

Management of suspected infectious diarrhoea by English GPs:

are they right?

Abstract

Background

The criteria used when GPs submit stool specimens for microbiological investigation are unknown.

Aim

To determine what criteria GPs use to send stool specimens, and if they are consistent with national guidance, and whether GPs would prescribe an antibiotic before they receive a result.

Design and setting

Questionnaire survey of 974 GPs in 172 surgeries in England.

Method

GPs were sent a questionnaire (23 questions) based on national guidance.

Results

Questionnaires were returned by 90% (154/172) of surgeries and 49% (477/968) of GPs. GPs reported sending stool specimens in about 50% of cases of suspected infectious diarrhoea, most commonly because of individual symptoms, rather than public health implications. Fewer considered sampling with antibiotic-associated diarrhoea post hospitalisation, or children with acute, painful, bloody diarrhoea; only 14% mentioned outbreaks as a reason. Nearly one-half of GPs reported they would consider antibiotics in suspected cases of *Escherichia coli* O157, which is contraindicated. Only 23% of GPs would send the recommended three specimens for ova, cysts, and parasites (OCP) examination. Although 89% of GPs gave some verbal advice on how to collect stool specimens, only 2% of GPs gave patients any written instructions.

Conclusion

GPs need more education to address gaps in knowledge about the risks and diagnosis of different infections in suspected infectious diarrhoea, especially *Clostridium difficile* post-antibiotics, *E. coli* O157, and requesting OCPs. Advice on reports, tick boxes, or links to guidance on electronic request forms may facilitate this.

Keywords

antibiotics; diarrhoea; *E. coli* O157; general practice; guidance; investigation.

INTRODUCTION

Since the Health Protection Regulations were updated in 2010, medical practitioners are now obliged to report cases of infectious bloody diarrhoea, food poisoning, and haemolytic uraemic syndrome (HUS).¹ National guidance was also issued to GPs and other medical practitioners that explained the obligations under the new legislation.¹ In a recent qualitative interview study of 20 English GPs, the majority of participants reported that stool specimen microbiology was useful but should not be routine, as most cases of suspected infectious diarrhoea were self-limiting and most patients did not usually require specific antibiotic treatment.² This reported behaviour has been backed up by data from a longitudinal study of infectious intestinal disease (IID) in the UK, which showed that there were 147 community cases of IID and 10 GP consultations for every case reported to national surveillance.³ In the current study, limited but rich qualitative data were used from the previous study,² to develop a questionnaire to collect data from a much larger sample of GPs. The aim was to determine what clinical and public health criteria GPs use to decide when to send stool specimens, what (including national guidance) informs these management decisions, whether GPs would prescribe

an antibiotic before they receive a stool culture result, and to elicit how practice related to national guidance.⁴ The results from this study will inform whether patients with suspected IID are being treated appropriately and if the spread of infection is being minimised through the actions of GPs; furthermore, it will inform GP guidance review and implementation, and highlight particular areas on which to focus education.

METHOD

Questionnaire development

The questionnaire was developed by the authors, based on previous qualitative interview responses.⁴ It consisted of 23 questions covering attitudes toward stool sample submission, consideration of public health implications, patient treatment decisions, advice given, and how the microbiology laboratory might help improve the investigation and management of infectious intestinal disease (IID). For several open questions GPs were first asked to write their answers in free text in a large box. Over the page they were asked similar information phrased as closed questions using answer lists with tick boxes. However, they were specifically requested not to adjust their previous answers. This approach was piloted with

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How this fits in

Although it is known that there are 10 patient consultations with English GPs for every case of infectious diarrhoea reported to national surveillance, little is known about the reasons why diarrhoeal specimens are submitted for microbiology. This large survey shows that GPs send stool specimens for investigation of symptoms rather than any public health implications; few mentioned outbreaks as a reason for submitting a stool sample and few would ask about occupational risk factors. Nearly half of GPs reported that they would consider prescribing antibiotics for suspected cases of *Escherichia coli* O157 diarrhoea, which is contraindicated. Less than one-third of GPs in this study spontaneously mentioned post-antibiotic diarrhoea as a reason for sending a stool specimen or would consider antibiotics for suspected *Clostridium difficile* infection. The gaps in some GPs' knowledge about the diagnosis, management, and public health risks of suspected infectious diarrhoea, indicate a need for clearer advice on reports, easier access to guidance, and education, especially around *E. coli* O157, *C. difficile*, and ova, cysts, and parasites.

a group of 24 GPs, discussing the format and questions with them; it was found to be acceptable and GPs did not modify their answers. After some alterations the questionnaire was piloted with further GPs for ease of completion.

