WSLH Wisconsin State Laboratory of Hygiene

Results

News from Wisconsin's Public Health and Environmental Laboratory

Issue No. 23 Winter 2000

Sprouts outbreak highlights partnership between DPH, WSLH

By Stephanie Kuenn, WSLH Public Affairs

Cooperation was the key to containing an outbreak of salmonella in alfalfa sprouts sold in Wisconsin.

It all began last September, when Marge Hamacher, an advanced microbiologist in WSLH's Communicable Diseases Division, noticed that the Bacteriology Lab had received several samples containing *Salmonella* Muenchen, a relatively uncommon serotype of salmonella.

In a typical year, Wisconsin has 10 cases of *Salmonella* Muenchen. Between September and October, the state confirmed 19 cases. Hamacher also noticed the samples were tartrate-negative, something that isn't usual in salmonella samples.

Hamacher called the Division of Public Health to alert them to a possible outbreak of *Salmonella* Muenchen.

Dr. Mary Proctor, section chief for DPH's Communicable Diseases Section, said what made this outbreak really unusual was its epidemiology. Usually, salmonella infects either the very young or the very old, but the average age of cases in this outbreak was 36 years and there were twice as many females as males infected. This provided a valuable clue as to the food vehicle responsible for the outbreak.

Workers at the Division of Public Health interviewed patients about their food histories and by October 5, 1999, had uncovered the association of illness with consumption of alfalfa sprouts.

The DPH issued a warning against selling, serving or consuming alfalfa sprouts on October 6 and began the process of determining the source of the contaminated sprouts. WSLH and the Wisconsin Department of Agriculture, Trade and Consumer Protection (DATCP) tested sprouts that were pulled from grocery store shelves and recovered from restaurants where infected individuals had purchased or eaten the sprouts.

Initial tests found that the sprouts themselves had not been contaminated, but it was subsequently determined that the seeds themselves were the source of the *Salmonella* Muenchen. The investigation traced the sprouts to two Wisconsin sprouters, who had bought the tainted seeds from International Specialty Supply in Tennessee. International Specialty Supply voluntarily recalled the seed lot.

Bacteria can grow easily in sprouts because of the warm, humid conditions need for growing sprouts. The sprout growers had followed all FDA regulations for growing sprouts.

Proctor cited the cooperation between WSLH, DPH, DATCP, local health department staff and the Food and Drug Administration as a reason for the outbreak's quick resolution.

"I think it was one of the better outbreaks in terms of cooperation," Proctor said. "This one worked really well."

Table of Contents

Outgoing WSLH Board Chair reflects upon a productive year

Mary Jo Kopecky is deputy administrator for the Wisconsin Department of Natural Resources' air and waste division. She served as WSLH Board chairperson from February 1999 - January 2000.

I wasn't sure what I was getting into as the Chair of the State Laboratory of Hygiene Board, but I certainly did not predict the challenging, but exciting time, it's been this last year. The membership of the Board was changed by the Legislature in the 1997-99 biennium from a Board made up primarily of state agency members to a Board that is more diverse with significant membership from both the private and public sectors. Five individuals were added to the Board (out of 11 members) who had not previously served on the Hygiene Lab Board. This new Board needed to spend time to understand what its role is and how we, as Board members, can best work together given our diverse backgrounds and interests.

I am impressed with the dedication of the new Board members and their desire to serve the best interests of the citizens of Wisconsin. I believe that this Board is fully capable of working through the tough issues that we must deal with if the Laboratory is to maintain its standing as a national leader in human and environmental public health.

Certainly the highlight of the year was the dedication of the new Agriculture Drive facility for Environmental, Occupational and Toxicological Sciences. The Agriculture Drive facility is clearly a first class laboratory and will enhance the ability of State Lab staff to continue to pioneer better methods to monitor the state of human and natural resource health. It is certainly a quantum leap from the facility I worked in in the mid 1970s (maybe several quantum leaps!). We have highly competent scientists working at the State Lab who are recognized as experts in their fields. It is important that we give our scientists the best possible tools with which to do their jobs. Features of the new facility, such as the ultra-clean metals analysis room, will help our staff to do the state-of-the-art work we have come to expect from them.

