

Cryptosporidiosis

An action plan for the tourist industry

An FTO document

Unless amendments are issued this document is valid until 31 December 2004

A further version, taking into account the experience in 2004 will be issued for 2005

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PRELIMINARY NOTE

This document is based on a consensus document drawn up between The Federation of Tour Operators and the Confederation Española de Hoteles y Apartamentos Turísticos. This version has been amended for use in other countries and is a guidance document for FTO members. It is an internal document and it has no legal scope whatsoever. Nevertheless, in the absence of any other legislative reference- compliance with it by tour operators is highly recommended.

The Federation of Tour Operators (FTO) comprises 12 major tour operators representing over 70 per cent of the British overseas package holiday market. The group exists to bring about change and improvement in all areas affecting customers' holidays, from the UK departure point, through the journey, to the accommodation and standards of safety, health and hygiene overseas.

The Confederation Española de Hoteles y Apartamentos Turísticos (CEHAT) is the Spanish organisation representing the interests of tourist accommodation owners both in cities and resorts. The Confederation comprises of about 30 major Hotel Associations (both local and regional), with more than 5000 associated hotels all over Spain.

The following independent experts having considered available information, their own experience and the requirements of FTO and CEHAT have compiled these guidelines. The aim has been provide practical advice while recognizing that with the present state of knowledge there is little strong scientific evidence to back some recommendations. It is believed, however, that the guidelines are based on current knowledge and best practice. They recognise the requirements to protect the health of tourists and the commercial requirements of the tourist industry. It will be necessary to revise these guidelines as new knowledge is obtained and in the light of experience.

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The draft document was circulated to public health and swimming pool experts in the U.K. and their comments considered and incorporated where deemed relevant.

PREAMBLE

Experience with cryptosporidium and other infection outbreaks has shown that by tour operators and hoteliers working closely together they can most effectively control the situation with minimal bad publicity. If they work separately conflicts can easily arise. The document provides advice for both hoteliers and tour operators. As with all probable outbreaks of infection in a hotel, the support of the local public health department should be requested.

The response to a report or reports of cryptosporidiosis in association with a hotel will vary mainly due to a lack of knowledge by both hoteliers and many health personnel about the condition and the method of spread. This means that tour operators will have an educative task as part of their response to reported infections. In some countries there may be legislation on the use and treatment of swimming pools and these requirements will need to be observed. They may not, however, be stringent enough to meet the expectation of a British Court of Law. As a minimum the FTO swimming pool code of practice should be followed.

TERMINOLOGY

Hotel is used to cover all residential accommodation provided for tourists. This will include self catering apartments and villas.

Hotelier covers those responsible for ensuring health and safety in tourist accommodation.

PART 1

INTRODUCTION

Cryptosporidiosis is an infection that causes diarrhoea, stomach pains and sometimes vomiting. The illness usually lasts for 1 – 2 weeks. It is caused by microscopic parasites called *Cryptosporidium hominis* and *C. parvum*. Unfortunately some infected persons have few or no symptoms but can still pass the parasite on to others. Children are infected more frequently than adults. The infection is usually self limiting although in immuno-compromised individuals it can be life threatening.

In the past few years, there have been some major outbreaks of cryptosporidiosis associated with hotels that have caused negative publicity. It has been necessary for tour operators to demand, that hoteliers close, empty and clean swimming pools. Furthermore expensive legal or insurance claims have been made against both the hotel and the tour operator.

All European tour operators are subject to the requirements of the 1990 EC Directive (90/314/EC) on package travel, package holidays and package tours. This holds the tour operator liable to the tourist for all aspects of the package holiday including those supplied by other parties e.g. the hotelier. This means that tourists who have become ill in hotel associated outbreaks take legal action against the tour operator. In the U.K. tourists frequently take legal action as a group and this is known as a class action. Outbreak litigation damages can exceed €5 million, with legal costs of a similar amount. In addition there is usually wide spread media coverage with considerable negative publicity for the tour operator, the destination, the resort and the hotel.

The cryptosporidium parasite is widespread in all countries and it infects man and some animals such as sheep and cattle. It is spread from very close contact with an infected person or animal, or through the consumption of contaminated drinking water or swimming pool water. Cases have also been associated with fresh-pressed apple juice, chicken salad and improperly pasteurised milk. Infected food handlers have also been implicated in onward transmission. Although shellfish grown in sewage contaminated water have been shown to contain cryptosporidium oocysts, outbreaks of cryptosporidiosis from shellfish have not been reported.

In hotel associated outbreaks, the initial source of the infection is only rarely detected, but an infected guest who may have only mild symptoms or no symptoms most probably introduces it. The infected guest will, however, be excreting large numbers of the cryptosporidium parasite from their gut and these can easily contaminate the swimming pool water if the guest swims or bathes in the pool.

Although all hotel swimming pools have water treatment plants so that the water is made safe for the bathers. The majority of treatment systems rely on the addition of chlorine to kill the viruses and bacteria that may be present. Unfortunately cryptosporidium can protect itself from the normal swimming pool levels of chlorine by developing a resistant form called an oocyst. The oocysts if swallowed in very small numbers can lead to an infection.

Oocysts can be killed by raising the chlorine level to very high levels (the pool must be closed) for a few hours. Filters providing that they are correctly installed, maintained and operated should remove the oocysts. The correct operation of filters is complex and can only be undertaken adequately by a fully trained technician.

Unfortunately it takes many hours for all the water in a contaminated pool to pass through the filters and this means that during this period other bathers remain at risk. If someone swallows some water containing cryptosporidium oocysts they do not become ill immediately, over 90% of infected individuals will present with acute diarrhoea after 7 – 10 days. This period is known as the incubation period. There are, however, different ranges for the incubation periods quoted by different authorities. The English Health protection Agency states 2 – 5 days while the U.S. Center for Disease Control states 2 – 10 days. It is probable that many guests in a hotel will not develop symptoms until they have left the hotel so the hotelier will initially be unaware of their illness.

It is possible that cases of cryptosporidium infection in a guest may not have been acquired in the hotel but from an outside source. This is why it is very important to consider such sources in an epidemiological investigation. If there is an outside source it can be expected that cases would occur in guests in other hotels and also in the local population. The local Public Health Department in their investigation always considers this.

It frequently appears that cryptosporidium infection is a British disease and that only the British tourists become infected. This is not a true representation of the facts but because doctors in Britain regularly test people ill with diarrhoea for cryptosporidium. When it is detected it is reported to the public health officials responsible for infectious diseases. In most other European countries, the testing and reporting systems are different.

It is very important that in order to protect their health of the tourists and their business, hoteliers must ensure that their swimming pool is maintained to a very high standard by properly trained staff. If a guest reports that they have the cryptosporidium infection both the hotelier and the tour operator should take immediate action.