Participants

General practice surgeries in central and south west England served by Gloucester, Taunton, and Salisbury microbiology laboratories in 2011 were identified via laboratory computer systems. In total, 172 surgeries were identified; practice populations ranged from 1072 to 28 514 patients, mean practice population 7335. Branch surgeries with completely separate staff were considered as a separate practice. The practice websites were used to identify all the doctors working at the surgery, including locums and salaried doctors. Practice managers were telephoned to warn them of the planned audit and to obtain doctors' names if these were not listed on their website. Nurses were not invited to participate. GPs who had participated in the qualitative interviews or questionnaire development were excluded. Thus, 974 GPs in 172 surgeries were invited to participate.

Questionnaire distribution

Personally addressed invitation letters and hard copy A5 questionnaires, bearing local trust and Health Protection Agency (HPA; now Public Health England) logos, were mailed in autumn 2011 by the local laboratory. Participants were offered a certificate of reflective practice for their portfolio, but no financial incentive. After a month, duplicate questionnaires were distributed in the local laboratory transport to non-responding GPs via their practice manager. In January 2012 if no GP from a single practice had responded, the practice manager was telephoned to make sure they had received the questionnaires and ask if they could encourage at least one GP to complete the audit.

Data entry and analysis

Free text answers were discussed by three researchers and assigned to categories. The questionnaire data were double entered by two separate researchers; disagreements were resolved by referral to the original questionnaire. Categorical data were then analysed using frequency distributions, with summary descriptive statistics for the continuous data.

RESULTS

Five GPs had left the surgeries contacted and one was on maternity leave. Questionnaires were returned from 477 of the remaining 968 GPs (49%). At least one questionnaire was received from 90% (154/172) of surgeries. Returns varied slightly by laboratory: in Salisbury 42% (75/177) of GPs and 76% (22/29) of surgeries; in Gloucestershire 48% (212/446) of GPs and 93% (75/81) of surgeries; and in Taunton 56% (195/351) of GPs and 92% (57/62) of surgeries. At least 93% (443/477) of participants answered each questionnaire, except for the question on interpretation of results which had a typographical error. This question has been excluded from the analysis.

There was a wide range in how often GPs reported sending specimens in cases of suspected infectious diarrhoea (median 50%, interquartile range 10–90%, range 0–100%). Over one-half of GPs spontaneously reported that a history of persistent diarrhoea, recent foreign travel, and blood or pus in the stools would prompt them to send a specimen for microbiology; over 80% ticked these options when prompted (Table 1). Less than one-third considered sampling if the patient was recently hospitalised and had antibiotics, this rose to 81% when prompted. Only 6% spontaneously mentioned sending a

Table 1. Factors mentioned by GPs in open and closed questions that would prompt them to send a stool sample for microbiological investigation (n = 471)

History, symptom, or sign	Open question (n = 471)	Closed question (n = 472)
	Free text answers, %	Tick box answers, %
Persistent diarrhoea	87	85
Recent foreign travel	81	87
Blood or pus in stools	68	82
Patient systemically unwell	43	63
Post antibiotics and hospitalisation	31	81
Occupation: food/care/home/school/farm	21	NA
Severity or pain	17	NA
Possible outbreak	14	NA
Contact with notifiable disease	7	NA
Acute painful, bloody diarrhoea in children	6	73
Farm visit	3	NA
Immunocompromised	5	NA
To reassure patient	2	31
Cause suggests infection	2	NA
Suspected food poisoning	27	74
To determine if specific treatment is needed	NA	54

NA = Not applicable as not mentioned by GPs in the open question or not listed in the closed question.

sample in children with acute, painful, bloody diarrhoea; when prompted this rose to 73%.

Despite food poisoning being a statutorily notifiable disease, when asked about factors that would make them consider wider public health implications, only about half reported possible food poisoning, outbreak, or food handler; this rose to 90%, 92%, and 71% respectively when prompted (Table 2). About one-quarter mentioned occupational risk, or working or attending a care home or nursery; many GPs would only record these factors if the patient volunteered the information. One-half did not ask if the patient was a healthcare worker. *C. difficile* was spontaneously reported as a public health risk factor by 8%. Contact with farm animals was considered a public health risk by only 4% and only 12% reported, when prompted, that they would routinely ask about farm visits, the majority (63%) reported that they would only record this if volunteered by the patient.

Most GPs appropriately advised healthcare workers (94%), food handlers (99%), and nursery or school workers or children (87%) to stay at home with diarrhoea. Although 72% appropriately advised healthcare workers to stay at home for 48 hours after they were asymptomatic, 22% advised less than 48 hours and about 10% more than 48 hours.

