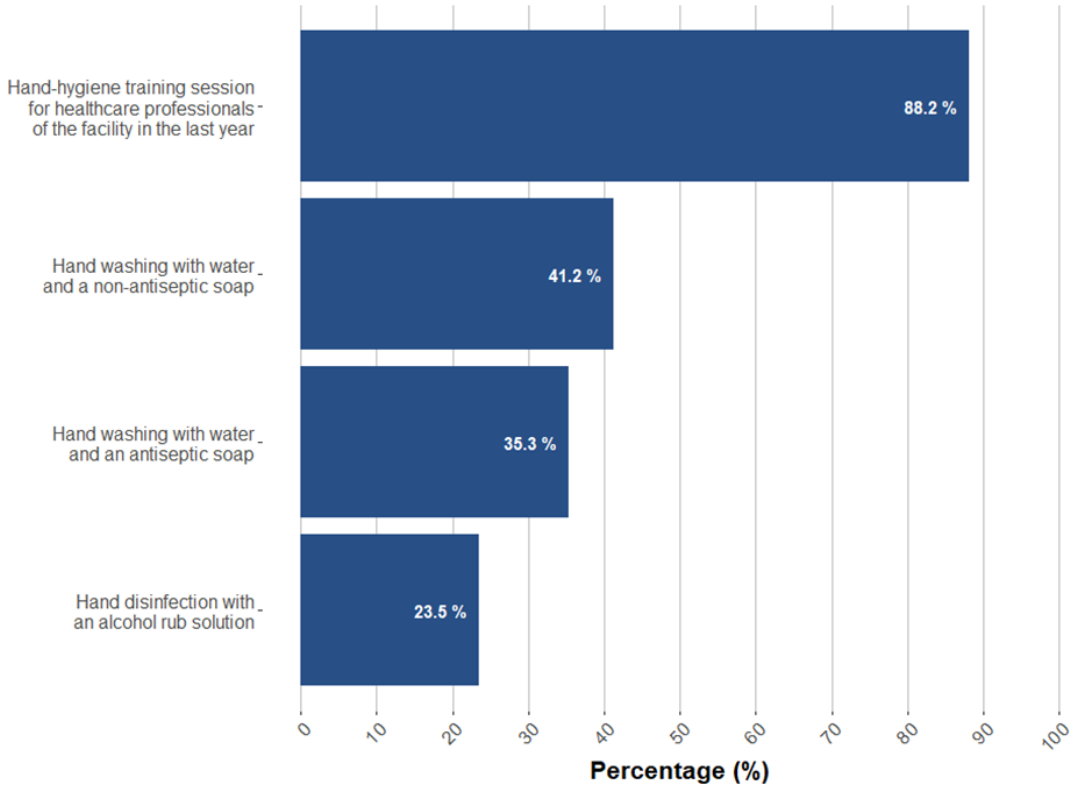


Figure 14 *Details on healthcare workers hand hygiene practices within LTCFs (n=17) (2023)*

Infection prevention and control written protocols within LTCFs

The LTCFs were asked to respond on various written protocols and policies available within their facilities. Figure 15 details the responses from the LTCFs. Above 80% of facilities noted a written policy for the management of MRSA and / or other multi-drug resistant microorganisms. All facilities had written protocols for the management of hand-hygiene but only 88% for urinary catheters and 47% for vascular catheters or lines. Approximately 53% had documentation for enteral feeding. For infection management all facilities had protocols for the management of GI infections and 94% for RTI. Approximately 82% of LTCFs had no policy of universal masking in place.