Congratulations go to the many staff and managers who were involved in the design of the new laboratory and especially to Doug Dube for his tireless work in seeing that the design was correctly translated into the structure we dedicated last June.

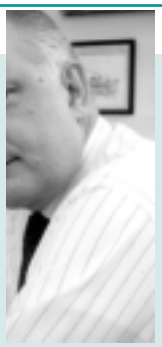
I mentioned above that this current Board is a new mix of members from the private and public sectors. During 1999, a small workgroup of these Board members met frequently to deal with the difficult issue of how to maintain a financially viable Laboratory of Hygiene without hampering private sector efforts to increase their capabilities. This is an important issue. In the public health area, the trend is for laboratory work to be done at the point of service (where the patient and medical community interact) resulting in less need to call on the State Laboratory for work. In the environmental area, the numbers of samples being collected is decreasing, while the number of environmental laboratories in the state (over 500) is not changing significantly. The financial structure set up for the Laboratory by the Legislature expects that the Laboratory will have a significant portion of its funding coming from non-state agency revenues. This can lead to competition between the Laboratory, private labs, and local government laboratories that may not serve the public interest.

The workgroup met throughout the summer and into the fall and came up with 11 recommendations addressing financial management, communications, environmental, clinical and occupational health testing. These recommendations call for the Board to initiate a strategic planning process, in partnership with the Laboratory's Strategic Leadership Team, to determine the nature of the Laboratory Wisconsin needs to have at the end of this decade. This process began successfully at the Board's January meeting.

Other recommendations address the need to better define the capability and capacity of the Laboratory, development of test pricing principles, processes for seeking public input on policy issues, and developing stronger partnerships with other environmental laboratories in Wisconsin. The implementation of these recommendations will allow the Board to focus more time on strategic public/environmental health direc-

continued on next page

Laessig receives NCCLS' highest honor



The National Committee for Clinical Laboratory Standards named WSLH Director Dr. Ronald Laessig the recipient of the Russell J. Eilers Award for Outstanding Contributions to Voluntary Consensus.

The NCCLS is an organization responsible for creating standards of practice for the laboratory community. It creates these standards through a practice known as "voluntary consensus." All members of the NCCLS are volunteers, and they create voluntary standards for laboratories by achieving consensus among the entire laboratory community. This includes participants from industry, laboratory professionals and government.

Laessig served as president of NCCLS from 1980-1982 and actually presented the first outstanding achievement award. It was later named for Russell Eilers, who was the founding president of the association. It is the highest honor the NCCLS confers.

The NCCLS honored Laessig further with these words, printed alongside his award announcement: "NCCLS is proud to honor Ron Laessig as recipient of the Russell J. Eilers Memorial Award, an expression of its gratitude for his career-long commitment, as a volunteer and leader, to NCCLS and to advancing the principles of consensus. NCCLS looks forward to being the beneficiary of his vision and continuing guidance."

tions, as well as on appropriate financial strategies. The recommendations will also build a stronger working partnership between the Board and the Laboratory's Strategic Leadership Team that will lead to a more effective implementation of the Laboratory's strategic directions.

Much of the work of implementing the recommendations will fall to my successor–Jim Clawson. Jim brings a strong private sector financial management background, accompanied by responsibility for occupational health testing, that is well suited to the issues in the recommendations. Jim will provide excellent leadership to the Board as we work to make the recommendations reality.

I certainly never anticipated the significant issues the Board and Laboratory would deal with when I became Chair in February 1999. I want to thank my fellow Board members and the staff of the State Laboratory for their support and their willingness to work through some tough issues with me. It's been a privilege to be Chair and work on behalf of the Laboratory. In looking back, I feel very satisfied with the progress made by the Board as we start a new decade, century, millennium. I am excited for the future of the State Laboratory of Hygiene and its ability to continue to meet the public health/environmental health needs of the citizens of Wisconsin.