GPs varied in how often they reported that they would treat with antibiotics in

Table 2. Clinical details or history that GPs reported would make them think about wider public health implications and which factors when prompted in the question they specifically asked about

History, symptom, or sign	Open question Free text (n = 463)	Closed question with tick boxes (n = 472)		
	Would prompt to consider public health issues, %	Routinely ask the patient, %	Record only if patient volunteers information, %	Neither ask nor record, %
Query food poisoning/food-related	58	90 ^a	NA	NA
Others ill/outbreak	49	92	4	5
Contact with known positive patient	12	77	14	10
Food handler/worker	47	71	24	5
Occupation or occupational risk	25	71	24	5
Lives or works in care home	23	48	40	12
Child/adult working in/attending nursery school	19	40	48	13
Overseas travel	19	NA	NA	NA
Recent hospitalisation	15	NA	NA	NA
Query <i>Clostridium difficile</i>	8	NA	NA	NA
Contact with farm or animals	4	12	63	25
Prolonged diarrhoea	3	NA	NA	NA
Exposure to untreated water	2	NA	NA	NA
Difficulty washing hands/disability	NA	1	60	39
Patient is a healthcare worker	16	50	35	15

NA = Not applicable as not listed in the closed question. ^aOnly 470 GPs answered this question.

Table 3. Circumstances in which GPs reported they would consider and/or prescribe antibiotic treatment without microbiology result. Closed question with tick boxes (n = 465)

History, symptom, or sign	'I would consider', %	'I have prescribed', %
Contact with known outbreak	68	12
Acute severe symptoms in a previously healthy child	30	6
Severe abdominal pain	24	7
Patient systemically unwell	44	17
Suspected <i>E. coli</i> O157 or contact	45	5
Clinically suspect <i>Campylobacter</i> infection	39	25
Clinically suspect giardiasis	33	18
Clinically suspect <i>Clostridium difficile</i> infection	27	12
Clinically suspect antibiotic-associated diarrhoea	13	5
Clinically suspect norovirus	4	0
Never treat without a culture result	22	3

cases of suspected IID before receiving a microbiology result (median 1%, interquartile range 0–10%, range 0–100%) (Table 3). Thirty-nine per cent of GPs reported that they would consider treating suspected campylobacteriosis and 24% severe abdominal pain without a result, 33% suspected giardiasis, and 27% suspected *C. difficile*. Forty-five per cent of GPs would consider treating cases of suspected *Escherichia coli* O157 with antibiotics, and 5% reported having done so. In contrast, 22% reported that they would never prescribe antibiotics without a result.

Table 4. Circumstances when GPs would consider, and the symptoms, signs, or history that have prompted them to request ova, cysts, and parasites examination

History, symptom, or sign	Open question	Closed question
	Free text (n = 465)	with tick boxes (n = 458)
	GP would consider, %	GP has requested, %
Recent travel abroad	84	96
Prolonged diarrhoea	30	65
Friends/family/colleagues also ill	10	20
Systemically unwell/fever/pain/suspect severe illness	10	NA
Job – food/farmer/sewage/carer	8	NA
Contact with animals or farm	7	NA
Exposure to untreated water	6	60
Child attending nursery	6	14
Immunosuppressed	3	26
Food poisoning	1	11
Don't request	5	5

NA = Not applicable as not listed in the closed question.

Unprompted, GPs reported in the open question that they would consider asking the laboratory to look for ova, cysts, or parasites (OCPs) if the patient had travelled abroad recently (84%) or had prolonged diarrhoea (30%); this rose to 96% and 65% when prompted (Table 4). Exposure to untreated water, nursery attendance, and immunosuppression were rarely mentioned in the open answers, but rose when prompted. Only 23% of GPs would send the recommended three stool specimens and only half specifically request it on the laboratory form. The others reported they relied on the laboratory to look for them if clinically indicated.

When asked what information they routinely gave patients about collecting a stool specimen, 51% of GPs reported they gave verbal advice on how much specimen (volume) to collect, 75% how to get the specimen into the pot, 90% how/when to return a sample to the practice. Only 2% gave patients any written instructions and 9% reported just giving them the pot and bag (with little or no instruction).

When asked which resources they had used for advice or information when managing or treating patients with suspected infectious diarrhoea, most GPs (85%) used clinical staff in the microbiology laboratory, 55% their GP colleagues, 33% local hospital guidance/intranet, 47% GPnotebook, 32% internet search, 28% HPA website, 20% Clinical Knowledge Summaries/Prodigy, 27% patient.co.uk, and 15% the local health protection unit. Only 6% used the HPA Infectious Diarrhoea Quick Reference Guide,⁴ and 7% reported not using any resources, relying on their own clinical judgement. Many GPs indicated that they would value more advice on report forms about management (59%) and which tests to request in the future (49%), explanation of the result (38%), and more tick boxes on request forms (43%); only 13% requested faster turnaround of results.

