

A report on the management of diarrhoea in care homes

Including an assessment of the implications for recognition and management of residents with *Clostridium difficile* infection; August 2010.



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Produced by:

Surrey and Sussex Health Protection Unit, in collaboration with Brighton and Sussex Medical School.

Acknowledgements:

Thanks to all care homes who participated in this study. This study was funded by the South East Regional Office of the Health Protection Agency.

Target audience:

NHS and HPA healthcare-associated infection leads, PCT and adult social care commissioners, care homes, policy-makers and others concerned with tackling healthcare-associated infection at national, regional and local level.

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Cover picture: Centre for Infections/Science Photolibrary

Clostridium difficile bacteria, coloured transmission electron micrograph (TEM).

These rod-shaped bacteria cause pseudomembranous colitis, one of the most common hospital-acquired infections and antibiotic-associated diarrhoea. Infection can be fatal. Treatment is with antibiotic drugs, although this bacterium has become increasingly resistant to the use of antibiotics. Magnification: x15,500 when printed 10 centimetres wide.

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Executive summary

Background

Clostridium difficile is a healthcare-associated infection of the intestine and is the main cause of antibiotic-associated diarrhoea and colitis. It is a major public health problem and mainly affects elderly patients and those with underlying illnesses. Although rates of *Clostridium difficile* infection (CDI) in England have decreased recently, the number of cases remains high. Efforts to reduce *C.difficile* infection rates have been initiated in care homes, led by national guidance. This reflects the concentration of vulnerable people in such settings, where use of antibiotics and gastric acid suppressants is common.

This study aimed to find out how well diarrhoea is managed and treated in nursing and residential homes (care homes)¹, to identify areas where knowledge and practice could be improved.

Methods

Surrey and Sussex Health Protection Unit sent a questionnaire to all 907 care homes in Sussex in early 2009, exploring the management and treatment of diarrhoea and related infection control and human waste management practices.

Results

Of the 907 care homes sent questionnaires, 368 responded (41% response rate). Reminder letters were not possible, as the H1N1 flu pandemic began and became a priority at this point in the study. Residents with diarrhoea were reported to be isolated promptly in 36% of homes and 78.2% of homes reported always wearing appropriate personal protective equipment. Most homes waited over 24 hours before sending a stool sample for testing. Frequency of bowel movements was monitored well, but stool consistency was less well monitored in residents with diarrhoea. Temperature and pain were monitored in less than half of care homes. Human waste was disposed of exclusively by automated sluice machine in 48.7% of nursing and 7.6% of residential care homes. Bedpans were washed in residents' sinks in 8.4% of all homes and in communal baths in 9.6% of residential homes.

Conclusions

This study found that many homes are not fully compliant with current infection prevention and control guidance. This has implications for the effective recognition, management and treatment of *Clostridium difficile* infection (CDI) and other forms of infective diarrhoea.

1 All care homes are required to be registered with the Care Quality Commission. Nursing homes must employ Registered Nurses to be on duty at all times; this is not a requirement in residential care homes.

Recommendations

Based on the findings, the following recommendations are made for improving early recognition, management and treatment of CDI in care homes:

1. Care homes should ensure standards for infection control are upheld, in line with national guidance. This includes ensuring staff have adequate infection control training and updates, implementing policies for infection control (including management of diarrhoea and outbreaks), having adequate waste management facilities and monitoring of unwell patients.
2. PCT and Adult Social Care commissioners should ensure that such standards for infection control are included in contracts and that implementation is monitored.
3. The Care Quality Commission should ensure that homes are assessed on the above areas, as well as other aspects of infection prevention and control.
4. The Health Protection Agency should use these findings to advise on standards for care homes, to help ensure that infection prevention and control practices in care homes are appropriate and effective.

Introduction

Clostridium difficile is a healthcare-associated infection of the intestine and is the main cause of antibiotic-associated diarrhoea and colitis. It is a major public health problem, mainly affecting elderly patients and those with underlying illnesses. Although rates of *Clostridium difficile* infection (CDI) in England have decreased recently, the number of cases remains high. During the financial year 2008/09, there was a 35% reduction in the number of cases reported in England, compared with the previous year (HPA, 2009). This downward trend is encouraging but the actual number of reported cases remains high at 36,095 for 2008/09. The majority of cases identified were aged over 65 (80% of cases). The Health Act 2006 states that the duty to prevent and control healthcare-associated infections (HCAIs) applies wherever patients are cared for, including care homes.