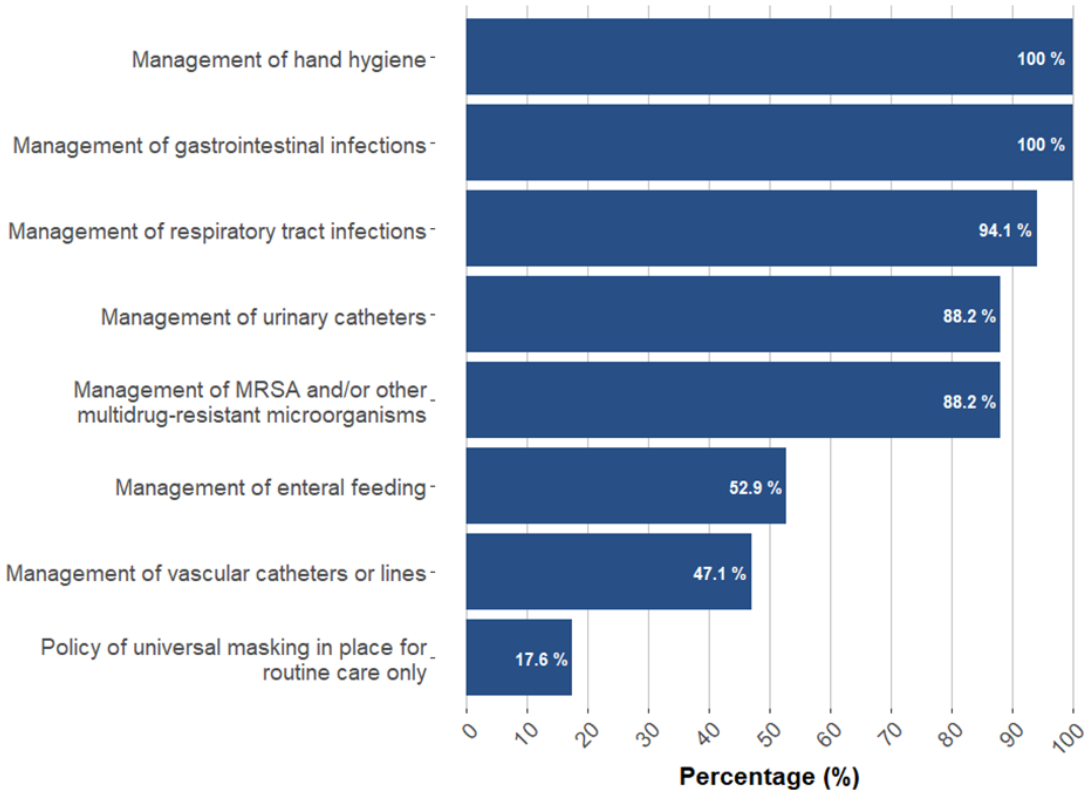


Figure 15 *Details on infection prevention and control written protocols within LTCFs (n=17) (2023)*

Antimicrobial Stewardship

Each participating LTCF provided information on antimicrobial stewardship, particularly antimicrobial policy activity and written protocols within the LTCFs. Details of the responses are noted in figure 16 (policy activity) and figure 17 (written protocols).

Antimicrobial policy activities

Of the 17 LTCFs 8 (47.1%) had written antimicrobial guidelines for appropriate use (good practice) in the facility. Only 35% of LTCFs had a system to remind healthcare workers of the importance of microbiological samples to inform the best antimicrobial choice. Approximately 35% of LTCFs had advice from a pharmacist for antimicrobials not included in the formulary and approximately 29% had regular training on appropriate antimicrobial prescribing. The survey noted that LTCFs do not regularly prescribe restricted antimicrobials as previously noted in the 2017 survey. Approximately 23% feedback to local GPs on antimicrobial consumption in the facility. Only 3 LTCFs had an antimicrobial committee and available data on annual antimicrobial consumption in the facility. Over 35% of LTCFs noted they had no antimicrobial policy activities.