Cytopathology fellow's outreach benefits El Salvadoran women

By Stephanie Kuenn, WSLH Public Affairs

Taking the WSLH outreach mission to a global scale, Dr. Luis De Las Casas, the State Lab's Cytopathology Fellow, recently won with Dr. Miriam Cremer, University of Wisconsin Hospital and Clinics (UWHC), a first-place presentation award for their work studying the rates of cervical cancer in rural El Salvadoran women. They presented their preliminary findings at the Latin American Federation of Obstetrics and Gynecology annual meeting in San Salvador.

Their study aims to find a better way to detect women with high-grade dysplasia. High-grade dysplasia progresses to cervical cancer more often than low-grade dysplasia. De Las Casas and Cremer found in their rural El Salvador study that by using liquid-based cytology (ThinPrep™), more high-grade lesions were detected in comparison to conventional pap smears. In a country with limited

continued on facing page

CDC grant will strengthen state's public health infrastructure

By Stephanie Kuenn, WSLH Public Affairs

Wisconsin is the recipient of a $1.12 million cooperative agreement from the CDC for public health preparedness for and response to bioterrorism.

The grant, which is overseen by the state Division of Public Health, will improve the state's public health infrastructure by linking all of the state's local health departments (LHDs) electronically, strengthening epidemiology and surveillance activities and upgrading laboratory capabilities. The grant's implications are broad.

"Although this grant is technically for bioterrorism preparedness, the upgrades we plan to make to the public health infrastructure will improve local and state agencies' abilities to respond to outbreaks, emerging infectious diseases and other more routine public health events," said Dr. Jeff Davis, Wisconsin's chief medical officer and state epidemiologist for communicable diseases, DPH.

One of the most exciting developments for public health will come in the form of the Health Alert Network (HAN), which plans to upgrade the information systems for all of the state's LHDs. Through the HAN, all local agencies will receive a T1-dedicated line to the Internet. HAN staff will also ensure LHDs have compatible systems for multimedia and Web conferencing.

The grant also provides funding for training LHD staff to use the Health Alert Network. The DPH currently is conducting a technology needs assessment. By year's end, the DPH hopes all local agencies will meet the minimum technology standards. The HAN is supervised by Dr. Larry Hanrahan, epidemiologist and chief of DPH's Bureau of Environmental Health Epidemiology and Toxicology Section.

The epidemiology section of the grant, overseen by Davis, will include increasing surveillance activities, developing and coordinating databases and reporting systems and providing seminars throughout the state to train public health staff on how to monitor and respond to an outbreak or bioterrorist attack.

The third section of the grant will strengthen the state's two largest public health laboratories-the WSLH and the Milwaukee Health Department Laboratories-as well as smaller labs. Both the WSLH and Milwaukee Health Department Lab will develop and evaluate core diagnostic testing methods to identify biologic agents and work with the CDC and FBI to develop a plan in case of a bioterrorism event. Training level-A labs (local clinical and public health labs) to deal with and identify biological and chemical agents is also part of the plan. Dr. Pete Shult, director of the WSLH Communicable Disease Division, is supervising the laboratory portion of the grant.

There are changes coming, and they are changes that will allow Wisconsin's public health system to better serve its residents. As Hanrahan said, the grant is helping create "'public health.com'," a catch-all place to stop outbreaks, deal with biological terrorism and keep Wisconsin's citizens healthy."

from previous page

economic resources it is extremely important to identify the high risk population to whom these resources should be first directed.

A little Med School project

The project began four years ago, when Cremer, now a second-year resident in OB/GYN at UWHC, did a rotation at a hospital in Arcatao, El Salvador, as a medical student. While there, several women died from cervical cancer at a young age. Cremer organized a pap-smear campaign with the "health promoters," women who lived in the villages and coordinated their local public health campaigns. Cremer conducted small group education sessions and collected pap smears (both ThinPrep™ and conventional). She returned the next year to work on the project further.