Although outbreaks of cryptosporidium infection are not associated with food, questions will always be asked about the hotel food and water hygiene programme when a gastro intestinal disease occurs in guests. In the event of an outbreak, or even a possible outbreak, an audit of the food hygiene protocols should be undertaken. It will be expected that the hotel food hygiene programme be based on the HACCP principles.

In the event of a faecal accident, or incident, it is important to ensure that the guests are kept fully informed of any actions that are being taken to ensure their safety and to reduce the risk of acquiring cryptosporidium infection.

PART 2

ACTION PLAN FOR DEALING WITH CRYPTOSPORIDIOSIS CASES ASSOCIATED WITH STAYS IN TOURIST ACCOMMODATION ESTABLISHMENTS

This action plan endeavours to act as a reference of the available options that would assist in organising, standardising and addressing the response of tour operators and hotels to the possible appearance of cryptosporidiosis cases associated with stays in tourist establishments. The recommendations included in this action plan should be followed without prejudice to the obligatory compliance with legal requisites of a local, National or European scope, or where appropriate, that which may be ordered by the Competent Authorities.

The document, although based on available information and acquired experience, cannot encompass each and every one of the potential situations that could occur. Consequently, it must inevitably be considered as being open and flexible, at least in certain aspects. On occasions, it must be the local realities that decisively indicate the choice of one option or another.

This action plan presupposes that the tourist establishments and the tour operators have already correctly implemented certain basic prevention methods. (See part 3) The prevention of cryptosporidiosis associated with stays in tourist establishments cannot be based solely on this plan, which deals **only** with the response to reported cases.

Although cases are referred to, it will not be necessary to obtain or hold identifying data on any case. If patient details are required this will be for the Public Health Department to obtain them and store them in accordance with data protection legislation.

BASIC DEFINITIONS FOR USE IN THESE GUIDELINES

The definitions given below although they have been agreed on the basis of current generally accepted knowledge are only valid within the context of this Document. In no circumstances do they attempt to replace possible official definitions, preventative strategies or outbreak control plans, nor do they necessarily imply any certain causal relationship between associated cases and a specific tourist establishment.

Case: Clinical picture compatible with cryptosporidiosis, characterized by diarrhoea, abdominal cramps, loss of appetite, nausea and vomiting, that is laboratory confirmed.

Case associated with a tourist accommodation establishment: Case staying in the establishment in the 2 -10 days prior to the onset of symptoms.

Linked Cases: two, or more cases, associated with the same establishment, with dates of symptom onset within the same period of 4 consecutive weeks without any other obvious epidemiological relationship

COMMUNICATION OF CASES AND RESPONSE PROCEDURES

Communication of cases and communication flow

In the tourism medium, information on cases of cryptosporidiosis associated with tourist establishments will normally follow the diagram in Fig. 1. The majority of the cases are informed by their doctor of the diagnosis. This follows the laboratory examination of a faecal sample. The diagnostic laboratory will also inform the British Public Health Authorities. It is common for the infected person or a member of their, inform the tour operator if it is considered that the infection may have been acquired during a holiday or a trip to another country. This is, normally within the context of a claim and often the tourist establishment is given as the presumed source of contagion. It is then that the tour operator informs the Hotel of the existence of the case.

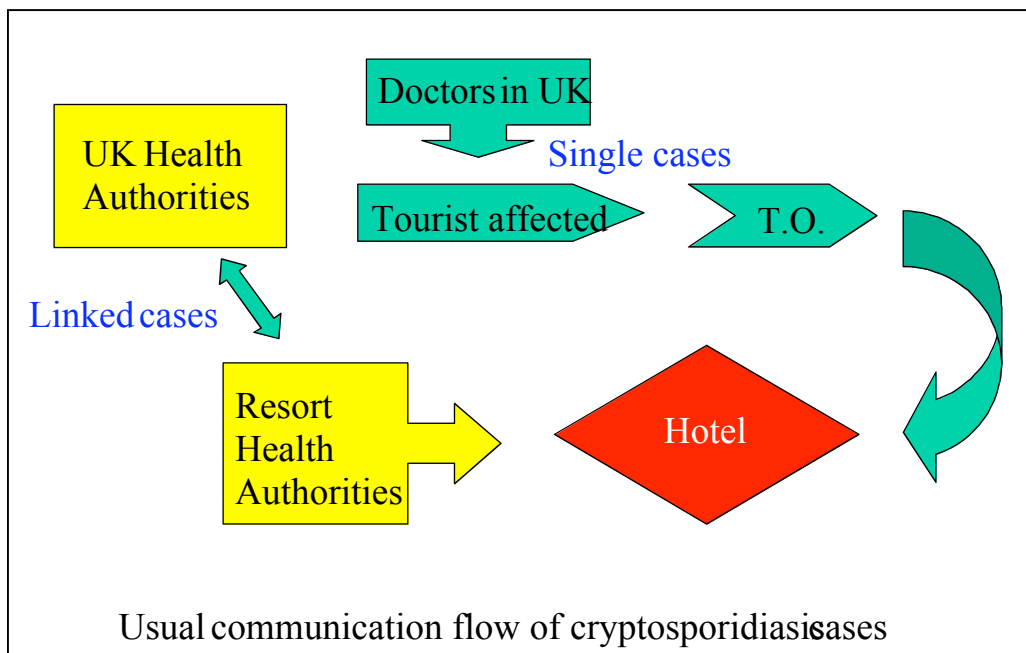


Fig.1: Normal flow of the communication of cases of cryptosporidiosis in the tourism context.

SPORADIC CASES AND LINKED CASES

The large majority of cases communicated in this way are, apparently, sporadic cases, in other words, single cases in which it is not possible to establish any obvious temporal or spatial epidemiological relationship. Notwithstanding, occasionally, notification is received of linked cases, which is a number of cases associated with the same establishment. It is in this instance, when a rapid and more specific response may become necessary with the objective of controlling a possible outbreak. In this present plan, those situations with 2 or more associated cases are considered in a particular way.

In all reports of cryptosporidiosis, whether they are sporadic or linked cases, associated with a hotel a report form should be completed and a copy held by the hotel and the tour operator(s).