Specific guidance for control of CDI comes from the Department of Health publication *Clostridium difficile infection: how to deal with the problem*, which is aimed at all NHS organisations (DH, 2009). In order to improve early identification of the infection, the guidance recommends that a protocol represented by the acronym 'SIGHT' is applied in all cases of diarrhoea:

- **S**uspect that a case may be infective where there is no clear alternative cause for diarrhoea
- **I**solate the patient while determining the cause of the diarrhoea
- **G**loves and aprons must be used for all contacts with the patient and their environment
- **H**andwashing with soap and water should be carried out before and after each contact with the patient and their environment
- **T**est the stool for toxin by sending a specimen immediately.

Seeking advice from the Health Protection Unit (HPU) is recommended when two or more cases of diarrhoea which are suspected of being infectious occur within a few days in a care home.

As of October 2010, all care homes are required to comply with the Health and Social Care Act (2008) as part of their registration requirements (Department of Health, 2008). This includes a requirement to '*have regard to national guidance relating to infection prevention and control*'. The accompanying Code of Practice sets out ten compliance criteria on the prevention and control of infection. Three of these criteria are particularly relevant to this report. Criterion 2 states that homes must '*provide and maintain a clean and appropriate environment in managed premises that facilitates the prevention and control of infections*'. This includes management of human waste and safe cleaning of commodes and bedpans. Criterion 5 requires that care homes '*ensure that people who have developed an infection are identified promptly and receive the appropriate treatment and care to reduce the risk of passing on the infection to other people*'. This links in with the requirement to provide adequate isolation facilities (Criterion 7).

A recent study of over 1,000 care homes in England examined how well care homes were prepared for these forthcoming changes in regulation (Care Quality Commission, 2009). The report concluded that care homes have not yet effectively implemented guidance on improving infection prevention and control and many were

unaware of the pending regulatory changes. The study found that sharing of patient information between care organisations is poor and that good leadership and staff training is vital to successful infection prevention and control in care homes. There is currently little evidence regarding infection prevention and control practices in UK care homes and the last audit of infection control practices in nursing homes was conducted ten years ago (Roberts et al, 2000).

In cases of *Clostridium difficile* infection and especially where outbreaks² have occurred, a Root Cause Analysis (RCA) is often undertaken. RCA provides a framework for reviewing how and why infections have occurred. It should be used to identify any areas for improvement and to make recommendations for improvements in practice, to ensure lessons are learned and to prevent mistakes from being repeated. In Sussex, the RCA has been undertaken using a standardised questionnaire, administered with the home manager either over the phone, or during a visit to the care home. This process has identified several areas for improvement in care homes in Sussex. Areas of particular concern include management of human waste, infection control practices and poor knowledge of healthcare-associated infections. These issues have also been identified during infection control training provided for care homes by Surrey and Sussex HPU and the PCTs across Sussex.

This study builds on these findings by examining how well diarrhoea is recognised, managed and treated in care homes and investigating related infection control practices. Based on the findings, recommendations are made for improving early recognition, management and treatment of CDI in care homes.

Methods

All residential and nursing homes in East and West Sussex, Brighton and Hove were invited to participate in the study. The letter was addressed to home managers with the intention that they would complete the questionnaire. A questionnaire was developed by a multi-disciplinary team of health protection practitioners and clinicians from the Surrey and Sussex Health Protection Unit, Brighton and Sussex Medical School and Brighton and Sussex University Hospital Trust. The questionnaire was piloted in six care homes in a neighbouring county (Surrey) before being sent out to all care homes. It addressed four broad categories: management of diarrhoea, treatment of diarrhoea, general infection control in the home and frequency of diarrhoea in the home. The questionnaire was titled *Management of residents with diarrhoea*, as the researchers did not want to influence the responses by mentioning *C.difficile* (which was high profile in the media). The questions asked regarding management and treatment of diarrhoea reflected the SIGHT recommendations for management of suspected infective diarrhoea, namely suspecting that diarrhoea is infectious where there is no clear alternative cause, rapid isolation, wearing of gloves and aprons, handwashing, and testing for *C.difficile* toxin (DH, 2009). Questions were also asked about how human waste was managed in the home.