While the conventional pap smears were screened in El Salvador, Cremer sent the ThinPrep™ samples back to the State Lab, where cytotechnologist volunteers from the WSLH Cytology Section screened them during their off-hours–some of them even coming in to work on weekends. In addition, the WSLH's Dr. H. Daniel Hoerl and Dr. Daniel Kurtycz interpreted selected slides.

"The WSLH has been so helpful, it's a groundswell of support," Cremer said. "This was a little fourth-year medical school project–and then there's people coming in on Saturdays to help."

From host to visitor

De Las Casas became involved when two doctors from El Salvador visited the State Lab last fall to be trained in liquid-based cytology methods. UWHC's Dr. Julian Schink, the mentor of this study, contacted De Las Casas and asked him to get involved in the study.

De Las Casas and Schink interpreted the results from the slides that the WSLH had analyzed and found that the ThinPrep™ method had double the sensitivity of the conventional cervical Pap smears when it came to detecting high-grade lesions.

"Our preliminary results are impressive and indicate a very high prevalence of high-grade dysplasia in rural areas of El Salvador," De Las Casas said. "We're trying to find a way to improve the detection of those persons who are at high risk for developing cervical cancer".

De Las Casas said the study's goal is to find the best way to identify the high-risk patients in a developing country, where needed resources are very limited and cost-effectiveness is crucial.

Along with presenting the study findings, De Las Casas spent his week in El Salvador giving lectures on cytology. He spoke on fine-needle aspiration biopsy at University Jose Matias Delgado's School of Medicine and the Central Laboratory of the Minister of Public Health. He also gave a lecture on the cytology of fluids at Maternity Hospital and a glass slide workshop to practicing local pathologists, cytotechnologists, pathology residents and medical students. De Las Casas appreciated the treatment and help he received from the people of El Salvador during his visit and feels that the study is extremely important for El Salvador's rural areas.

"The work was worth it. The people were very receptive and eager to participate in what was presented," De Las Casas said. "I learned from them. Every time you share something, you learn."

Influenza season sweeps over state

***Peter Shult**, Ph.D., is director of the WSLH Communucable Disease Division and is WSLH chief virologist. He received his doctorate from UW-Madison.*

***Carol Kirk** is a microbiologist supervisor in the WSLH Virology Laboratory. She has 29 years of professional laboratory experience at the WSLH.*

Influenza A detections are declining in Wisconsin, after reaching peak levels during the last week of 1999 and the first week of 2000. The virus which has predominated this year is influenza A/Sydney (H3N2), according to the CDC. Influenza A/Sydney/05/97 (H3N2) began circulating during the 1997-98 season and has continued to circulate during the last two seasons.

No culture-confirmed influenza B has been detected in Wisconsin; only 31 cases of influenza B have been detected nationally. Seven cases of influenza A (H1N1) have been detected nationally; two were detected in Wisconsin.

We will be watching now to see if a second peak of influenza activity occurs, as has occasionally occurred in past years.

Although influenza A was detected earlier than usual in Wisconsin, virus detections remained at sporadic levels until they increased in mid-November, reaching peak levels in Wisconsin during late 1999 and early 2000. The timing of the peak activity is presumably at least part of what prompted some media reports to refer to influenza as the "real Y2K bug", or the "millennium bug".

While there has been much discussion about how "early" this influenza season began, a look back at the previous 19 years shows us that laboratory detections of influenza have peaked in Wisconsin between mid-December and mid-January during six of the 19 years. Detections have peaked during or after mid-February five times in the nineteen years. Two of those "late seasons" occurred during 1997-98 and 1998-99, providing a contrast to make the somewhat "early" onset of this season seem even more unusual.

