VIRGINIA
EPIDEMIOLOGY BULLETIN

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Bacterial Contamination of Iced Tea

Over the past 6 months, there have been several newspaper and television reports concerning contamination of iced tea with coliform bacteria. Dr. Robert V. Tauxe and Dr. Mitchell L. Cohen of the National Center for Infectious Diseases, Centers for Disease Control and Prevention (CDC) have compiled the following information on this topic. To date, the Office of Epidemiology has not received any reports of contaminated tea or illness related to tea.

Background

In August 1995, a patron of a restaurant in Cincinnati, Ohio, requested that the City Health Department analyze a sample of iced tea obtained from the restaurant that had an "off odor" and looked cloudy. Laboratory testing of that sample revealed high total coliform counts as well as the presence of *Klebsiella* and *Escherichia coli.* The City Health Department collected samples of iced tea from 20 other area restaurants; the samples contained a median of 29,500 total coliform colony forming units (CFU) per ml (range 0 to 200,000 CFU/ml). Since then, at least three other states have conducted similar studies and have also found high total coliform counts. Local and state health departments have requested guidelines from CDC for preparing and storing iced tea in a manner that would reduce bacterial contamination.

Health Risks

The CDC is aware of only one instance in which gastrointestinal illness may have been associated with iced tea. In 1986, four persons who dined together at a Lubbock, Texas, restaurant experienced gastrointestinal symptoms following the meal. No pathogen was identified. The only food item consumed by all persons was iced tea. Analysis of iced tea from this restaurant and from 50 other local restaurants revealed coliform counts ranging from 0 to 1.3 million CFU/ml, with the predominant organisms being *Klebsiella pneumoniae, E. coli,* and *Enterobacter aerogenes.* No other illnesses were linked to the consumption of iced tea at the implicated restaurant or at other area restaurants. This outbreak was not reported to the Foodborne Outbreak Surveillance System. Review of data available in that system shows that none of 9,502 foodborne outbreaks reported from 1973 to 1991 (the years for which complete data are available) clearly linked gastrointestinal illness to iced tea.

Sources of Contamination

Iced tea could become contaminated with bacteria at any of several steps in its production, e.g., growing, harvesting, processing, transport, steeping, and storage of brewed tea. Cultures of black leaf tea have yielded total coliform counts as high as 1,100 most probable number (MPN) per gram, fecal coliforms up to 23 MPN/g, and *Klebsiella* (Tea Association of the USA, unpublished data). Other studies conducted by the Tea Association showed that tea brewed in a clean urn at 175°F or higher and stored at room temperature had no detectable coliform counts during the first 16 hours of storage. After that time, total coliform counts grew exponentially. Tea brewed at lower temperatures or sampled from an irregularly cleaned urn yielded coliforms, including *Klebsiella* and *Enterobacter,* after shorter storage times. Cultures of swabs of a cafeteria urn after "routine" cleaning revealed total coliform counts of up to 12,000 CFU/gram of biomaterial collected from the faucet of the urn, but not from other parts of the urn. In other studies, *Salmonella* has been documented to survive in brewed tea at room temperature.

Discussion

These studies show that indicator organisms and pathogens can survive in brewed tea, making transmission of infectious agents theoretically possible. Finding indicator organisms, such as fecal coliforms, in brewed tea does not mean that the tea is in fact hazardous. Rather, this indicates a failure in food handling or sanitation, creating a potentially hazardous condition, in which a pathogen could cause disease if it were introduced.

For tea brewed at an appropriate temperature, the issue is primarily one of stor-

age conditions of the tea and cleaning and disinfection of the tea dispenser. Some tea dispensers in use are not easy to clean. The theoretical risk of disease transmission from brewed tea would be minimized if iced tea is brewed at an appropriate temperature in a clean urn and stored for no longer than 8 hours. The tea industry has developed guidelines for brewing tea, and for regularly cleaning and sanitizing dispenser machines. In addition, commercial food establishments and consumers wishing to reduce their exposure to a theoretical hazard may avoid brewing tea in tepid water or the practice of making "sun tea" by steeping tea bags in a container of water in the sun, because in these instances the tea is brewed at low temperature.

Summary

- Tea is a beverage with little history of disease transmission. At present, no outbreaks of infection have been reported to CDC that were clearly associated with the consumption of tea.
- Tea leaves may be contaminated with coliform bacteria. If iced tea is brewed at inadequate temperatures or in an improperly cleaned urn, or if it is stored for too long, it may grow coliform bacteria, most frequently *Klebsiella* and *Enterobacter,* and less commonly *E. coli.* In particular, the faucet of iced tea urns may provide a nidus for bacterial contamination.
- Foodhandling errors that lead to the introduction or that encourage the replication of microbial pathogens in brewed tea could theoretically result in human disease.
- Brewing iced tea at an appropriate temperature in a thoroughly cleaned urn and limiting the time held at room temperature before serving will minimize the theoretical risk of bacterial contamination.