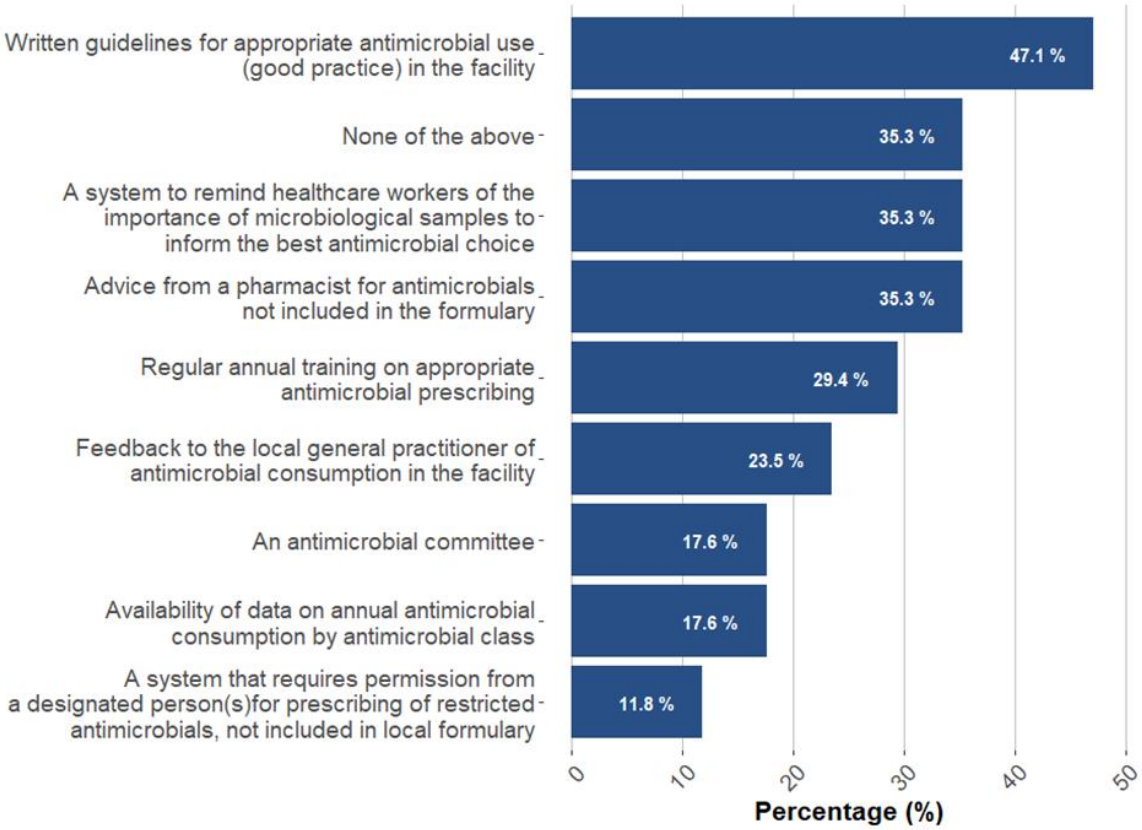


Figure 16 *Details on antimicrobial policy activities within LTCFs (n=17) (2023)*

Antimicrobial written protocols within LTCFs

Written therapeutic guidelines were present in many of the 17 LTCFs survey. Approximately 79% of LTCFs had written therapeutic guidelines on RTI and 71% on UTI. However, 57% had written guidelines on wound and soft tissue infections. Overall, in the 2023 survey, there has been an increase in the percentage of LTCFs with elements of antimicrobial stewardship compared to the 2017 survey.

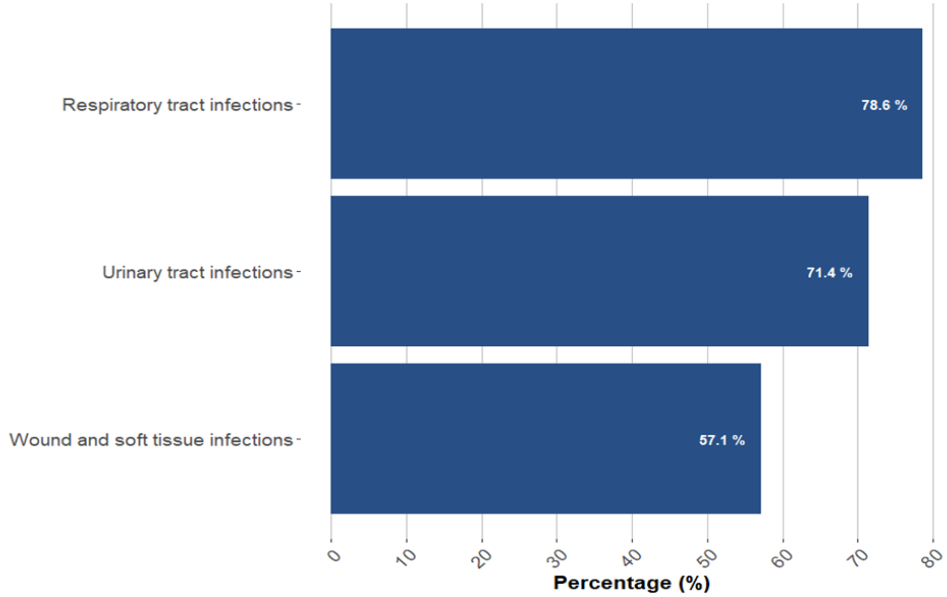


Figure 17 *Details on antimicrobial written protocols within LTCFs (n=17) (2023)*

Surveillance activity within LTCFs

Each participating LTCF provided information on surveillance activity within the LTCFs. Details of the responses are noted in figure 18.