² An outbreak is defined as 'two or more cases caused by the same strain related in time and place based on the date of onset of the first case' .

The questionnaire was sent by post to all 907 care homes in Sussex in April 2009. A covering letter was sent out explaining that findings would be used to identify areas for improvement and create local guidelines for management of diarrhoea. It was made clear that all findings would be treated anonymously and in confidence, to encourage respondents to answer honestly. Care home responses were received and anonymised by Brighton and Sussex Medical School colleagues, to ensure that individual responses could not be traced to participating care homes. The number of outbreaks of diarrhoea identified in this survey was compared with the number of outbreaks voluntarily reported to the HPU during the same period (as recorded on the HPU data management system). Data from the questionnaires analysed using STATA 10 provided basic descriptive statistics.

Ethical approval was not required, as the aim was audit, with a view to service improvement based on the findings of this survey of diarrhoea management and infection control practices.

Results

Of 907 care homes in East and West Sussex, Brighton and Hove 368 (41%) completed the questionnaire. Half of nursing homes and 36% of residential homes participated. Most homes participating in the study self described as residential (69%) and the remainder were nursing homes. Of these, 26% provided care for elderly people with mental illness. Nursing homes tended to be larger than residential homes. 105 care homes (28%) reported having had at least one outbreak of diarrhoea during January to March 2009. Table 1 provides a summary of demographic characteristics of the participating care homes.

Initial management of diarrhoea: isolation and stool sampling

In 35.1% of residential homes and 39.6% of nursing homes residents were isolated after 2-3 episodes of diarrhoea in a 24-hour period, with 19.6% of residential homes and 3.6% of nursing homes reporting that they never isolated residents (Table 2). Most nursing homes (92.8%) and 71.7% of residential homes reported that gloves and aprons were always worn when entering the room of an affected resident (Table 2). Over a fifth (21.9%) of residential care homes did not answer this question. Stool samples were sent within the first 24 hours of onset of diarrhoea in 36.9% of nursing homes and 17.6% of residential homes, although most homes reported waiting beyond 24 hours (Table 2). Almost half (42.2%) of residential homes reported that they would send a stool sample for testing only on the request of a GP (Table 2).

Clinical monitoring of residents who develop diarrhoea

Daily temperature was always monitored in 42.3% of nursing homes and 27.1% of residential homes, with 3.6% of nursing homes and 12.8% of residential homes reporting that they never monitor the temperature of residents who develop diarrhoea (Table 3). Over a fifth (22.7%) of residential homes did not answer this question. Half of all homes reported that they always monitor pain in patients who develop diarrhoea (Table 3). A relatively high proportion of homes did not answer this question (24.7% residential, 18.9% nursing). Frequency of bowel action is monitored in 97.3% of nursing homes and 94.4% of residential homes. 96.4% of nursing homes and 85.7% of residential homes monitor stool consistency (Table 3). Hydration is monitored in 70% of all care homes (Table 3).

Infection control: handwashing and human waste management

86.5% of nursing and 81.3% of residential homes reported that all staff had received training in hand hygiene techniques (Table 4). Human waste was disposed of exclusively in an automated sluice machine in 48.7% of nursing and 7.6% of residential homes, with 21.6% of nursing and 70.5% of residential homes using a method other than automated sluice (Table 4). Commodes and bed pans were washed only by automated sluice in 64% of nursing and 8.8% of residential homes (Table 4). Almost one third (31.9%) of residential homes did not answer this question. Bedpans and commodes were washed out in residents' sinks in 4.5% of nursing and 20.7% of residential homes and in a communal bath in 9.6% of residential homes (Table 4).