Response procedures in situations with single cases

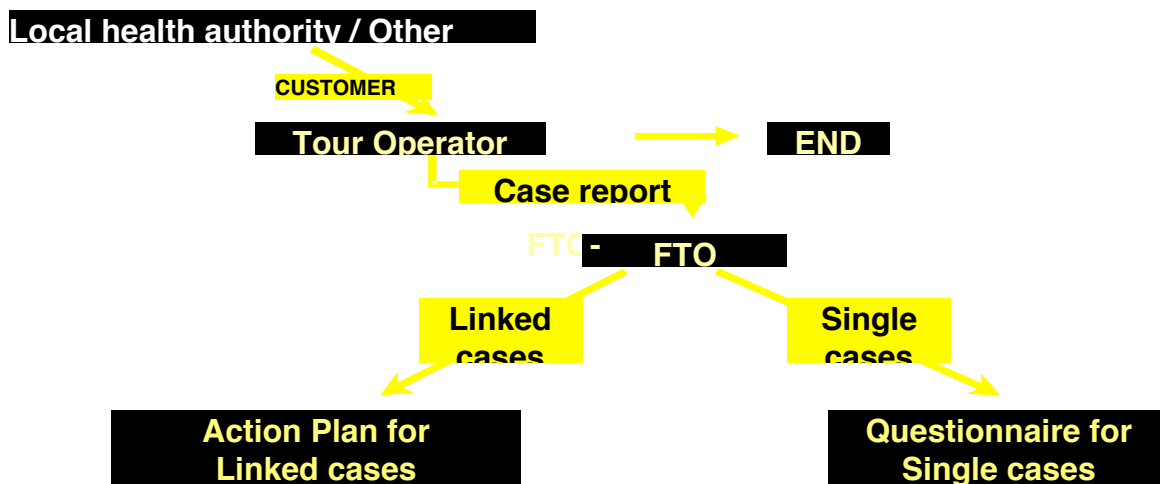
After confirmation that it is an associated case, the Tour Operator will notify the Federation of Tour Operators (FTO). (See Cryptosporidium Incident Report Form, Appendix 1).

If it is known that the establishment in question has been associated with no other cases in the preceding month (as from the date of the onset of symptoms), the procedure to be followed is that of an action plan for single cases. The action plan for a single case consists of ensuring that the minimum preventive requirements have been met and are found to be correctly implemented.

In practice, following the plan involves completing a checklist (Appendix 2) within one week, which will be signed by the manager of the establishment and the representative of the tour operator involved, who will be the one to initiate and complete the procedures. If during these procedures, any anomaly is detected, efforts must be made to resolve it within the shortest possible time.

Notification of the case should also be sent to FTO for circulation to all FTO members.

ACTION PLAN FOR FOR SINGLE CASES



Response procedures in situations with linked cases

If it is established that the property has been associated with linked cases, then the action plan for linked cases will be followed (see below plan for linked cases flow chart). If however, the notification of two or more cases, or, if the dates of the onset of symptoms, were to occur within a period of one week and that week is within the past 4 weeks, then closing the swimming pool as a precautionary measure is recommended (See also explanatory algorithm in Appendix 3).

The affected tour operator should be responsible for promoting an urgent (within 24-48 hours) independent investigation that includes a risk assessment of the establishment concerned which should be undertaken by a qualified and experienced professional (or team of professionals). The risk assessment will consider all aspects of the pool(s) water treatment and include any local legislative requirements. In addition, the general recommendations envisaged in this document should be taken into consideration together with those issued by National or International Agencies or an acknowledged authority (e.g. Ministries of Health, European Community, CDC, WHO, PWTAG, etc.).

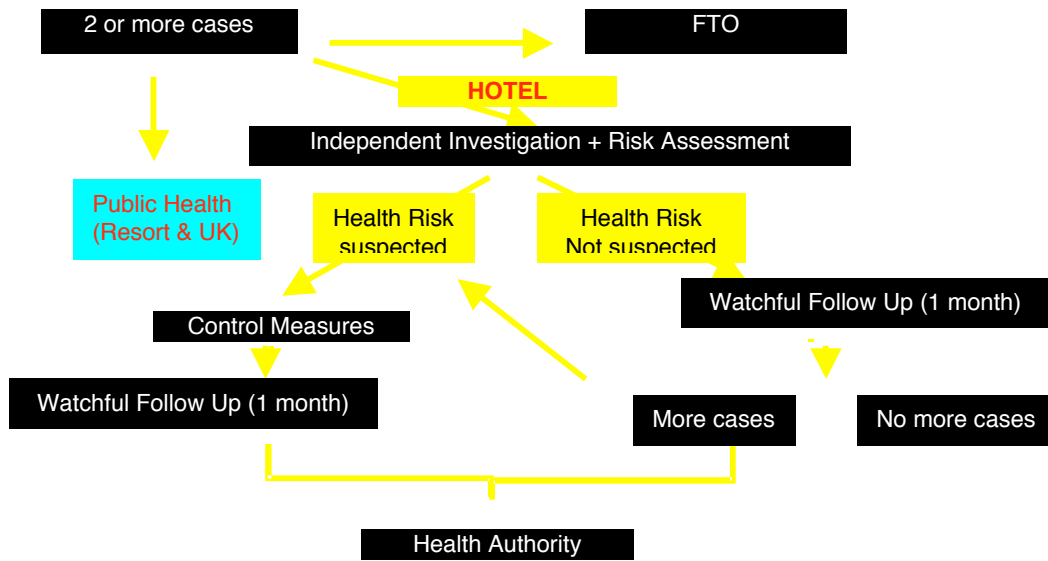
Whether or not the pool is closed to bathers, the treatment plant should be operated normally until the risk assessment has been completed, unless recommended otherwise by the assessors. The pool should be operated normally until the risk assessment has been completed unless recommended otherwise by the assessors. No remedial action should be undertaken until the assessor recommendations are received. Failure to observe this may render the risk assessment invalid and may prolong the eventual actions necessary to the detriment of the hotelier and the tour operator.

Some relaxation of this recommendation may be possible, but only if more than four clear weeks have occurred since the end of the week in which the 2 or more cases were reported, or their symptoms commenced. In such a situation the facts should be discussed with the professional advisers of the tour operator and the hotelier and ideally also the local public health officials.

In all situations with linked cases it would be prudent, and demonstrate due diligence, for a pool water decontamination procedure to be undertaken. Recommended procedures are attached in appendix 4.

If more than one FTO member features the property, collaboration between the members is essential. Tour Operators should notify FTO of the details and any investigations undertaken should be conducted on behalf of all affected FTO members and all correspondence copied to FTO.

ACTION PLAN FOR LINKED CASES



Risk assessment results

Immediately after completing their work, the investigators should issue a preliminary report, addressed to those responsible for instigating the investigation. A full copy of this report must be given immediately to and the contents discussed with the hotelier. This report must, as a necessity, include their opinion on the existence of or otherwise significant risk to the health of tourists and, consequently, whether or not the urgent implementation of additional prevention and control measures (e.g. decontamination of the swimming pool) are essential. On the basis of this preliminary report, the establishment or hotel must consider the immediate route to be followed.