Over 70% of the LTCFs surveys noted that a surveillance programme of healthcare associated infections was in place. This included summary reports to the institution on number of UTIs, RTIs etc. provided by Public Health Wales or the local health board. Approximately 47% noted a surveillance programme of resistant microorganisms in place (e.g., MRSA, *C. difficile*) and above 41% noted a surveillance programme of antimicrobial consumption was in place.

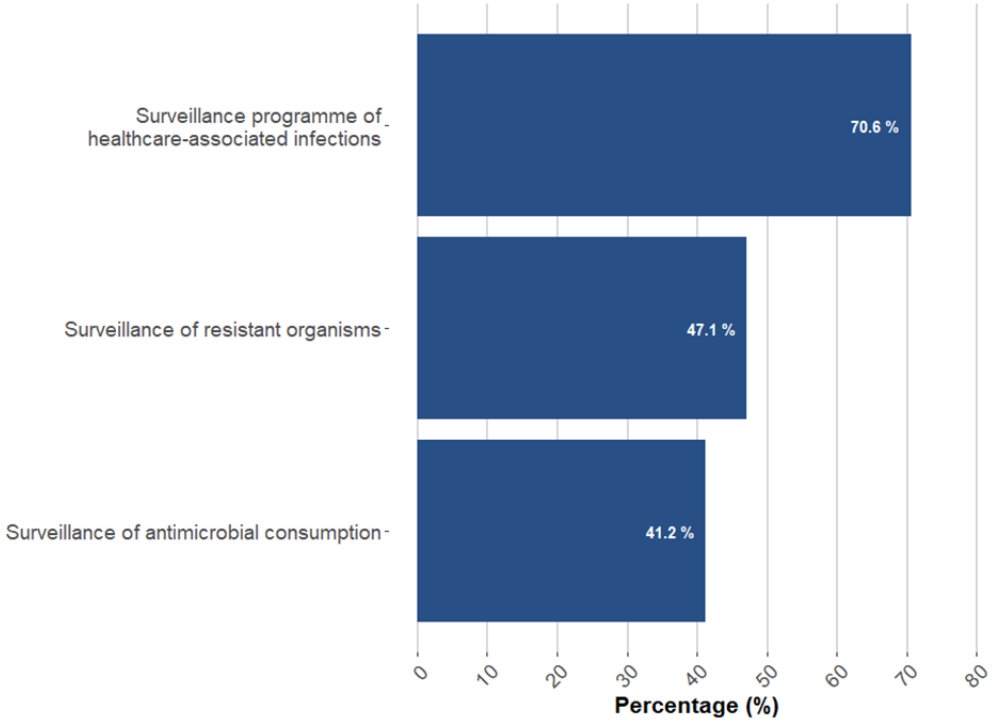


Figure 18 *Details on surveillance activity within LTCFs (n=17) (2023)*

4. Discussion

The findings of the 2023 PPS (HALT-4) indicate a HAI prevalence of 7.6%, showing a burden equivalent to one in every thirteen residents with an infection associated with a care home setting. The prevalence of antimicrobial prescribing was 8.7%, equivalent to one in every eleven residents prescribed antimicrobials. RTI was the highest reported infection accounting for approximately 59% of reported infections. UTI was the second highest accounting for 25% of reported infections and skin / soft tissue accounted for 13% of infections. A total of 8.9% of residents had an in situ device with 8.5% of residents specifically having a urinary catheter in situ.

