

# The Appropriate Use of Diagnostic Services (iv) How Useful is the Microbiological Investigation of Diarrhoea?

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## INTRODUCTION

Reports of most gastrointestinal infections in England, Wales and Northern Ireland continue to increase (Figure 1); *Campylobacter* notifications have risen from 6,346 in 1978 to 20,902 in 1984<sup>1</sup>. However, even the most intensive microbiological investigation including a search for parasites and viruses as well as bacteria reveals an identifiable agent in less than 20% of cases of diarrhoea. The routine bacteriological laboratory investigation of faecal specimens will reveal a cause in less than 10%. Toxins, anxiety, drugs or faecal impaction may also produce diarrhoea and in other cases it may reflect underlying gastrointestinal tract pathology. It is probable, however, that the majority of cases of diarrhoea are caused by infective agents, probably viruses; and most of these remain so far unidentified.

One of the delights of microbiology is that new agents continue to be discovered. We have seen the appearance of *Campylobacter jejuni*<sup>2</sup> as a significant cause of diarrhoea, enterotoxigenic *Escherichia coli* (ETEC) have been shown to be the cause of diarrhoea in travellers returning from abroad<sup>3</sup> and *Cryptosporidium* has recently been discovered to produce illness in man<sup>4</sup>. Thus faced with these basic facts we have to ask "Is the microbiological investigation of diarrhoea justified in each sufferer"?

## IS SPECIFIC TREATMENT AVAILABLE?

It is generally agreed that treatment with antibiotics is only justified in cases of early

campylobacteriosis and in protozoal infections. Antibiotics are deleterious in *Salmonella* gastroenteritis but will certainly be indicated in invasive *Salmonella* infections such as occur in the very young, the aged and the immunosuppressed patient. Antibiotics are not normally indicated in the treatment of *Shigella* infections; improved personal hygiene is all that is required. It has yet to be proved whether antibiotics will reduce the period of excretion of shigellas. Since we can treat so few cases, the question arises as to whether the microbiological investigation of faeces is justified, bearing in mind that the full cost of such an investigation may amount to anything between £10–£50 per specimen. In the practice of microbiology today and the provision of an open access to general practitioners we have to address the problems of cost weighed against benefit to the patient and the community and advise the users of our service bearing in mind these provisos.

## DOES BEING ABLE TO NAME THE MICROBE HELP THE PATIENT?

If a microbe is identified it is usually of academic interest to the doctor but at the same time knowledge of its existence may turn the patient into a pariah. Hippocrates said over 2,000 years ago that "The disease is only important if it is important to the patient. If it does not matter it is a luxury to the Doctor."<sup>5</sup>

The patient's expectations are to be cured and that the agent that caused his illness will not spread to other members of his family. He will not have much interest in the name of an identifiable pathogen but will want treatment to

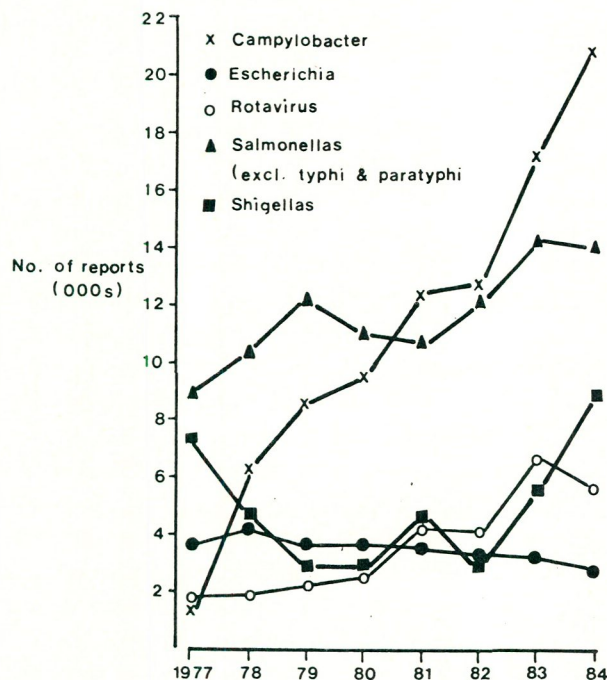
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'cure' what in the great majority of cases is a mild interruption in every day life. Of course, identification of the agent is necessary in the investigation of outbreaks, firstly, to determine the routes of infection and limit the outbreak and secondly, to introduce preventative measures to prevent further outbreaks.

#### Gastrointestinal Infections 1977-84.



Source: Communicable Disease Surveillance Centre

#### IS THE CONVALESCENT CARRIER DANGEROUS?

Since the discovery that some cases of diarrhoea, particularly some outbreaks of diarrhoea following the ingestion of food were associated with the presence of particular microbes in the stool, it was naturally assumed that the hosts of such microbes were a danger to their associates and therefore to the general public. It was also assumed that very small numbers of such microbes could produce disease. However, on the one hand, 'volunteer' experiments<sup>6</sup> revealed that enormous numbers of salmonellas had to be ingested to produce disease in healthy adults. On the other hand, three outbreaks have recently been noted in which relatively small numbers of

these organisms produced disease.<sup>7</sup> It was probable that in these outbreaks that only a few thousand salmonellas were needed. It could be reasoned from the above that moderate numbers of salmonellas (in the thousands of microbes per gram of ingested material) can produce disease especially in the old, the sick and the very young.