Subsequently, once the study is finished in its entirety, the investigators will issue their final report which will, at the very least, include the results of the technical inspection, the degree of compliance with the basic general preventive measures and, as appropriate, the pertinent recommendations.

If the risk assessment reveals, within reason, the absence of foreseeable risk or that the risk is insignificant to the health of the users, no additional control measures will be taken. The establishment will remain under close observation and monitoring. If there are no new associated cases during the next month, the procedure will be closed. If however, new associated cases are notified in the next month, the situation must be reevaluated in the light of the new data and the appropriate action taken. In both cases, the Health Authorities must be informed of the decisions made.

If the risk assessment indicates the existence of a potential hazard for users, urgent control measures must be instigated. The exact kind of measures to be taken will depend on the conclusions of the risk assessment and on any other epidemiological evidence. These measures will normally involve the disinfection of the potential source of infection. On determined occasions, other complementary measures may be necessary: emptying the swimming pool, changing filters, improvements and repairs, etc.

Any water samples that are taken for epidemiological purposes should be collected prior to carrying out any intervention. These will also provide a base line against which to judge any subsequent samples. (See Appendix 5, testing swimming pools for *Cryptosporidium* Oocysts). Similarly, the local resort Health Authorities should be informed of the measures taken.

Copies of all reports should be given to the hotelier

Observation and monitoring subsequent to the control measures

Whenever the existence of an outbreak is recognised or suspected in a determined establishment, observation and monitoring is most useful in order to evaluate the efficiency of the implemented measures. If, in the following month no new associated cases appear, the event can be closed.

If, however, new associated cases appear, the situation must be re-assessed.

PART 3

GENERAL RECOMMENDATIONS FOR THE PREVENTION OF CRYPTOSPORIDIOSIS ASSOCIATED WITH BATHING WATER

There are no absolutely guaranteed preventive measures against Cryptosporidiosis associated with bathing water (swimming pools, hydro massage baths and similar). Chlorination, at the concentrations normally employed in swimming pools, is not effective against *Cryptosporidium*. Nonetheless, it is considered that good treatment of the water, the filtration in particular, and correct maintenance of the swimming pool are basic requisites for prevention.

Equally important are:

- a) The hydrodynamic functioning of the swimming pool.
- b) The existence of adequate guidelines on the response to faecal accidents.
- c) The education and information of the relevant personnel involved, including those responsible in the establishments, swimming pool maintenance personnel and the swimming pool users themselves.

The recommendations presented below must be framed within this context. These are recommendations that tend to minimise the risk of contagion, based essentially on the application of the aforementioned preventive requisites. In parallel, there must be compliance with the local regulations in respect of public swimming pools and with the permitted bathing load.

Design

- It is recommended that children's swimming pools have a water treatment plant that is independent of that of the adults' swimming pools. This may be a legal requirement in some areas.
- Showers should be provided in the pool area and the drainage from the showers should be discharged to waste.

Filtration

It is the filtration process of swimming pool water that, if carried out adequately, is the most efficacious method of eliminating the *Cryptosporidium* oocysts in the recirculating water. Some recommendations for correctly carrying out this process are given below:

- The water must be re-circulated and filtered continuously.
- The swimming pool filters must be technically inspected at least once a year and preferably prior to the seasonal opening of the hotels.
- The filters must be backwashed periodically, at least once a week, and in accordance with the manufacturer's instructions. It is preferable to carry out the backwashing operation at the end of the day, and the manufacturer's instructions should be meticulously followed. An excessive frequency of backwashing (more than once a day, for example) could be counterproductive to the efficiency of the filters.

- Abrupt changes in the flow through the filters should be avoided as they can compromise the efficiency of the same. If backwashing one filter, while the others remain in operation, backwashing should begin and end slowly (15-20 seconds).
- Ideally, the installations should be fitted with flow meters to control filtration and backwashing rates.

Coagulation / flocculation

- In installations with sand filters, the adequate use of flocculants is essential in ensuring effective filtration of the *Cryptosporidium* oocysts.
- The flocculants should be added in a continuous way via dispenser pumps, at some point on the circuit prior to the filtration (never directly into the pool itself). Ideally, the mixing time before filtration should be 10 seconds.
- For the efficiency of the coagulation process, the water pH should be maintained within the limits recommended by the manufacturer of each specific flocculant.

Prevention of swimming pool contamination

Bathers are normally the principal source of swimming pool contagion so that measures intended to avoid this kind of contamination are necessary.

In all establishments, bathers must be duly informed of the regulations governing the use of the swimming pool which, in addition to the recommendations in the preceding paragraph, must also include:

- Compulsory showering before using the swimming pool.
- Not swallowing the swimming pool water
- Always washing hands after changing nappies or using the toilet
- Taking children to the toilet with the due frequency.
- Prior to using the swimming pool, children should always be washed with abundant water and soap, particularly in the anal area.
- It is recommended that children under the age of 6 months do not bathe in the adults' swimming pool.
- Children who are still incontinent, (those who wear nappies) must wear waterproof bathing costumes when using the swimming pool. They should never swim in the nude or swim wearing nappies.
- It is desirable for there to be a room reserved for nappy changing close to the swimming pool. It should have washbasins and special containers for nappy disposal. Where it does not exist, guests should change their childrens nappies in their rooms, never in the swimming pool areas.
- People who have recently suffered from diarrhoea (within the preceding 14 days) should not use the swimming pool. This recommendation is particularly applicable to children who still wear nappies.
- Before using the swimming pool, all bathers should wash themselves thoroughly with soap and water in their rooms.

Faecal accident policies

All establishments must have a comprehensive action plan for dealing with faecal accidents, which should be followed in the event of a faecal accident. Guests should be encouraged to immediately report all faecal accidents to a member of hotel staff so that the faecal accident plan can be promptly implemented. Where there is a Local Health Authority designated action plan, this should be followed.

In those situations where no official recommendations are in place, the two currently most widely accepted policies on the response to faecal accidents –the British and that of the CDC (USA) – are to be found in the Appendix 6 to this document.

A record of all faecal accidents and the treatment undertaken should be recorded in a faecal accident log for the pool.

Information and education of bathers

In all establishments, bathers must be duly informed of the regulations governing the use of the swimming pool which, in addition to the recommendations in the preceding paragraph, must also include:

- Compulsory showering before using the swimming pool.
- Not swallowing the swimming pool water
- Always washing hands after changing nappies or using the WC.
- Taking children to the WC with the due frequency.
- Prior to using the swimming pool, children should always be washed with abundant water and soap, particularly in the anal area.