The 2023 PPS results were comparable with earlier surveys in 2017 and 2013 (Jeffrey and Harrison 2018, ECDC 2014). The prevalence of HAI in 2023 was higher (7.6%) than in 2017 (6.0%) and significantly higher compared to 2013 (3.8%). The prevalence of antimicrobial prescriptions in LTCFs has decreased since 2017 (10.2% 2017 compared to 8.7% 2023), however, not significantly. The infection types and their ranking were similar in all the surveys (2013 – 2023). The number of residents with a urinary catheter in situ has increased since 2013, from 5.4%, 7.5% to 8.5% in 2013, 2017, and 2023, respectively.

The comparison of data between the surveys in 2023 and 2017 is possible. The number of residents in both surveys was similar and inclusion of outliers within the data. As with the results in 2017, the prevalence for HAI and prescribing should take account of outliers that might skew the data and provide the median prevalence in addition. The timing of the 2023 and 2017 survey differed slightly in that the 2023 survey covered December in addition to October and November covered by the 2017 survey. As approximately 38% of LTCFs were surveyed in December in 2023, this may have contributed to an increase in infections, particularly RTI.

The prevalence of HAIs within LTCFs in Wales

Approximately 59% of HAIs were RTI during the 2023 survey. Over 94% of residents were prescribed antimicrobials as treatment. Findings were comparable to the 2017 PPS, however, the percentage of RTIs in residents over 85 years was double the percentage in 2017, although numbers in the age category were similar. As previously noted, surveys were conducted during December which may have contributed to increased numbers. In addition, residents within this age category may be more vulnerable to RTIs attributed to after-effects of COVID-19, especially fatigue and breathlessness (Fyffe *et al*. 2023).

Although PHW reports on COVID-19, influenza and acute respiratory infections, there is a need to specifically target RTI surveillance within care homes. This in turn could lead to interventional work to reduce such infections going forward. The communicable disease surveillance centre (CDSC), PHW, is intending to utilise the provision of respiratory testing results (influenza, COVID-19, RSV) for care home residents to better understand the trends and clusters of respiratory infections within care homes. The work will aim to understand the burden of respiratory diseases amongst care home residents on hospitalisation and mortality. A further aim is to model hospitalisations of respiratory infections for the winter of 2024.

Such information will be informative, allow for winter planning, and particularly aid with avoidable hospital admissions (Sampson *et al.* 2019).

In addition, care homes should be aware and follow IP&C measures for acute respiratory infections including COVID-19 for health and care settings (Public Health Wales 2023b; NHS Scotland 2023). Vaccination of residents and staff is essential to reduce the burden of infection. The results showed a lack of uptake of vaccines, particularly for staff. Only 18% of care homes reported residents fully vaccinated against COVID-19 and similar for influenza. Boosters for both infections were offered in the majority of LTCFs (82%). Vaccination of staff against COVID-19 was less than in residents with 12% of LTCFs reporting staff fully vaccinated and almost 50% reported less than 50% of staff were fully vaccinated. For influenza, no staff were fully vaccinated and over 41% of care homes reported less than 50% of staff were fully vaccinated. Further work is required to determine vaccination uptake within LTCFs in Wales.

A total 25% of HAIs were UTIs, a decrease since the 2017 survey (approximately 40% of HAIs were UTIs). Only 35% of the UTIs identified were 'confirmed' by definition. Confirmed UTIs required signs and symptoms of infection present and a positive urine culture. A 'probable' UTI includes signs and symptoms of infection and either a culture has not been taken, is negative or results unknown (European Centre for Disease Prevention and Control 2023a). Of the 'probable' UTIs noted, 43% were diagnosed via a urine dipstick, with all residents being over 65 years of age. None of the residents diagnosed via a urine dipstick had a urinary catheter in situ. Wales primary care guidelines do not recommend use of dipsticks in patients 65 years of age or over. A negative result from a dipstick can exclude a UTI but a positive result has no value and does not suggest the presence of a UTI. A urine dipstick should not be performed when an individual has a catheter in situ as most will have bacteria present in the bladder / urine without an infection (All Wales Antimicrobial Pharmacist Group, All Wales Antimicrobial Guidance Group and All Wales Medicines Strategy Group 2022). The results show LTCFs are following guidance around catheter urine sample testing.

Where positive microbiology was available, the top microorganisms associated with a UTI were *E. coli* and *S. aureus. E. coli* is one of the most common bacteria that can cause a UTI (Waller *et al.* 2018). The percentage of UTIs was high in residents over 85 years of age (65%), with an increase of 17% compared with 2017. The lack of positive microbiology did not however prevent the prescribing of antibiotics with a prescribing rate of 91%.

