

In this article...

- Infectious organisms that typically cause outbreaks in care homes
- Principles of outbreak prevention, preparedness, detection and management
- Signs and symptoms of infection to look out for

Infection outbreaks in care homes: prevention and management



Nursing Times
Self-assessment

Key points

Care homes are a fertile ground for outbreaks of infections, mostly respiratory and gastrointestinal

Rigorously applying standard infection control precautions is key in preventing outbreaks

Care homes should run an autumn campaign to ensure staff know what to do if an outbreak occurs

Staff need to look out for signs and symptoms of infection and promptly signal any suspected outbreak

Reflecting on how an outbreak was managed helps to prevent future outbreaks

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Abstract Care home residents share air, space, food and equipment, so they also share organisms that can easily cause infection outbreaks, such as viruses and bacteria. They are also more prone and vulnerable to infections, which can lead to death. Care home staff therefore need to be adequately trained to prevent, detect and manage an outbreak of infectious disease, and care homes must have an outbreak plan ready, to minimise the number of people affected and the harm done. This article summarises the principles of outbreak prevention, preparedness, detection and management, highlighting key practical guidance.

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In any shared living space such as care homes, there are also shared infectious agents – usually bacteria or viruses – that from time to time cause infection outbreaks (Box 1) (Utsumi et al, 2010; Strausbaugh et al, 2003). In care homes, the opportunities for infection outbreaks are abundant and the consequences can be severe: all outbreaks – even of pathogens as common as noroviruses – can result in the death of residents (Lindsay et al, 2015); so it is important to understand how to prevent, prepare for, detect and manage them.

This article, aimed at nurses and nurse managers in care homes, focuses on prevention and preparedness, which can prevent outbreaks or at least reduce them in scale. It also discusses the actions to be taken when an outbreak occurs.

Types of outbreaks in care homes

The most common types of disease outbreaks in care homes are outbreaks of respiratory infections (often caused by influenza viruses), and gastrointestinal infections (often caused by noroviruses)

Box 1. What is an infection outbreak?

An infection outbreak, with minor variations in wording, can be defined as:

- Two or more people with the same infection caused by the same organism who probably acquired the organism in the same place
- More people than you would expect with the same infection

Source: Public Health England (2014); Scottish Government (2013).

(Utsumi et al, 2010; Strausbaugh et al, 2003). Some organisms can cause more than one type of infection; for example, *Streptococcus pyogenes* (*S pyogenes*) and multi-drug-resistant organisms (MDROs) such as methicillin-resistant *Staphylococcus aureus* (MRSA) can cause skin, urinary tract, and bloodstream infections (Steer et al, 2012; Utsumi et al, 2012).

In a literature review of 206 infection outbreaks in care facilities for older

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Table 1. Most common types of infection outbreaks in care homes

| Types of infection outbreaks | Most common causative infectious agents | Mode of transmission |
|---|---|---|
| Respiratory infection | Influenza virus (A or B) | Droplets and physical contact |
| | <i>Mycobacterium tuberculosis</i> | Airborne infection |
| Skin and soft tissue infection | <i>Streptococcus pyogenes</i> | Droplets and physical contact |
| | <i>Staphylococcus aureus</i> (sensitive or resistant) | Physical contact and airborne dissemination |
| | <i>Sarcoptes scabiei</i> (the mite causing scabies) | Physical contact |
| UTI (with or without a urinary catheter)* | <i>Escherichia coli</i> Many MDROs | Physical contact (transmission will have taken place sometime before the organism causes a UTI) |
| Gastrointestinal infections | Norovirus <i>Salmonella</i> and other organisms causing food poisoning | Physical contact with contaminated items followed by ingestion** or direct ingestion of contaminated food |
| | <i>Clostridium difficile</i> | Physical contact with contaminated items followed by ingestion** |

Key: MDRO = multidrug-resistant organism; MRSA = methicillin-resistant *Staphylococcus aureus*; UTI = urinary tract infection.