Education of personnel

- All personnel involved in swimming pool maintenance must have received the appropriate training in properly carrying out their tasks. This training must be accredited with a corresponding officially issued certificate when local regulations so require or through some other certification system when other circumstances apply.
- Similarly, the management of the establishment and the relevant staff must have sufficient knowledge of the dangers associated with swimming pool use, prevention methods, the pertinent legislation and the responsibilities derived from the same.

Other preventive methods

Specific preventive measures for swimming pools have been proposed among them, ozonisation, continuous ultraviolet radiation treatment or ultra filtration. Published information on laboratory experiences is available on all of them but experiences in the field are still limited.

PART 4

CRYPTOSPORIDIOSIS - WHEN A CASE IS REPORTED

1. When a case is reported by a customer to a tour operator, the following information should be checked by the operator concerned.
 - That the diagnosis has been confirmed by a laboratory test
 - The dates of the holiday
 - The date when the illness started
 - Adult or child
 - How many other members of the party were affected and the dates when their illness started. Note if adults or children.
 - Home address or town
 - Contact telephone number

2. The tour operator to notify FTO Health & Safety Co-ordinator in writing of information above together with the name of the hotel, the resort and the country.

The FTO Health & Safety Co-ordinator to pass all information on to FTO Medical Advisor and to circulate the hotel name and resort, country and holiday dates to FTO members.

3. Medical Advisor to notify CDSC, SCIEH, CDSC Wales or CDSC NI and ask if they have reports of other cases associated with the hotel or resort and whether other cases have been reported from the home town.
4. The tour operator to alert (but not alarm) the hotelier and request;
 - that the swimming pool water treatment be checked to ensure that it is operating correctly.
 - that the swimming pool faecal accident policy is fully operational.
5. The tour operator to check that the hotel illness record is being completed and that there has been no increase in reported stomach upsets during the previous 3 – 4 weeks.
6. If three or more independent (i.e. not the same holiday group) cases occur the FTO action plan should be followed.
7. If there is an increase in stomach related illness in the hotel illness log, investigations should be considered to assess whether this is a food borne incident or possibly the early signs of a cryptosporidiosis outbreak. The Tour operator, medical or hygiene consultant should be contacted.

PART 5

REFERENCES

British Institute of Sport and Recreation Management

Cryptosporidium and faecal soiling procedures for swimming pools
www.isrm.co.uk/information/free.htm

British Standards Institute

Management of public swimming pools, water treatment systems, water treatment plant and heating and ventilation systems; Code of Practice. British Standards Publicly Available Specification PAS 39:2003. BSi London 2003

Health Protection Agency

Large summer and autumn peak of cryptosporidiosis in England and Wales 2003
Communicable Disease Report Volume 13 Number 41 9 October 2003
www.hpa.org.uk/cdr/back_issues.htm

Instituto de Salud Carlos III

Vigilancia Epidemiológica de la criptosporidiasis en España. Red Nacional de Vigilancia Epidemiológica. Boletín Epidemiológico Semana:45 Pag.277-280.
<http://193.146.50.130/bes/bes0345.pdf>

Pool Water Treatment Advisory Group

Swimming Pool Water Treatment and Quality Standards. Pool Water Treatment Advisory Group Pages 143 Greenhouse Publishing Diss. U.K . 1999
ISBN 0 9517007 6 6

The book can be ordered direct from the publishers:
Greenhouse Publishing, Holly Lodge, Botesdale, Diss, Norfolk IP22 1BZ, UK
Telephone: +44 (0)1379 890721 Fax: +44 (0)1379 898244
e-mail: sales@landroverenthusiast.com or online from www.ghpbooks.com

Advice on Cryptosporidium updated
www.pwtag.org/home.html see under Press releases

US Centers for Disease Control and Prevention

Cryptosporidium and water: A Public Health Handbook. Atlanta, Georgia: Working Group on Waterborne Cryptosporidiosis. CDC. 1997.
www.cdc.gov/ncidod/dpd/parasites/cryptosporidiosis/default.htm

Swimming Pool Hygiene

The Center has published a number of useful guidance notes for swimming pool operatives. They are available on the web under www.cdc.gov/healthyswimming/index.htm

In particular

12 Steps for Prevention of Recreational Water Illnesses

www.cdc.gov/healthyswimming/twelvesteps.htm

Fecal Accident Response for Pool Staff

www.cdc.gov/healthyswimming/fecalacc.htm

APPENDIX 2
Cryptosporidium Incident
Questionnaire for Single Cases

Hotel:..... Resort:.....

Tour Operator.....

Date of report to hotelier.....

	Checks	√	X
1	Does the establishment implement a Food and Water Safety Management System based on HACCP principles?		
2	Does the establishment have pool staff accredited with a corresponding officially issued certificate when local regulations so require or through some other certification system when other circumstances apply?		
3	Does the establishment operate a swimming pool Fecal Accident Policy?		
4	Have fecal accidents been registered in the preceding four weeks. If yes give details below.		
5	Does the establishment have a correctly completed Official Swimming Pool Registration Book?		
6	Have any anomalies in the normal operation of the swimming pool been registered in the last four weeks: cloudiness, technical problems, etc.? If so, give details below		
7	Does the TO keep a daily record of the number of clients reporting a gastrointestinal upset?		
8	Has there been an increase in the number of guests reporting a stomach illness the preceding four weeks?		
9	Did the TO inform clients on their arrival at the hotel, or at any other time, of the good hygienic practices that swimming pool users must follow?		
10	Does the establishment or the TO representative have information on other previous cases of cryptosporidiosis occurring among hotel guests in the last four weeks?		

Signed: Establishment Manger: Print Name:

Signed: TO Representative: Print Name:

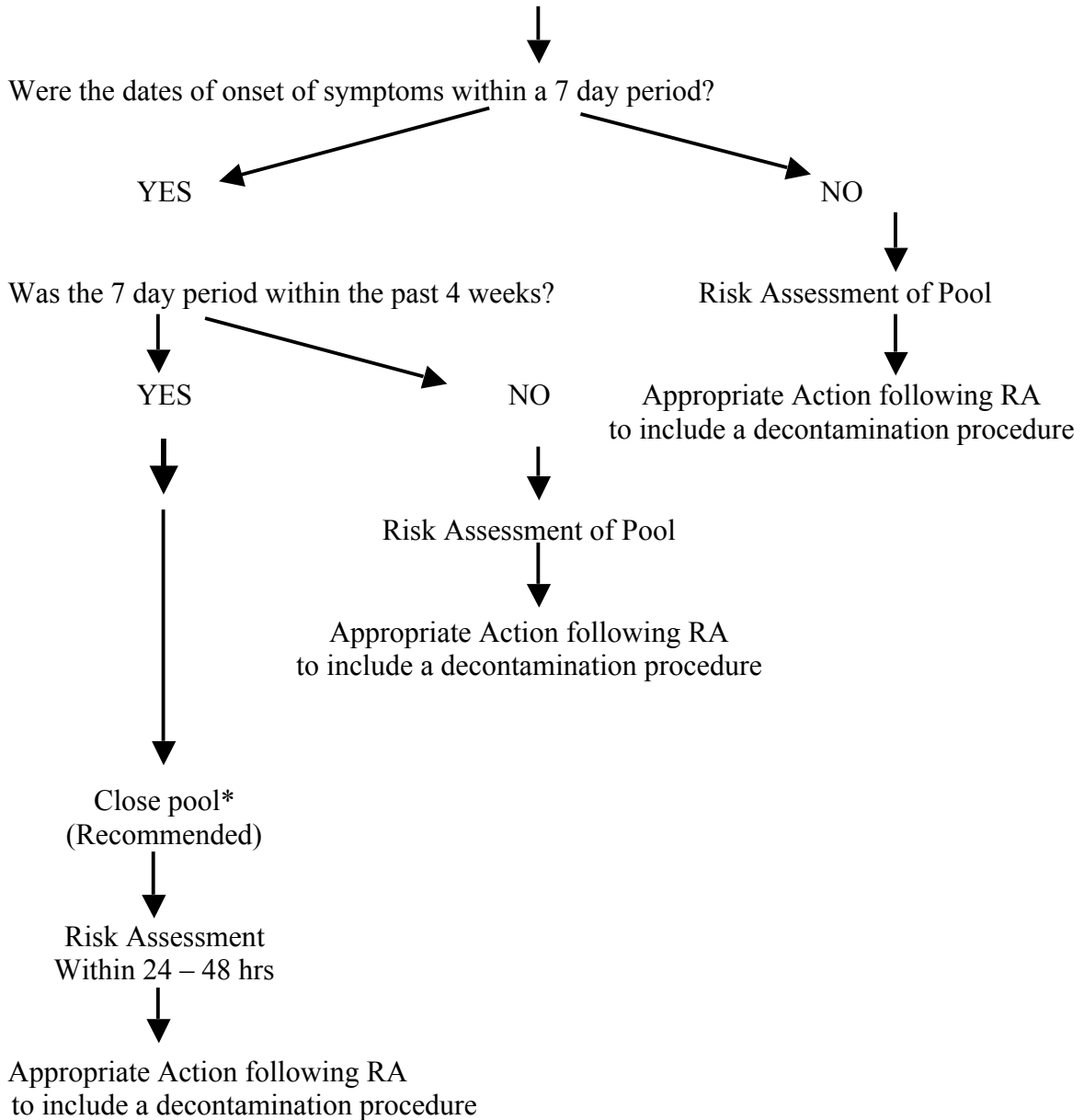
Date:

Copies to be kept by hotelier and Tour Operator

APPENDIX 3

Explanatory Algorithm for Linked Cases

(Two, or more cases, associated with the same establishment, with dates of symptom onset within the same period of 4 consecutive weeks)



If the pool is closed,

- The guests should be notified by letter of the reason and any precautions that they should take
- The hotelier and tour operator should prepare a Press statement that can be issued if necessary.

APPENDIX 4

Decontamination of Pools contaminated with, or suspected of being contaminated with, cryptosporidium oocysts.

As there are no validated procedures that have been published or recommended by competent authorities, it is recommended that both the procedures recommended following a faecal accident be used as the basis for a decontamination procedure.

The US CDC method relies on high level chlorination of 20 mg/ l for a period of 8 hours. The U.K. experts have severe reservations on the efficacy of chlorine at these levels to kill cryptosporidium oocysts in a swimming pool situation. They recommend vacuuming and sweeping the pool then using good coagulation filter the water for six turnover cycles. Then back wash the filters. This relies on efficient filters.

Both the US and U.K responses are for fecal accidents and have not been assessed for use in a known contaminated pool with associated cases of cryptosporidiosis

It is recommended that FTO members should advise the following protocol:

- 1. Thoroughly clean the pool and pool surrounds*
- 2. Clean strainers and coarse filters*
- 3. Backwash the filter to and allow to settle*
- 4. Chlorinate to 20 mg/L at pH 7.2 - 7.5 for 8 hours as in the CDC procedure*
- 5. Using optimized coagulation, filter for six turnover cycles (which may mean closing the pool for a day). This assumes good hydraulics and filters that have been correctly installed and maintained.*

This decontamination procedure should only be undertaken by a qualified and experienced pool engineer.

APPENDIX 5

Testing swimming pools for *Cryptosporidium* Oocysts

1. There is considerable misunderstanding about the value and indications for testing swimming pool water for the presence of cryptosporidium oocysts. Whether or not oocysts are demonstrated in a sample of water from a pool no conclusions can be reached as to whether or not it is safe or dangerous to bathe in the pool.

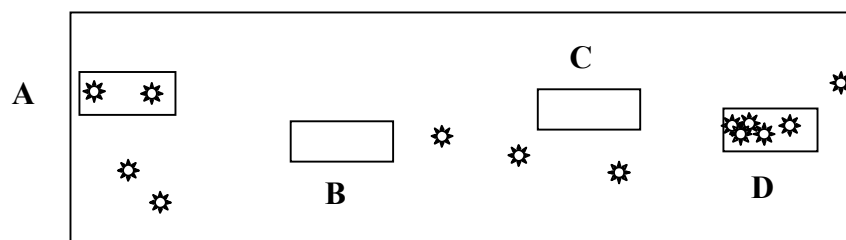
The presence of oocysts only means that the water has been contaminated at some time and that they are present in the sample tested. It tells nothing about the remainder of the pool water or whether the cysts are alive or dead.

The absence of oocysts only means that none could be determined in the sample tested. It does NOT mean that the pool is safe for bathing.

In order to understand these statements it is necessary to have some understanding of cryptosporidium oocysts in swimming pool water and the limitations of the test methods.

2. When oocysts are released into a pool, usually from an infected bather, they are not evenly distributed throughout the water but will often stay in clumps. The number of oocysts present in the total volume of pool water may also be low but due to the uneven distribution, the concentration will vary in different parts of the pool. This means that different test results are usually obtained from samples collected at the same time but from different areas of the pool. There is therefore NO safe level for oocysts in pool water samples.

Diagram showing oocysts (*) in a pool. A, B, C are sample volumes. A will contain 1 oocyst, B and C no oocysts, D 5 oocysts.