There is more urgency to reduce the burden of UTIs due to increasing antimicrobial resistance. The ability to eliminate bacteria such as *E. coli* and *Klebsiella pneumonia*, for example, with antibiotics has declined over time (Waller *et al.* 2018). Implementation of multimodal interventions is necessary particularly with focus on preventing infection, leading to a decrease in overall prescribing in primary care. Currently the HARP team have piloted UTI surveillance within care homes in Wales. This includes determining the burden of UTIs within care home residents and the top causative organisms based on positive urine microbiology results. Results to-date suggest a high infection rate within the general care home population (approximately 25%) with *E. coli* the top causative organism, followed by *Klebsiella pneumoniae* (unpublished data). As noted, these two organisms have known antimicrobial resistance and are of concern especially in the elderly population (Waller *et al.* 2018). Continuation of this surveillance will allow trends in UTI rates to be monitored, indication of possible risk factors for increased infection (e.g., catheter in situ, dehydration) and inform on hospital admission

rates. In addition, such data will form the basis for introduction of interventions / quality improvement work at a Wales level going forward.

The HARP programme has published key standards for UTI prevention, treatment, and management, known as the 'UTI 9'. The standards include prevention, diagnosis, treatment, and monitoring strategies such as hydration initiatives, urine sampling and appropriate prescribing of antimicrobials within the community (Public Health Wales 2018). Additionally, social care resources have been developed for the prevention of UTI and catheter associated infection (CAUTI) in older adults. The e learning course is intended for staff working in care homes or looking after individuals in their own dwelling (Public Health Wales no date). The work conducted by the HARP programme has been in conjunction with the National Action Plan (NAP) - Tackling antimicrobial resistance 2019 to 2024 (Department of Health and Social Care 2022). An addendum to the document highlighted four new commitments to reduce UTIs in relation to halving healthcare associated Gram-negative blood stream infections. Particularly, to develop new and promote existing educational materials and resources for prevention and management of UTI for the primary and social care sectors. To consider the association between hydration and the prevalence and outcome of urinary tract or blood stream infections.

The prevalence of antimicrobial prescribing in LTCFs in Wales

A total of 113 antimicrobials were prescribed during the survey with 90% of residents receiving one antimicrobial. Antimicrobials prescribed ranged from amoxicillin (top prescribed antimicrobial) to vancomycin (prescribed for one resident with a confirmed *C. difficile* infection). Approximately 81% of antimicrobials prescribed were for the treatment of infections including RTI (62%), UTI (18%) and skin (11%). Amoxicillin was the most common antibiotic prescribed for the treatment of an RTI and flucloxacillin for skin infections. Trimethoprim was the commonest antimicrobial for treating a UTI, but similar numbers were noted for nitrofurantoin.

In the previous survey, trimethoprim prescribed was 5-fold more than nitrofurantoin. Antimicrobial resistance is an increasing problem, and increased resistance has been seen for *E. coli* particularly for inpatient urine samples. Surveillance in Wales has shown the resistance rate to trimethoprim continues to be high at 38.1% (Public Health Wales NHS Trust 2023). Guidelines in Wales recommend nitrofurantoin as first line treatment for lower UTIs in patients 65 years and above (All Wales Antimicrobial Pharmacist Group, All Wales Antimicrobial Guidance Group and All Wales Medicines Strategy Group 2022). Results from this survey shows a greater adherence to the guidelines since 2017. To continue help combat the issue of resistance, it is important that clinical staff seek out their local bacterial resistance patterns and antibiograms, properly diagnose and treat UTI if indicated, and recognise their role in antibiotic stewardship (Waller *et al* .2018).