* UTIs are more often caused by a resident's own gut flora than by an external infectious organism.

** Also known as the faecal-oral route.

people, the respiratory tract was involved in 45% of outbreaks, the gastrointestinal tract in 36%, the skin in 7% and the eyes in 2%. Only four organisms – influenza virus, norovirus, salmonella and *S pyogenes* – made up more than 50% of all infectious agents involved (Utsumi et al, 2012).

Although infection outbreaks happen frequently in care homes throughout the UK, they can be a rare event in individual care homes. Care homes can also be the setting of 'no-infection outbreaks', where organisms are transmitted between residents without causing infections (Curran, 2013). If these no-infection outbreaks involve MDROs, they are not without consequences: should infection arise later, there may be few or no effective antibiotics available to treat residents.

Table 1 shows the common types of outbreaks in care homes, the agents that cause them and how they spread.

Why and how outbreaks happen

Infection outbreaks can occur in care homes because:

- Infectious agents can survive in and on people, as well as in the environment;
- Vulnerable residents have frequent contacts with staff, other residents, visitors and the environment;
- The immune system of vulnerable residents can be easily overwhelmed.

Kramer et al (2006) have shown that the influenza virus and norovirus – both common causes of outbreaks in care homes – can survive for one to two days and up to seven days respectively, and that common outbreak-causing bacteria such as *S pyogenes* and MRSA can survive for several months.

Box 2. SICIP guidance in the UK

England: Prevention and Control of Infection in Care Homes: An Information Resource (Bit.ly/DHInfectionCareHomes)

Northern Ireland: The Northern Ireland Regional Infection Prevention and Control Manual (www.niinfectioncontrolmanual.net)

Scotland: National Infection Prevention and Control Manual (www.nipcm.hps.scot.nhs.uk)

Wales: National Infection Control Policies for Wales (Bit.ly/WalesInfectionControl)

Key: SICIP = standard infection control precaution.

Infectious agents spread:

- Through physical contact – a person touches, or is touched by, someone or something that is contaminated with the infectious agent, and then touches another person or object without applying hand hygiene principles;
- Through droplets – small droplets containing the infectious agent are spread by coughing or sneezing and land directly on another person, or on an object from which the organism spreads through physical contact;
- By airborne infection – a person directly inhales the exhaled breath of an infected person; this is how tuberculosis spreads, for example;
- By airborne dissemination – the infectious agent is disseminated in the air – for example, during bed-making

or dressing changes – and lands on a person or object from which it can spread via the physical contact route;

- Through ingestion – a person eats contaminated food or water.

Residents' risk of developing an infection if they encounter an infectious organism depends on many factors; for example, the risk of infection with MRSA is increased if the resident has a wound or an invasive device in place; and the risk of infection with *Clostridium difficile* is increased if the resident has taken antibiotics in the previous eight weeks.

Prevention, preparedness, detection and management

The approach to infection outbreaks encompasses prevention, preparedness, detection and management (PPDM). How well staff in a care home perform outbreak PPDM, both individually and collectively, determines whether residents become sick, how many become sick and how sick they become.

Outbreak prevention

Many outbreaks can be prevented if the basic level of care is done well; that is, if standard infection control precautions (SICPs) are followed by all staff, all the time. The application of SICPs is included in at least eight of the 10 compliance criteria of the Department of Health's code of practice (DH, 2015). There is no single definition of SICPs used by all countries that make up the UK (Curran, 2015), but each provides either specific guidance or a manual (Box 2). Although what is included in SICPs varies, there are some common

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recommendations regarding outbreak prevention. Staff should:

- Assess all new residents for infection before admission, and seek advice before admitting them if they present with any of the following infection risks:
 - Signs and symptoms indicating an infectious disease, such as diarrhoea, vomiting, productive cough, night sweats, fever, breaks in the skin, and inflammation of the skin or soft tissues;
 - A history of staying in a care setting where there is/has been an outbreak;
 - A history of previously having had an infectious disease/having been infected with a MDRO;
- Perform hand hygiene at the recommended five moments (Box 3);
- Manage care equipment and the care environment safely;
- Use protective equipment (gloves and aprons) to prevent the spread of infectious agents;
- Use invasive devices only when clinically indicated, as they increase the risk of infection;
- Promote sneezing and coughing hygiene.