Recommendations

» The tea industry recommends that iced tea be brewed at 195°F for 3-5 minutes, that tea be stored for no longer than 8 hours, and that the tea brewer, storage dispenser, and dispenser faucet be cleaned daily. These guidelines for the preparation and storage of iced tea are consistent with available data and are likely to reduce the coliform contamination of iced tea.

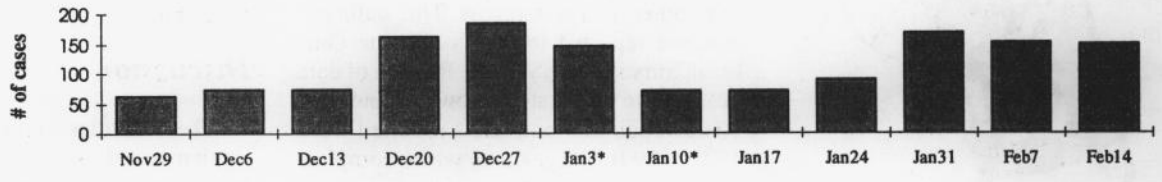
» Redesigning tea dispensers to be more easily dismantled and cleaned than those currently used could further reduce the theoretical risk of bacterial contamination of iced tea.

» The practice of making "sun tea" by steeping tea bags in a container of water in the sun may be of higher theoretical risk than brewing tea at higher temperatures because it provides an environment where bacteria are more likely to survive and multiply.

» Questions on how to clean tea dispensers should be directed to the manufacturer or the National Sanitation Foundation: (313) 769-5763. Questions about the most appropriate measurement and interpretation of indicator organisms in food and beverages should be directed to the Food and Drug Administration, Center for Food Safety: (202) 205-5140. Reports of outbreaks of disease, and consultations on their investigation, should be directed to your local health department or the Office of Epidemiology, Virginia Department of Health, 804/786-6261.

FLU CORNER

Influenza-like Illness, Virginia
Sentinel Surveillance 95-96



*incomplete reporting

Reports of influenza-like illness have decreased from all regions of Virginia except the Southwest region. The Southwest began reporting increased numbers of cases during the week ending January 31 and continuing through February 14. Influenza type A has been isolated from all regions except the Southwest. No influenza type B has been reported in Virginia. Nationally, only 2% of isolates have been type B.

WONDER SYSTEM SOFTWARE

WONDER software, distributed by the Centers for Disease Control and Prevention (CDC), provides many useful services that may be of interest to local health departments, as well as other health practitioners. It is a software program for personal computers that provides a fast and efficient electronic link between health practitioners and the CDC by use of a computer, modem and toll-free number. This program allows the user to do any of the following:

- Exchange electronic mail messages with CDC personnel, staff from state and local health departments (including many VDH staff members), Public Health Service agencies or anyone else using CDC WONDER/PC around the world.
- Search for and retrieve "Morbidity and Mortality Weekly Report" articles and prevention guidelines published by CDC.
- Access and query public-use data sets regarding mortality, cancer incidence, hospital discharges, AIDS, behavioral risk factors, diabetes, and many other topics. These data can be readily summarized and analyzed using tools built-in to CDC WONDER/PC.
- Identify courses, slide sets, and other training resources available through CDC.
- Join one of the many special interest groups that have been formed on the WONDER network.

This software is available free of charge to state health department personnel. For districts that do not yet have a copy, one copy per district of the CDC WONDER/PC software can be obtained from the Office of Epidemiology. This copy may be shared among all district employees. Each user must apply for a unique user ID account from CDC. Health department employees who need a user ID account should contact Renee Milton in the Office of Epidemiology, (804/786-6261) for a registration form. The form must be mailed along with a letter on health department stationery to:

CDC WONDER User Support
1600 Clifton Road, NE; Mailstop F-51
Atlanta, GA 30333.