The microbiologist nowadays has the ability to detect in the stool small numbers of salmonellas, a pathogen frequently associated with outbreaks of diarrhoea. Unfortunately, prolonged excretion of *Salmonella* is a fairly common phenomenon.<sup>8</sup> It has, also unfortunately, become the custom to attempt to look for and report the last *Salmonella* in the stool of a recovered sufferer from an infected turkey after a Christmas party. The implication is that there is a potential danger to the public. This phenomenon has placed an unreasonably harsh burden on the microbiologist, the general practitioner, the environmental health officer and, most sadly, the patient. If the microbiologist detects very small numbers (tens) of salmonellas per gram of faeces he feels bound to report that they are present. But if such a report reaches the uninitiated the person may be put off work when the likelihood of his being a danger is remote in the extreme. We have discovered to our horror that a schoolgirl had been excluded for three months following a mild bout of *Salmonella* food poisoning and was not accepted back to her 'O' level studies until her stools were completely clear.

#### ARE SMALL NUMBERS OF SALMONELLAS IN THE STOOL A DANGER?

It has been demonstrated that although salmonellas, when deliberately inoculated on to fingertips, survive for a few hours, these organisms are relatively easily removed by a simple hand-wash.<sup>9</sup> The contamination of fingers of convalescent carriers following an attack of *Salmonella* gastroenteritis has also been investigated. It was found that although contamination occurs after defaecation, detectable salmonellas are easily removed by a normal hand-wash with soap and water.<sup>10</sup>

The usual route of transmission for agents that cause diarrhoea is faecal-oral and it can therefore be assumed from the above that appropriate



hygiene measures such as hand-washing will prevent the direct transmission of the small numbers of food poisoning organisms that are present in the stool of a convalescent carrier. The importance of hand-washing and good personal hygiene is much greater, however, where either there may be an intermediate food which could be inoculated and in which the organisms may multiply to produce an infectious dose, or there could be passive transfer of, for instance, a Norwalk-like virus.<sup>11</sup> It should be noted that if at the least one needed a few thousands of salmonellas directly to infect other human beings this would be from the visibly soiled hands of a convalescent carrier. However, the peak of infectivity for virus gastroenteritis is just before the diarrhoea begins and before the food handler becomes ill. Thus, at that time and therefore at all times, normal hygiene measures must be perfect.

### COMMUNITY EXPECTATIONS

Community expectations are to prevent spread of an infectious agent from a person to other members of that community. Guidance notes on this have been published.<sup>12</sup> What clearly comes out of these notes is that anyone employed in an occupation where others may be potentially at risk should take particular care and be given strict advice. Thus a nurse working in a children's unit, one of the high risk groups,<sup>12</sup> who has diarrhoea from any cause should not return to work until 48 hours after she feels well and has formed stools. What is much more important is that the chef in a hospital kitchen who has signs or symptoms referable to the gastrointestinal tract should go home and not return to work until he is clinically well with an arbitrary addition, say, of forty-eight hours; hopefully to allow a reduction in carriage to a level where the risk to food may be vanishingly small. The name of the microbe that causes gastroenteritis does not usually matter as it is more than probable that clinically recovered people with normal household hygiene will not, as we have noted transmit, say, a *Salmonella*<sup>9</sup> if they have taken care to wash their hands after defaecation. The number of potentially pathogenic bacteria or viruses falls dramatically as clinical recovery occurs and stools become formed. To chase that last *Salmonella* or *Campylobacter* in the normal stool of a person who unfortunately becomes a carrier of small numbers

of these pathogens for months is mischievous and may lead to paranoia.

### UNDER WHAT CIRCUMSTANCES SHOULD WE TEST?

1. If the patient is clinically bacteraemic; when specific therapy is needed.
2. If there are grounds to suspect that antibiotic therapy may be useful; campylobacteriosis has a characteristic clinical picture and may be treated. On the other hand, it must be remembered that antibiotic-associated diarrhoea may be associated with *Clostridium difficile* toxin.
3. If there is a suspected public health hazard; for instance, if a person who normally works in a food processing plant or retail food outlet has been off sick with diarrhoea and has questionable personal hygiene.
4. To eliminate enteric pathogens as a cause of a patient's inflammatory bowel disease symptoms.
5. Investigation of outbreaks of diarrhoea when the name of the organism may help to point to the source. It is not necessary to test every person in an outbreak and retesting is unnecessary. Strict attention to hygiene, however, should be observed.
6. To study the epidemiology of diarrhoea. It must be emphasised, however, that the expectations of the individual may not match those of society as a whole.
7. The routine investigation of "traveller's diarrhoea" may be unnecessary. If the patient continues to suffer from diarrhoea, however, there may be a treatable disease, such as giardiasis or amoebiasis.

From time-to-time new microbes are discovered that sometimes cause diarrhoea.<sup>13</sup> Although it is appreciated that some have been discovered by chance findings the authors suggest that research into the microbiological causes of diarrhoea should be organised on a localised prospective basis and should not rely on serendipitous findings from random specimens.

Money currently expended on large numbers of faecal examinations in cases of mild diarrhoea and chasing insignificant numbers of food-poisoning organisms would be better expended on improving the hygiene of food handlers, with



adequate compensation from time off work in cases of diarrhoea until they had fully recovered. Great care must be taken not to turn the patients into social outcasts; this has happened not infrequently. To resample recovered cases of salmonellosis is usually mischievous.

#### SUMMARY

The microbiological investigation of diarrhoea is seen to be useful in certain clearly defined situations; the patient benefits and the community benefits. In other situations the clinician initiating a request must apply common sense and consider the social and cost implications involved.

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