DISCUSSION

Summary

GPs reported sending specimens in about 50% of cases of suspected infectious diarrhoea, but many GPs report not sending specimens in cases where guidance indicates they should. GPs most commonly sent specimens because of symptoms rather than public health implications; most commonly persistent diarrhoea, recent foreign travel, and blood or pus, but fewer considered a sample in

cases of antibiotic associated diarrhoea post hospitalisation, or for children with acute, painful, bloody diarrhoea. Several gaps in knowledge about public health guidance were found; only 14% mentioned outbreaks as a reason for submitting a stool specimen, one-quarter of GPs would only record occupational risk factors, 63% animal contact/farm visit, if the patient volunteered the information, and 20% of GPs advised patients in at-risk occupations with diarrhoea to stay at home for less than 48 hours after becoming asymptomatic. Nearly one-half of GPs reported they would consider antibiotics in suspected cases of *E. coli* O157, which is contraindicated. Only 23% of GPs would send the recommended three specimens for OCPs, and one-half relied on the laboratory to look for them if clinically indicated. Most GPs used their local laboratory clinicians and one-half used their colleagues for advice. Only 2% of GPs gave patients any written instructions on how to collect stool specimens.

Strengths and limitations

A large number of GPs were surveyed, with 90% of general practices and 49% of GPs responding across three areas; this is similar to a US study,⁵ but more than double the return rate of a Canadian study.⁶ It is not known how representative the present GP sample is of all GPs in the area, as the GPs were not asked to give any details about themselves. It is likely that GPs with more interest in diarrhoea would complete the questionnaire, so it could be speculated that the results are likely to reflect better practice than seen across all GPs. Nurses were not asked to participate, as this would have involved a much larger survey. Open-ended questions were used to enquire about their usual stool submission behaviour and then questions were repeated providing the GP with a list of options. The open-ended format allowed determination of what factors may come to a GP's mind when faced with the clinical scenario of diarrhoea, and the lists allowed determination of the greatest number of GPs who would consider that part of the history important in a case of suspected IID. A pilot of this approach indicated that GPs did not go back to the open-ended questions to alter answers after viewing the lists of options for the closed questions; this can be confirmed by the results of the present study as many responses ticked for the closed questions were not mentioned by GPs in their open answers (Tables 1, 2 and 4). Overall response rate within the questionnaire was excellent, as over 94%

answered each question bar one where there was a typographical error. The present findings echo the findings of a previous qualitative study,² but in a generalisable group of GPs. This survey is reported behaviour and is open to acquiescence bias, and cannot replace a case-based audit or prospective study of clinical cases of diarrhoea; however, such a study would be much more time-consuming.

Comparison with existing literature

In the present study, GPs varied greatly in how often they reported sending stool specimens and although the median was 50%, the interquartile range was 10–90%. The recent IID study in the UK did not estimate how often GPs send stool specimens, but did show that there were 10 GP consultations for every case of infectious diarrhoea reported to national surveillance.³ It is likely that more than the 10% of the consultations reported would have had a stool specimen submitted, which is in the range of the submission rates reported by GPs in the present study. In a Japanese study GPs submitted stool samples from about 10% of patients consulting with diarrhoea.⁷ A reason for the higher submission rate by English GPs may be that only patients with more severe or prolonged cases of diarrhoea consult; the IID study found that, although IID incidence in the community had increased since 1990, consultations to GPs had halved.³ Bloody diarrhoea, diagnosis of AIDS, and duration of diarrhoea were the most common indications for sending a stool specimen in US and Canadian surveys of clinician practice;^{5,6} and similar numbers (44% and 25%) to those in the present study sent a specimen in their last case of diarrhoea. In the US survey paediatricians were more likely to send specimens for patients with bloody diarrhoea than other clinicians (94% versus 67%).⁵ *E. coli* O157 is the leading cause of HUS and has recently been associated with outbreaks of diarrhoea and HUS associated with farm visits.⁸ Although there was much media attention around this and other *E. coli* O157 outbreaks, few of the GPs surveyed in this study routinely asked about farm visits, or mentioned bloody painful diarrhoea in children in the open questions; this compares with 81% of GPs in the present study and 83–99% of US clinicians who would send a sample of bloody diarrhoea when directly questioned about this symptom.^{5,9} In a recent prospective, multicentre cohort study, over 9 years across five US states, of children infected with *E. coli* O157:H7, 14% of 259

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Ethical approval

This study was considered to be an audit and NHS ethical approval was not required. Clinical governance approval was obtained from Gloucestershire (PRJ/363), Somerset (Clinical Audit Proposal Form dated 30/04/10), and Wiltshire PCTs.