Discussion

Our data show that inadequate infection control and clinical monitoring practices in relation to diarrhoea are very common in care homes. Only a third of homes immediately isolate residents with potentially infective diarrhoea and most homes do not send stool samples to the laboratory soon enough. Monitoring of residents with diarrhoea is inconsistent, which can delay diagnosis and treatment and lead to more serious health outcomes. Frequency of diarrhoea is monitored by the majority of homes, although stool consistency is less well monitored by residential homes. Fluid balance was generally well monitored. Infection control measures were inadequate in some homes and over a fifth of homes did not always use gloves and aprons when caring for patients with diarrhoea. Most homes reported that all staff had received training on hand hygiene, although 3.2% of residential homes reported that no staff had received this training. There were no nursing homes which reported that none of their staff had been trained. In 11.2% of residential homes and 9.9% of nursing homes it was reported that 'some' staff had received training. Perhaps of most concern was the finding about how human waste was managed in care homes. Few (7.6%) residential homes and half of nursing homes used an automated sluice exclusively and unsafe practices, including washing out bedpans or commodes in communal baths, were reported by some residential homes (9.6%). Although there were a few questions to which participants did not always respond, the rate of non-response to questions about management of human waste was particularly high, especially in residential homes. Findings show that care homes are under-reporting outbreaks of diarrhoea, with less than a quarter of outbreaks recorded via the survey having been reported to the HPU in the corresponding period. The HPU plays an important role in providing support and advice regarding such outbreaks, so it is important that all suspected outbreaks are reported early.

A particular strength of this study was the large number of homes that participated (368). Due to the response rate of 41% it is not possible to rule out response bias, which may affect the ability to generalise from these findings. Response rate was higher for nursing homes (50%) than for residential homes (36%). Social desirability bias may have been an issue, in that respondents may have reported what they ought to do, rather than what they really did in practice. Anonymising the results may have helped to reduce this form of bias.

Very little is currently known about the role of care homes in transmission of *C.difficile* and this study adds to our understanding of how diarrhoea is managed and treated in care homes. Our findings add further evidence that many care homes are not compliant with current infection prevention and control guidance which concurs with the recent Care Quality Commission report (CQC, 2009). Both studies found that a great deal of progress must be made in order to meet the requirements of the Health and Social Care Act 2008, prior to its implementation in 2010. These findings highlight a need for current guidelines for identifying, managing and treating CDI to be better integrated into care home practice.

The results of this study show that many homes are not fully compliant with infection prevention and control guidance, nor are they always monitoring residents for signs and symptoms to allow for early diagnosis and treatment. These findings have implications for the effective recognition, management and treatment of CDI in care homes. Improvements could be achieved by more consistent clinical monitoring of

residents with diarrhoea and early isolation and stool sampling in all cases of diarrhoea where the cause may be infectious and there is no clear alternative cause for diarrhoea. Infection control practices need to be improved in some care homes in order to prevent ongoing transmission of infections such as *C.difficile*. National guidelines such as *Clostridium difficile: how to deal with the problem* (DH, 2009) should be fully implemented in care homes, with particular attention to the SIGHT guidelines. Use of automated sluice machines in residential care homes is not mandatory (although it has long been a requirement for nursing homes in Sussex) and this study highlighted human waste disposal practices that put staff and residents at risk of infection in a high proportion of care homes. Where sluice machines are available they should be used properly, to avoid such high-risk practices. These findings have wider policy implications, particularly in light of the Health and Social Care Act (2008). Our findings show that many homes are not meeting the Health and Social Care Act requirements to *'ensure that people who have developed an infection are identified promptly'*, or to *'provide adequate isolation'*. Our findings regarding management of human waste suggest that some homes are failing to *'provide and maintain a clean and appropriate environment that facilitates the prevention and control of infections'*, in line with the pending Health and Social Care Act requirements. Care home staff must be given ongoing support and training in infection prevention and control. Managers need to be made aware of their responsibility to report outbreaks of diarrhoea in care homes to the HPU as this study suggests that outbreaks are being substantially under-reported at present, despite local HPU guidance documents and many local training events with care homes to encourage reporting.

Conclusions

This study highlights areas in which care homes must improve in order to reduce the transmission of *Clostridium difficile* in this setting and to meet the requirements of the Health and Social Care Act (2008). The study findings have implications for the identification, management and treatment of CDI in care homes, as well as wider infection control implications.