It is also important to ensure everyone knows how to apply SICPs and what to do if they see someone who does not follow them.

Wilson et al (2015) have shown that the use of gloves is something healthcare staff often get wrong. Gloves are required when there is a risk of contamination from blood or body fluids. It is important that good hand hygiene is followed before putting gloves on, and immediately after taking them off. It is just as important to use a new pair of gloves for each new task, even if performed for the same resident.

Outbreak preparedness

In addition to preventing outbreaks by applying SICPs, preparing for them is essential. Autumn is the perfect time to do so, as outbreaks most commonly occur during the winter months (Petrigiani et al, 2015). Influenza vaccination is offered to all people aged 65 and over in autumn; *The Green Book* also recommends that immunisation should be provided to health and social care workers in direct contact with residents, for their own protection and to reduce the risk of transmission in social care premises (Public Health England, 2015).

Encouraging staff to be vaccinated can be challenging for managers, but life-saving for residents. It is important to plan a vaccination programme early and look online for novel approaches to encourage care workers to get their flu jab.

Box 3. The 'five moments' for hand hygiene

- Before touching a patient/resident
- Before undertaking clean/aseptic procedures
- After body fluid exposure/risk
- After touching a patient/resident
- After touching patient/resident surroundings

Source: World Health Organization (2009)

Box 4. Information needed by the health protection team

- About the people who are sick
 - What are the people sick with?
 - How many are/have been sick?
 - When did they get sick?
 - Are they all still sick?
 - Which GPs have been called?
- About the care home
 - How many people live in the home?
 - On how many floors is the accommodation?
 - On how many floors are the sick residents?
 - Do staff work on affected as well as unaffected floors?
 - Are there any plans in place for the next few days?

Norovirus is sometimes called the winter vomiting bug, so autumn is a good time to warn staff, residents and visitors of the seriousness of a norovirus outbreak. People aged 65 years or over are at a significantly higher risk of death from a norovirus infection than younger adults (Lindsay et al, 2015). There is no currently available vaccine against norovirus, which makes the application of SICPs even more crucial. It is also useful to let relatives know, before winter, that the care home may suspend visits to protect residents – and visitors – should a norovirus outbreak occur (Currie et al, 2016).

In a study of 115 norovirus outbreaks in care homes, 12 were found to have been caused by a care worker; in three of these 12 cases, the care worker was symptomatic before coming on duty; in around half of the 115 outbreaks, the first case of infection was a resident who had been in the care home for more than four days (Curran et al, 2016). These figures confirm that noroviruses often spread in care homes undetected, and underline the importance of applying SICPs and of being well prepared for outbreaks.

To be well prepared, staff need to know how outbreaks manifest, so it is useful to ensure, in the autumn, that all staff are aware of the symptoms to look out for. They must report any concerns to the manager. Staff should also be familiar with the outbreak plan, which must include when and how to contact the health protection team or unit (HPT/U), as well as the form to be completed in case of an outbreak, as required by each country's regulations.

Outbreak detection

It is easy to detect an outbreak when it arises from a single source within a short space of time; for example, when contaminated food results in most residents becoming sick within hours of each other. It is much more difficult, however, to detect an outbreak when the time between cases is long. It is also difficult to confirm an outbreak, as it can take days – or sometimes weeks – to prove, from looking at specimen results, that the culprit is one and the same infectious agent. It is vital that care home staff have a high index of suspicion and promptly call in experts to investigate any suspected outbreak.