3. The test method, even in very experienced laboratories, will not detect all the oocyst in a sample of water. Recovery rates of 50 – 60 % are good rates.
4. The test is complex and labour intensive. The test can take 12-18 hours to complete.
5. The test does NOT distinguish between dead and alive oocysts.

6. Tests should always be undertaken in a laboratory approved for the purpose by the National Accreditation agency such as UKAS or ENAC.

The test method should be based on the US EPA Analytical Method 1662 "Cryptosporidium in Water by Filtration IMS/FA".

7. Laboratories that do not yet have full accreditation can be considered providing that;
 - an application for accreditation has been submitted
 - they can show satisfactory recovery rates from spiked samples
 - they have acceptable results in a recognized external quality assessment scheme.
 - They can demonstrate experience in the examination of swimming pool waters.
8. Any test laboratory should be able to provide a 24 hour turn round
9. The primary indication for testing swimming pool water is for epidemiological studies undertaken by an experienced epidemiologist. If as part of an outbreak investigation it is decided to test the water for oocysts, any which are isolated should be submitted by the test laboratory to a recognized cryptosporidium reference laboratory for further tests, ideally the one which is analyzing the human isolates. The oocysts (IMS pellets or microscope slides) can be examined in great detail by a genetic analysis, which enables them to be compared with any oocysts isolated from patients.. This is still a research project that is providing information which is helping in the understanding of cryptosporidium outbreaks.
10. Testing water in outbreak situations is not necessary for the appropriate control measures to be taken. It is also possible that the results may be misleading especially for persons who do not have a proper understanding of oocysts in water and the factors to be considered when interpreting results.
11. It is often asked whether oocyst testing should be part of routine pool water testing. The publicly available specification for the management of public swimming pools (PAS 39:2003) published by the British Standards Institute in December 2003 states that "routine testing for *Cryptosporidium* and *Giardia* is not considered useful"
12. If it decided to test swimming pool water, samples should only be collected by, or under the supervision of, an experienced consultant. The preferred method is by the use of a portable poolside filtration kit. This enables large volumes up to 1000 litres to be examined. Samples collected in container (5 or 10 litres) are NOT recommended.
13. In outbreak investigations filter backwash water and strainer material is worth sampling. Particularly if typing is to be undertaken since this MAY capture oocysts more closely in time to the contamination event.

14. No actions should be taken regarding the pool when the results are obtained without full discussion with experts who understand cryptosporidium testing.
15. Conclusion
Testing swimming pool water for the presence of *Cryptosporidium* oocysts should only be undertaken as part of a formal epidemiological investigation. Testing is not indicated as a routine test for swimming pools neither is it necessary as part of the decision making process in outbreak.

Some Accredited Test Laboratories

(The costs of using any of the laboratories below must be discussed with the staff of the individual laboratories.)

Spain (ENAC Accredited)

Dr. Ferran Ribas, Divisió Laboratoris, Societat General d'Aigües de Barcelona
Passeig de Sant Joan 39-43, 08009- Barcelona
fribas@agbar.es

Accreditation in progress

Antonio Doménech, Laboratory Manager
SANI CONSULT S.L., C/ Can Foradí 37 Bajos, 07009 Palma de Mallorca, Balears - SPAIN
Tel.: +34 971 706456 Fax: +34 971 706407 domenecha@clinicajuaneda.es

U.K. (UKAS Accredited)

Mr Howard Hawkins, Veolia Water Partnership Laboratory, Blackwell house, 3 Valleys Way, Watford WD23 2LG,
0044 (0) 1923 814387, Mobile: 0044 (0) 7801677726

Dr Howard Handley, Head of Water Quality, South East Water plc, 22-30 Sturt Road, Frimley Green, Camberley GU16 6HY
01252 832901, Mobile: 0044 (0) 7802 750 995, Email: hhandley@southeastwater.co.uk

Ashley Jonas, Thames Water Laboratories, Spencer House, Manor Farm Road, Reading RG2 0JN
0044 (0) 118 923 6266, Mobile: 0044 (0) 7747 642688

U.K. Cryptosporidium Reference Laboratory for typing isolates NOT for specimen or water testing.

Dr Rachael Chalmers, Head, Cryptosporidium Reference Unit, NPHS Microbiology Swansea, Singleton Hospital, Swansea SA2 8QA
tel. +44(0)1792 285341, fax. +44(0)1792 202320

APPENDIX 6

FAECAL ACCIDENTS RESPONSES

A) UK Faecal Accidents Response

The UK Pool Water Treatment Advisory Group (PWTAG) Swimming Pool Water and the Institute of Sport and Recreation management recommendations are:

If the faecal material is formed:

The material should be scooped out. Provided the pool is working satisfactory and the chlorine levels are adequate (it would be advisable to check the chlorine levels and record the result in the faecal accident record.) No further action is necessary.

If the faecal material is loose or unformed there is a possibility of cryptosporidium contamination:

- The pool should be cleared of people immediately.
- Disinfectant levels should be maintained at the top of the recommended range.
- The pool should be vacuumed and swept.
- Using a coagulant, the water should be filtered for six turnover cycles (which could well take up to a day, and so might mean closing the pool until the next day).
- The filter should be backwashed.
- The pool can then be reopened.

Clearly this is a fairly drastic course of action that any pool operator would want to avoid if possible. But if there is a good reason to suspect that Cryptosporidium or Giardia is responsible (certainly if the person involved has had diarrhoea for some days), it would be the safest procedure.

The local Public Health Department should be notified. A copy of such emergency measures can usefully be included in the operation and maintenance manual.

B) USA CDC Faecal Accident Protocol

1. If a bather has a faecal accident in the swimming pool everyone should be directed to leave the pool. This applies whether the accident is with formed or liquid stools.
2. Remove as much as possible of the contaminating material with a net or scoop. Do NOT vacuum the pool.
3. If the stool is formed
 - Raise the chlorine level to above 2 ppm (mg/L) and ensure that the pH is 7.2 – 7.5.
 - Keep the pool closed for 30 minutes.
 - Return the chlorine level to the normal operating level and reopen the pool.
4. If the stool is liquid there is a much greater risk and more comprehensive action is essential.
 - Raise the free available chlorine to 20 ppm (mg/L) with a pH of 7.2-7.5. Maintain this for at least 8 hours. Alternatively any CT value higher than 9.600 ([ppm of chlorine] x [minutes of time contact]) can be used.

- Ensure that the pool filtration is working normally.
 - At the end of the superchlorination back wash the filters and discharge the effluent to waste.
 - Return the chlorine level to the normal operating level and reopen the pool.
5. Record the incident and the procedure followed in the fecal accident log.