Provenance

Freely submitted; externally peer reviewed.

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Competing interests

Clodna AM McNulty leads on the Public Health England antibiotic guidance and diagnostic guides for primary care. The other authors have declared no competing interests.

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children developed HUS.¹⁰ Multivariable analysis shows antibiotic exposure early in the illness is associated with a threefold risk of HUS,¹⁰ therefore it is concerning that 45% of GPs in the present study would consider antibiotics for this condition. US clinicians also lack knowledge regarding diagnostic testing and management of this condition.⁹

In a similar survey of US emergency physicians,¹¹ only one-half reported that they would submit a diarrhoeal specimen from a chef or care centre worker and 20% said that a chef may return to work as long as he observes strict hand hygiene. This is similar to the number in the present survey who would advise that food handlers could return to work in under 48 hours of cessation of symptoms, contrary to public health guidelines.

Department of Health 2012 guidance advises that all community patients, aged >65 years, and others where it is clinically indicated (post hospitalisation or antibiotic use) should be tested for *C. difficile*.¹² Only 31% of GPs in this study spontaneously mentioned post-antibiotic diarrhoea, and 19% when prompted did not consider it an indication to send a sample. In a prospective community study, 2% of specimens were positive for *C. difficile*; exposure to antibiotics in the previous 4 weeks (particularly multiple agents, aminopenicillins and oral cephalosporins) and hospitalisation in the preceding 6 months were significant risk factors.¹³ The 2012 guidance also indicates that patients with suspected *C. difficile* infection should be considered for treatment before test results are available, particularly if symptoms and signs indicate severe infection.¹² Only 27% of GPs in the present study said they would consider antibiotics for suspected *C. difficile* infection. Although EU guidance¹⁴ indicates that for mild *C. difficile* infection (stool frequency <4 times daily; no signs of severe colitis), clearly induced by the use of antibiotics, it is acceptable to discontinue the inducing antibiotic and observe the clinical response, nevertheless patients must be followed very closely for any signs of clinical deterioration and placed on therapy immediately if this occurs.¹⁴

As OCPs are shed intermittently,¹⁵ national guidance advises that three stool specimens 2 days apart should be sent when they are suspected;⁴ only 23% of GPs surveyed did this. Standards advise laboratories to perform a smear for *Cryptosporidium* on diarrhoeal specimens from all symptomatic individuals,¹⁶ but OCPs are not routinely included in the primary testing set as yields are extremely

low,¹⁶ so it is important that GPs request OCPs if suspected. Many US clinicians⁵ and GPs from the present study (52%) thought that the laboratory would look for OCPs when appropriate, and lacked knowledge about when they should be requested.¹⁷ In the present study, few clinicians considered OCPs in the immunosuppressed, nursery attendance, or in suspected outbreaks. Clearer and easier access to guidance is evidently needed.

There has been little work on the value of written instructions on how to take stool or other diagnostic specimens. A Health Technology Assessment systematic review of value of written instructions with medicines found that patients valued written information that was tailored to their individual circumstances and illness, but did not want this to replace verbal information about medicines.¹⁸ Recent qualitative work by the authors (D Lecky, personal communication, 2013) indicates that patients would value simple written instructions with diagrams on how to collect stool specimens for diagnostic tests. The importance of understanding of written instructions in bowel cancer screening stool specimen returns is emphasised by the lower cancer screening uptake in South Asians (33% versus 61% for non-Asians), which is partly a result of poor literacy.¹⁹

Implications for research and practice

There are gaps in some GPs' knowledge about the risks and diagnosis of different infections in suspected IID, especially *C. difficile* post antibiotics, *E. coli* O157, and OCPs. Given the limited time available in traditional educational settings for GPs, innovative solutions are needed, for example providing more advice on reports, providing tick boxes on GP electronic request forms, linking to web pages that detail which tests to request, and the opportunity to reflect on current clinical cases. When prompted about certain symptoms and history, GPs were up to seven times more likely to say they would send an appropriate specimen in some clinical scenarios, for example bloody diarrhoea in children.

GPs also need more public health education about the risks of transmission of IID in patients with ongoing symptoms. Increasing the proportion of GPs who advise patients to stay at home for 48 hours after recovery should reduce onward transmission.

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