The earlier an outbreak is recognised and reported, the fewer people (residents and staff) will become sick (Davis et al, 2011). Outbreaks that are reported early are also easier to control. In the early stages of an outbreak, there may be just one source of infection – for example, one resident's room – but, as more people become sick, the number of possible sources rapidly increases, making control of the outbreak more difficult.

Box 5. Principles of outbreak PPDM in care homes

- Prevent outbreaks by applying and promoting SICPs every day, for every resident
- Prepare for outbreaks with an autumn campaign, ensuring everyone knows what to look out for and what to do if an outbreak happens
- Detect outbreaks as early as possible by being vigilant when people display signs and symptoms of infection
- Manage outbreaks well by involving the HPT/U, following advice on infection control measures and closely monitoring residents
- Reflect on the outbreak to improve outbreak PPDM in the future

Key: HPT/U = health protection team or unit; PPDM = prevention, preparedness, detection and management; SICP = standard infection control precaution.

In US TV shows, the police put out a 'BOLO' on suspicious characters. BOLO stands for 'be on (the) lookout (for)'. This is a tool that could be used in care homes, where staff could put out a BOLO on residents, visitors and staff who display signs and symptoms of infection that could lead to an outbreak. They should look out for:

- People with the same or similar symptoms – for example, cough or diarrhoea and/or vomiting;
- People with a fever;
- People who are very sick;
- People with skin or soft tissue infection – for example, an inflamed wound leaking purulent fluid (pus);
- More people than usual who have a fever or are very sick.

If a resident shows symptoms of infection, a safety brief can help to detect a possible outbreak as early as possible. Key questions to consider are: does anyone else have these symptoms now? Who was the last person to have these symptoms and when?

As soon as staff think an outbreak may be occurring, they must inform:

- The manager of the care home;
- The HPT/U;
- The GPs of those who are sick;
- The relatives of those who are sick;
- Residents;
- Other staff (DH, 2013).

Box 4 lists the information staff need to have at hand when contacting the HPT/U.

Outbreak management

Once the outbreak is confirmed, the goals are to stop it, prevent further spread and take care of all those affected. The HPT/U will provide guidance on specific infection control measures, which may include:

- Temporarily stopping admissions and transfers of residents;
- Suspending visiting;
- Using disinfectants as part of routine cleaning until the outbreak is over;

- Increasing use of protective equipment;
- Reducing the amount of socialising in the care home;
- Allocating staff to care for specific residents only;
- Checking all staff are applying SICPs;
- Ensuring affected residents are well cared for.

As organisms that cause outbreaks can survive in the care home environment from a few days to several months, it is imperative that all items residents touch are handled carefully, decontaminated effectively or discarded safely. There should be clear guidance as to how to do this.

NHS Scotland has published a helpful poster summarising key information about infection control measures to be used in case of a norovirus outbreak in care homes (Bit.ly/NHSScotlandNorovirus).

Applying infection control measures in a care home is often challenging; for example, residents with dementia may be unable to understand, even in the short term, the changes to their living arrangements. Stopping admissions will reduce the risk of new cases of infection. Decontaminating the environment and equipment will minimise contact spread.

The information in Box 4 must be updated and reported to the HPT/U every day. How long the control measures need to remain in place will depend on the number of new people who develop symptoms and the number who still have symptoms. Once there are no more symptomatic patients, the care home will need a deep clean. The HPT/U will decide when it is safe to lift the control measures.

Once it is over, it is helpful to reflect on how well the care home team has done in identifying and controlling the outbreak – the key question being how to improve outbreak PPDM in the future.

Conclusion

People in care homes share the same food, air and living spaces, so they also share infectious agents, and outbreaks happen easily. Care home residents are more vulnerable to infectious agents and at increased risk of developing serious infections, with potentially life-threatening consequences, so it is imperative (and part of the duty of care) that staff practise excellent outbreak prevention and preparedness. Early detection and good management will help to limit the number of people who get sick and how sick they get. The health and wellbeing, and possibly the lives, of care home residents depend on the quality of outbreak PPDM (Box 5). **NT**

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