Recommendations

We recommend that the SIGHT recommendations for management of suspected potentially infective diarrhoea be fully implemented in care homes³. This has the following implications:

Care homes should:

- Ensure standards for infection control are upheld in line with current national guidance. These standards should include ensuring staff have had adequate infection control training and updates, policies for infection control (including management of diarrhoea and outbreaks), adequate waste management facilities, and adequate monitoring of unwell patients.
- Care home managers should report all outbreaks to their local Health Protection Unit.

Commissioners should:

- Ensure standards for infection control are included in contracts when commissioning care home services and ensure that implementation of these standards is monitored. As a minimum standard, care homes should follow the SIGHT recommendations for management of suspected potentially infective diarrhoea.

The Care Quality Commission should:

- Ensure that care homes are assessed thoroughly on infection prevention and control. This should include checking infection control policies and procedures, human waste management methods, and reporting of outbreaks to the Health Protection Unit.
- Ensure that care homes are assessed on implementation of the SIGHT recommendations for management of suspected potentially infected diarrhoea.
- Ensure that Inspectors are appropriately trained in infection prevention and control.

The Health Protection Agency should:

- Use these findings to advise on standards for care homes, to help ensure that infection prevention and control practices in care homes are appropriate and effective.

³ The SIGHT guidelines recommend: suspecting that diarrhoea is infectious where there is no clear alternative cause, isolation, wearing of gloves and aprons, handwashing, and testing for *Clostridium difficile* toxin (DH, 2009).

References

Care Quality Commission (2009). Working together to prevent and control infections: a study of the arrangements for infection prevention and control between hospitals and care homes. September 2009.

Department of Health (2006). The Health Act 2006: code of practice for the prevention and control of healthcare-associated infections. London: Department of Health, 1 October 2006. Gateway ref: 6902.

Department of Health (2008). Health and Social Care Act (Registration of Regulated Activities) Regulation. London: Department of Health, 16 December 2009. Gateway ref: 13072.

Department of Health (2009). Clostridium difficile infection: how to deal with the problem. London: Department of Health, December 2008. Gateway ref: 9833.

Health Protection Agency. Summary points on April to June 2009 quarterly and financial year (2008/09) primary care organisation Clostridium difficile mandatory surveillance data

http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1239695848871 (accessed Oct 2009).

Roberts C, Mayon-White R, Grant-Casey J (2000). Audit of infection control practice in nursing homes: 1996-1998. Public Health Laboratory Service, London.

Tables

Table 1 – Characteristics of participating care homes*

	Residential only (n=251)		Nursing available (n=111)	
	number	(%)	number	(%)
Number of registered beds				
0-9	70	(27.9)	2	(1.8)
10-19	65	(25.9)	9	(8.1)
20-29	73	(29.1)	28	(25.2)
30+	43	(17.1)	72	(64.9)
Missing data	0	(0)	0	(0)
Total	251		111	
Care provided for elderly mentally infirm				
yes	60	(23.9)	35	(31.5)
Number of homes with no en-suite toilet facilities				
	47	(18.7)	8	(7.2)
Number of communal toilets				
0-4	157	(62.6)	33	(29.7)
5+	91	(36.3)	71	(64.0)
Missing data	3	(1.2)	7	(6.3)
Total	251		111	

* homes self-identified as 'nursing available' (nursing home) or 'nursing not available' (residential home).

Table 2- Initial management of diarrhoea: isolation and stool sampling [†]

	Residential only (n=251)		Nursing available (n=111)		P value
	number	(%)	number	(%)	
When do you normally isolate a resident with diarrhoea?					
Immediately after one episode	58	(23.1)	28	(25.2)	0.001
If continues for >24 h	13	(5.2)	14	(12.6)	
After 2-3 episodes in 24 h	88	(35.1)	44	(39.6)	
After 4-5 episodes in 24 h	19	(7.6)	12	(10.8)	
After 6-7 episodes in 24 h	2	(0.8)	2	(1.8)	
Other	15	(6.0)	3	(2.7)	
Do not isolate	50	(19.9)	4	(3.6)	
No response to question	6	(2.4)	4	(3.6)	
Total	251		111		
When a resident is isolated with diarrhoea, aprons and gloves are put on before entering their room:					
Always	180	(71.7)	103	(92.8)	0.001
Sometimes	14	(5.6)	1	(0.9)	
Never	2	(0.8)	0	(0)	
No response to question	55	(21.9)	7	(6.3)	
Total	251		111		
When would the home send a stool sample for testing?					
After 2/3 episodes in 24h	17	(6.8)	17	(15.3)	0.001
After 4/5 episodes in 24h	21	(8.4)	19	(17.1)	
After 6/7 episodes in 24h	6	(2.4)	5	(4.5)	
If continues for >24h	55	(21.9)	34	(30.6)	
If continues for >48h	38	(15.1)	18	(16.2)	
If continues for >one week	2	(0.8)	2	(1.8)	
On request from GP	106	(42.2)	14	(12.6)	
other	3	(1.2)	2	(1.8)	
No response to question	3	(1.2)	0	(0)	
Total	251		111		