Prescribing duration was captured within the survey based on the recommended number of days treatment as per the Wales primary care antimicrobial guidelines (All Wales Antimicrobial Pharmacist Group, All Wales Antimicrobial Guidance Group and All Wales Medicines Strategy Group. 2022). The guidelines were met on the treatment of the majority of lower RTI, however, 50% of prescriptions were for 7

days instead of the recommended 5 days. Future work should focus on meeting these guidelines within primary care. For UTIs, the guidelines were met on both treatment and duration of the prescribing. The Wales guidelines recommend 3- or 7-days treatment depending on the risk and complication of the UTI. A 3-day prescription is more likely for an uncomplicated UTI in a female. Prescriptions for 7 days are provided for complicated UTIs, catheter associated and UTIs in males. As no sensitivities were recorded for the urine sample results, duration and antimicrobials prescribed might have been influenced by the resistance noted, especially if the resident was being treated for a recurrent UTI. The guidelines were met on both treatment and duration of the prescribing for skin infections (5 – 7 days).

Approximately 19% of antimicrobials were prescribed as prophylaxis with a 50% reduction noted compared to the 2017 survey. This may be attributed to the ongoing work within primary care, specifically around GP prescribing in LTCFs within certain areas of Wales. The three top reasons for prescribing a prophylactic antimicrobial were for a UTI (38%), skin / wound infections (33%) and RTI (19%), although numbers were small. Comparison with results from the 2017 survey indicate a shift in the reasons for prescribing prophylactic antimicrobials (91% prescribed for UTIs in 2017). Results from the 2023 survey highlighted a high number of prescriptions covering prophylaxis for skin and soft tissue infections. This raises the question as to whether the LTCFs and GPs are engaging with their lymphoedema teams within primary care and may require further investigation.

Methenamine was the commonest drug prescribed for preventing a UTI, although it is not classed as an antimicrobial, rather an antiseptic drug (Hoffmann 2022). Its use has increased since 2022 and can be used for the prevention of chronic or recurrent (uncomplicated) UTIs (All Wales Antimicrobial Pharmacist Group, All Wales Antimicrobial Guidance Group and All Wales Medicines Strategy Group 2022b). The results demonstrate a change in prescribing from trimethoprim to methenamine for prevention of UTIs. Interestingly, prescribing of trimethoprim reduced 4-fold compared to prescribing in the 2017 survey, again, showing increased compliance with the guidelines in Wales.

Prescribing duration was captured based on the recommended number of months treatment as per the Wales primary care antimicrobial guidelines (2022). The guidelines recommend all prophylactic antimicrobials should be prescribed for 0-3 months in the first instance and then reviewed. Methenamine and phenoxymethylpenicillin can be prescribed for a longer duration but a review is recommended at 6 months. Most of the prophylaxis were prescribed for greater than 6 months, indicating a lack of appropriate review within LTCFs in Wales. A note of caution, numbers prescribed were small and sensitivities to certain antimicrobials were unknown which may have affected the choice and duration of the prescribed antimicrobials.

IP&C practice and written protocols within LTCFs

In summary, over 94% of LTCFs had persons with training in IP&C available to the staff within the facility (internal or external), with the majority being nurses. In addition, over 82% reported they trained the nursing / care staff in IP&C. However, only 29% reported that an infection control committee was available.

Most facilities were able to ask for help and expertise from an external infection control team on a formal basis. Most had a designated person responsible for the reporting and management of outbreaks and reported hand-hygiene training sessions for healthcare professionals of the facility in the last year. Other IP&C practices varied and 17% reported no IP&C activities within their facility.

Most LTCFs had IP&C written protocols available, including the management of MRSA, hand hygiene, urinary catheters, RTI and GI infections. Overall, IP&C practice has improved since the last PPS in 2017. To continue with such improvements, IP&C workbooks have been produced specifically for care home and domiciliary care settings by PHW IP&C team and Harrogate and district NHS foundation trust (Public Health Wales 2023c) and HARP continue to develop other resources, specifically accessed from the HARP website (Antibiotics and Infections - Public Health Wales (nhs.wales).

Antimicrobial policy activities and written protocols within LTCFs

In summary, over 47% of LTCFs had written antimicrobial guidelines for appropriate use (good practice) in the facility. Only 35% had a system to remind healthcare workers of the importance of microbiological samples to inform the best antimicrobial choice. Approximately 23% feedback to local GPs on antimicrobial consumption in the facility. Only 3 LTCFs had an antimicrobial committee and available data on annual antimicrobial consumption in the facility. Over 35% of LTCFs noted no antimicrobial policy or activities within their homes. However, written therapeutic guidelines were evident in many of the LTCFs, specifically on RTIs and UTIs but less on wound and soft tissue infections.