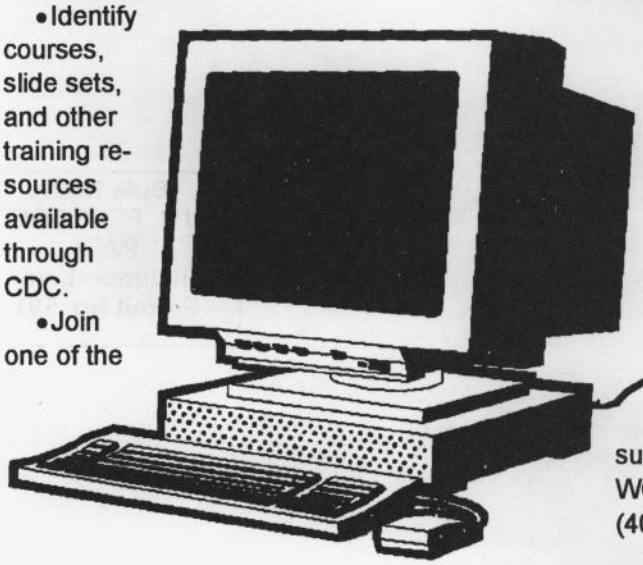
The letter should state that you are an employee of the health department and are requesting that CDC provide a CDC WONDER user ID account at no charge. Districts that need a copy of the software should contact Renee Milton for a copy of the disks.

The CDC WONDER/PC software contains an on-line help system. Documentation regarding loading and initial start-up of the software will be included with your disks. In addition, there is a CDC technical support number for the WONDER system -- (404)332-4569.

Persons not employed by state or local health departments, such as university faculty, hospital infection control practitioners, etc., can purchase the CDC WONDER/PC package, including software, manual and user ID account, for $50.00. In order to do this you must contact:

USD
2075 A West Park Place
Stone Mountain, GA 30087
(770)469-4098; Fax (770)469-0503.

Persons interested in using WONDER/PC should have an IBM-PC compatible microcomputer with a Hayes-compatible modem (9600 baud US Robotics recommended). The computer should have an 80286 or higher processor, MS-DOS or PC-DOS version 3.3 or higher; a hard disk drive with at least 2 megabytes of free space before installation; (installation of all features requires about 8 megabytes of free space). If you use a mouse with the software, it should have a Microsoft-compatible mouse driver.



Cases of Selected Notifiable Diseases, Virginia, January 1 through January 31, 1996.*

Disease	Total Cases Reported This Month						Total Cases Reported to Date in Virginia		
		Regions							
	State	NW	N	SW	C	E	This Yr	Last Yr	5 Yr Avg
AIDS	54	4	4	2	30	14	54	50	52
Campylobacteriosis	23	3	2	9	7	2	23	15	19
Giardiasis	10	1	1	3	2	3	10	7	12
Gonorrhea	789	66	90	101	165	367	789	890	961
Hepatitis A	2	0	1	1	0	0	2	17	5
Hepatitis B	4	0	0	1	3	0	4	8	8
Hepatitis NANB	0	0	0	0	0	0	0	0	1
HIV Infection	47	1	2	8	4	32	47	30	75
Influenza	45	9	0	0	0	36	45	183	206
Legionellosis	1	0	1	0	0	0	1	0	1
Lyme Disease	0	0	0	0	0	0	0	0	1
Measles	0	0	0	0	0	0	0	0	0
Meningitis, Aseptic	7	1	5	0	0	1	7	12	6
Meningitis, Bacterial†	3	0	0	0	3	0	3	9	4
Meningococcal Infections	3	2	0	0	1	0	3	1	2
Mumps	0	0	0	0	0	0	0	2	2
Pertussis	0	0	0	0	0	0	0	0	1
Rabies in Animals	24	10	2	4	6	2	24	19	14
Rocky Mountain Spotted Fever	0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0	0	0	0
Salmonellosis	53	7	9	10	16	11	53	68	46
Shigellosis	18	2	4	1	2	9	18	9	12
Syphilis, Early‡	67	1	1	2	9	54	67	91	91
Tuberculosis	1	0	0	0	0	1	1	2	7

Localities Reporting Animal Rabies: Accomack 1 raccoon; Amelia 1 raccoon; Augusta 1 fox, 1 skunk; Bath 1 skunk; Bedford 2 raccoons; Brunswick 1 skunk; Chesterfield 1 skunk; Franklin 1 skunk; Greensville 1 raccoon; Henrico 1 skunk; King and Queen 1 raccoon; Louisa 1 skunk; Madison 2 raccoons; Nelson 1 skunk; Orange 1 raccoon; Prince Edward 1 raccoon; Prince William 2 raccoons; Roanoke City 1 cat; Rockingham 1 cow, 1 skunk.

Occupational Illnesses: Asbestosis 26; Carpal Tunnel Syndrome 25; Coal Workers' Pneumoconiosis 20; Lead Poisoning 1; Loss of Hearing 17; Mesothelioma 1.

*Data for 1996 are provisional.

†Other than meningococcal.

‡Includes primary, secondary, and early latent.

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