[†] Respondents were instructed to tick one box only

Table 3 - Monitoring of residents with diarrhoea

	Residential only (n=251)		Nursing available (n=111)		P value
	No.	(%)	No.	(%)	
If a resident develops diarrhoea as a new problem, what do you normally monitor?					
Daily temperature					
Always	68	(27.1)	47	(42.3)	
Sometimes	94	(37.5)	46	(41.4)	
Never	32	(12.8)	4	(3.6)	
No response to question	57	(22.7)	14	(12.6)	
Total	251		111		0.007
Pain assessment					
Always	125	(49.8)	58	(52.3)	
Sometimes	49	(19.5)	30	(27.0)	
Never	15	(6.0)	2	(1.8)	
No response to question	62	(24.7)	21	(18.9)	
Total	251		111		0.206
Frequency of bowel action					
Always	237	(94.4)	108	(97.3)	
Sometimes	8	(3.2)	0	(0)	
Never	2	(0.8)	0	(0)	
No response to question	4	(1.6)	3	(2.7)	
Total	251		111		0.499
Stool consistency					
Always	215	(85.7)	107	(96.4)	
Sometimes	17	(6.8)	1	(0.9)	
Never	3	(1.2)	0	(0)	
No response to question	16	(6.4)	3	(2.7)	
Total	251		111		0.005
Fluid balance					
Always	174	(69.3)	80	(72.1)	
Sometimes	52	(20.7)	25	(22.5)	
Never	9	(3.6)	0	(0)	
No response to question	16	(6.4)	6	(5.4)	
Total	251		111		0.465

Table 4 – Infection control: hand washing and human waste management †

	Residential only (n=251)		Nursing available (n=111)		P value
	No.	(%)	No.	(%)	
How many of your staff have received training in hand hygiene techniques?					
All staff	204	(81.3)	96	(86.5)	0.376
Some staff	28	(11.2)	11	(9.9)	
No staff	8	(3.2)	0	(0)	
Don't know	3	(1.2)	0	(0)	
No response to question	8	(3.2)	4	(3.6)	
Total	251		111		
Where is human waste (faeces) disposed of when emptying bedpans/commodos?					
Automated sluice only	19	(7.6)	54	(48.7)	0.001
Automated sluice and other method	9	(3.6)	24	(21.6)	
Only methods other than automated sluice	177	(70.5)	24	(21.6)	
No response to question	46	(18.30)	9	(8.1)	
Total	251		111		
Where are bedpans/commodos cleaned (washed and rinsed)?					
Automated sluice only	22	(8.8)	71	(64.0)	0.001
Automated sluice and other method	6	(2.4)	17	(15.3)	
Dedicated sluice	67	(26.7)	9	(8.1)	
Resident's sink	52	(20.7)	5	(4.5)	
Communal sink or bath	24	(9.6)	0	(0)	
No response to question	80	(31.9)	9	(8.1)	
Total	251		111		
How is linen soiled with faeces/diarrhoea washed?					
Placed straight into washing machine	16	(6.4)	1	(0.9)	0.039
Hand-washed then placed into washing machine	19	(7.6)	2	(1.8)	
Placed in dissolvable bag then washing machine	187	(74.5)	99	(89.2)	
Other method	29	(11.6)	9	(8.1)	
Total	251		111		

† Respondents were instructed to tick one box only

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Updated August 2010
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