Overall, there has been an increase in the percentage of LTCFs with elements of antimicrobial stewardship compared to the 2017 survey. The HARP programme is also aware and involved in ongoing work with primary care pharmacists, GPs, and care homes to improve knowledge and guidance regarding antimicrobial prescribing.

Surveillance activity within LTCFs

Over 70% of LTCFs surveys noted that a surveillance programme of HAIs was in place. This could include summary reports to the institution on number of UTIs, RTIs, for example, provided by PHW or the local health board. Less than half reported surveillance around resistant organisms or of antimicrobial consumption. The results indicate LTCFs are more aware and involved in IP&C practice, to prevent / reduce infection and familiar with collating data on infections, or more likely to welcome reports on infection rates of significance to the residents (e.g., UTI, RTI). The lack of surveillance of antimicrobial consumption and resistant organisms is reflected in the low antimicrobial activities within LTCFs. There is a need to build upon the current surveillance activity within LTCFs. Surveillance is a valuable marker of the quality of residential care and can be used as a basis for improvement and to aid recommendations (Bordino *et al.* 2021; Umscheid *et al*. 2011). Importantly the data can be used for reassurance and to support ongoing work undertaken between health boards, health protection teams and primary care.

Conclusion and recommendations

These findings indicate that there is an increased burden of infection within care home settings in Wales with RTI, UTI and skin infections remaining the greatest burden since the survey in 2017. The catheter related prevalence has increased, which is an added-risk factor associated with infection, particularly UTIs. However, overall prescribing has reduced, more so associated with the prevention rather than treatment of infection. The HAI / AMR agenda remains a priority in Wales across all care settings and estimating the total burden of HAIs across all sectors is important when estimating the financial and economic burden of infection to the NHS.

The current HAI / AMR surveillance programme in Wales has various work streams around infection reduction and reducing antimicrobial prescribing. However, current surveillance does not specifically extend to LTCFs. This report informs on the need to develop such surveillance but more importantly to establish a programme of work across all healthcare sectors, a whole systems approach to tackle preventable infections and reduce unnecessary prescribing. Regular training of all staff on IP&C should be a priority and improved access to up-to-date policy and guidelines around reducing infections is key as is antimicrobial stewardship. In addition, the established programme should collaborate with all Wales groups such as Care Forum Wales, Care Inspectorate Wales and with health boards in Wales to standardise practice around RTIs, UTIs and wound care within LTCFs. Additionally, there is a need to work with GPs to improve prescribing and diagnosis of infections within LTCFs.

A new national action plan (NAP) has been launched by the government within the UK - 'Confronting antimicrobial resistance 2024 to 2029', which builds on the achievements and lessons of the first plan. It contains outcomes and commitments that will make progress towards the 20-year vision for AMR to be contained, controlled and mitigated (HM Government 2024b). A programme of work within care home settings will facilitate with the aims set-out within the NAP, particularly in preventing any increase in specific drug-resistant infections, reducing total antibiotic use in the human population by 5% and to increase UK public and healthcare professionals' knowledge on AMR by 10%.

Findings from this survey should be utilised in part to focus the work of health boards, health protection teams and public health colleagues in Wales and inform Welsh Government on priority areas to reduce infections and antimicrobial prescribing / resistance for the benefit of the population of Wales.

Recommendations:

- Further reduce the burden of UTIs within care home residents (multi-modal approach).
- Explore the burden of RTIs, particularly in residents over 85 years within LTCFs.
- Explore further the duration of prescribing for RTIs and compliance with current all Wales prescribing guidelines.
- Determine in greater detail the types of skin and soft tissue infections within LTCFs including the appropriateness of prescribing both as treatment and prophylactic cover.
- Further establish vaccination rates within LTCFs and Improve on vaccine uptake of residents and staff for COVID-19 and flu.

- Continue to provide education and guidance around IP&C activities and ensure LTCFS have adequate access to resource and learning material.
- Work with primary care colleagues, particularly pharmacists to improve on the knowledge and importance of antimicrobial stewardship within care homes.
- Develop and establish a programme of work within the care home sector to prevent / reduce HAIs and ensure appropriate prescribing. This should cover surveillance, quality improvement initiatives, education, and training – a whole systems approach.

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