Further details can be found on the CDC web site
www.cdc.gov/healthyswimming/fecalacc.htm

Cryptosporidiosis

(krip-toe-spo-rid-ee-oh-sis)

from the US CDC Web site

What is *Cryptosporidium*?

Cryptosporidiosis (krip-toe-spo-rid-e-o-sis) is a diarrheal disease caused by a microscopic parasite, *Cryptosporidium parvum*. It can live in the intestine of humans and animals and is passed in the stool of an infected person or animal. Both the disease and the parasite are also known as "Crypto." The parasite is protected by an outer shell that allows it to survive outside the body for long periods of time and makes it very resistant to chlorine disinfection. During the past two decades, Crypto has become recognized as one of the most common causes of waterborne disease (drinking and recreational) in humans in the United States. The parasite is found in every region of the United States and throughout the world.

What are the symptoms of Crypto?

Symptoms include diarrhea, loose or watery stool, stomach cramps, upset stomach, and a slight fever. Some people have no symptoms.

How long after infection do symptoms appear?

Symptoms generally begin 2-10 days after being infected.

How long will symptoms last?

In persons with average immune systems, symptoms usually last about 2 weeks; the symptoms may go in cycles in which you may seem to get better for a few days, then feel worse, before the illness ends.

How is Crypto spread?

Crypto lives in the intestine of infected humans or animals. Millions of Crypto can be released in a bowel movement from an infected human or animal. You can become infected after accidentally swallowing the parasite. Crypto may be found in soil, food, water, or surfaces that have been contaminated with the feces from infected humans or animals. Crypto is not spread by contact with blood. Crypto can be spread:

- By putting something in your mouth or accidentally swallowing something that has come in contact with the stool of a person or animal infected with Crypto.
- By swallowing recreational water contaminated with Crypto. Recreational water is water in swimming pools, hot tubs, jacuzzis, fountains, lakes, rivers, springs, ponds, or streams that can be contaminated with sewage or feces from humans or animals. Note: Crypto is chlorine resistant and can live for days in pools.
- By eating uncooked food contaminated with Crypto. Thoroughly wash with uncontaminated water all vegetables and fruits you plan to eat raw. See below for information on making water safe.
- By accidentally swallowing Crypto picked up from surfaces (such as toys, bathroom fixtures, changing tables, diaper pails) contaminated with stool from an infected person.

I have been diagnosed with Crypto. Should I worry about spreading infection to others?

Yes, Crypto can be very contagious. Follow these guidelines to avoid spreading Crypto to others.

- Wash your hands with soap and water after using the toilet, changing nappies, and before preparing or eating food.
- Avoid swimming in recreational water (pools, hot tubs, lakes or rivers, the ocean, etc.) if you have Crypto and for at least 2 weeks after diarrhea stops. You can pass Crypto in your stool and contaminate water for several weeks after your symptoms have ended. This has resulted in many outbreaks of Crypto among recreational water users. Note: you are not protected in a chlorinated pool because Crypto is chlorine resistant and can live for days in pools.
- Avoid faecal exposure during sex.

Am I at risk of a severe disease?

Although Crypto can infect all people, some groups are more likely to develop more serious illness. Young children and pregnant women may be more susceptible to the dehydration resulting from diarrhea and should drink plenty of fluids while ill.

If you have a severely weakened immune system, you are at risk for more serious disease. Your symptoms may be more severe and could lead to serious or life-threatening illness. Examples of persons with weakened immune systems include those with HIV/AIDS; cancer and transplant patients who are taking certain immunosuppressive drugs; and those with inherited diseases that affect the immune system. If you have a severely weakened immune system, consult with your health care provider for additional guidance. You can also call the CDC AIDS HOTLINE toll-free at 1-800-342-2437. Ask for more information on Cryptosporidiosis, or go to the CDC fact sheet Preventing Cryptosporidiosis: A Guide for People with Compromised Immune System

What should I do if I think I have Crypto?

See your health care provider.

How is a Crypto infection diagnosed?

Your health care provider will ask you to submit stool samples to see if you are infected. Because testing for Crypto can be difficult, you may be asked to submit several stool specimens over several days. Because tests for Crypto are not routinely done in most laboratories, your health care provider should specifically request testing for the parasite.

What is the treatment for Crypto?

There is no consistently effective treatment. Most people with a healthy immune system will recover on their own accord. If you have diarrhea, drink plenty of fluids to prevent dehydration. Rapid loss of fluids because of diarrhea can be life-threatening in babies; parents should consult their health care provider about fluid replacement therapy options for babies. Antidiarrheal medicine may help slow down diarrhea, but consult with your health care provider before taking it.

People who are in poor health or who have a weakened immune system are at higher risk for more severe and more prolonged illness. For persons with AIDS, anti-retroviral therapy that improves immune status will also decrease or eliminate symptoms of Crypto. However, Crypto is usually not cured and may come back if the immune status worsens. See your health care provider to discuss anti-retroviral therapy used to improve immune status.

How can I prevent Crypto?

Practice good hygiene.

1. Wash hands thoroughly with soap and water
 - Wash hands after using the toilet and before handling or eating food (especially for persons with diarrhea).
 - Wash hands after every nappy change, especially if you work with diaper-aged children, even if you are wearing gloves.
2. Protect others by not swimming if experiencing diarrhea (essential for children in nappy).

Avoid water that might be contaminated.

1. Avoid swallowing recreational water.
2. Avoid drinking untreated water from shallow wells, lakes, rivers, springs, ponds, and streams.
3. Avoid drinking untreated water during community-wide outbreaks of disease caused by contaminated drinking water. In the United States, nationally distributed brands of bottled or canned carbonated soft drinks are safe to drink. Commercially packaged noncarbonated soft drinks and fruit juices that do not require refrigeration until after they are opened (for example, those that can be stored unrefrigerated on grocery shelves) also are safe.
4. Avoid using ice or drinking untreated water when traveling in countries where the water supply might be unsafe.
5. If you are unable to avoid drinking or using water that might be contaminated, then treat the water yourself by: Heating the water to a rolling boil for at least 1 minute.

OR

Using a filter that has an absolute pore size of at least 1 micron or one that has been NSF-rated for "cyst removal."

Do not rely on chemical disinfection of Crypto because it is highly resistant to inactivation by chlorine or iodine.

Avoid food that might be contaminated.

1. Wash and/or peel all raw vegetables and fruits before eating.
2. Use uncontaminated water to wash all food that is to be eaten raw.
3. Avoid eating uncooked foods when traveling in countries with minimal water treatment and sanitation systems.

Avoid faecal exposure during sex.

This fact sheet is for information only and is not meant to be used for self-diagnosis or as a substitute for consultation with a health care provider. If you have any questions about the disease described above or think that you may have a parasitic infection, consult a health care provider.