COMING ATTRACTIONS

RSV

Respiratory syncytial virus (RSV) appears to be poised for its annual increase in activity. RSV is currently being detected by laboratories across the state, although at low levels. We can expect to see detections increase during the coming weeks. According to patterns seen in previous years, peak levels of detection are reached in Wisconsin during February and March.

RSV infections are a major cause of lower respiratory tract illness during infancy and childhood, causing bronchiolitis and pneumonia in infants and young children, and frequently causing upper respiratory tract infections when reinfecting older children and adults.

Rotavirus

We can also expect to see an increase in rotavirus detections in Wisconsin. Rotavirus activity tends to reach peak detection levels in late winter through early spring in Wisconsin, according to patterns of previous years.

Rotavirus is the most common cause of severe diarrhea in children. Although re-infections occur, repeat infections are usually less severe than the original infection.

Although a live virus vaccine was approved for use in children in 1998, it is no longer recommended for infants, due to a potential association with bowel obstruction in some infants.

Parainfluenza 3, Rhinoviruses

During the spring months, as we celebrate the passage of winter, we can expect to see increases in respiratory illnesses due to parainfluenza type 3 and rhinoviruses.

"Other" respiratory viruses, cont. Part 2

In the Fall 1999 issue of *Resu!ts*, we featured an in-depth look at Respiratory Syncytial Virus (RSV) and Parainfluenza viruses. This issue we continue our exploration of the "other" respiratory viruses.

Rhinoviruses

Rhinovirus-induced illnesses probably represent the most common acute infectious illness of humans, and may account for one-third to one-half of all acute respiratory illnesses. Known as the major cause of the common cold, rhinoviruses also have been increasingly recognized as the cause of more serious lower respiratory tract disease. In addition, these viruses have been implicated in exacerbations of asthma and in acute and chronic bronchitis.

Symptoms of a typical rhinovirus infection are rhinorrhea, sneezing , nasal obstruction, pharyngitis and cough. The illness will commonly last about one week, but may persist for two to four weeks. In the U.S., adults typically suffer two to five rhinovirus infections each year, while children typically suffer five to 10 infections each year.

There are at least 100 known serotypes of rhinoviruses, which may account for some of the frequency of infection. Rhinoviruses have a worldwide distribution and exhibit peak activity in the spring and fall in the Northern Hemisphere.

The incubation period of rhinovirus infections is one to four days, with the illness lasting one to four weeks. Transmission occurs by person-to-person spread, including direct contact and inhalation of large or small particle aerosols.

Work on methods of treatment and prevention of rhinovirus infections is ongoing. Recent reports of antivirals for treatment of rhinovirus infections appear promising. Testing for rhinoviruses is currently available by culture methods in virology laboratories.

Adenoviruses

Last but not least among these virus groups are the adenoviruses. There are at least 49 serotypes of adenoviruses, which have been recovered from virtually every human organ system. These viruses have been associated with a variety of different clinical syndromes, a number of them respiratory.

continued on page 8

Disease	Individuals at Greatest Risk	Principal Adenovirus Serotypes
Acute febrile pharyngitis	Infants, young children	1-3, 5-7
Pharyngoconjunctival fever	School-aged children	3, 7, 14
Acute respiratory disease	Military recruits	3, 4, 7, 14, 21
Pneumonia	Infants, young children	1-3, 7
Pneumonia	Military recruits	4, 7
Epidemic keratoconjunctivitis	Any age group	8, 11, 19, 37
Pertussis-like syndrome	Infants, young children	5
Acute hemorrhagic cystitis	Infants, young children	11, 21
Gastroenteritis	Infants, young children	40, 41
Hepatitis	Infants and children with liver transplants	1, 2, 5
Persistent virus in urinary tract	Immunosuppressed individuals, bone marrow transplant recipients	34, 35

Overview of CDC influenza surveillance

The following information on national influenza surveillance is reprinted from the CDC's web site –http://www.cdc.gov/ncidod/diseases/flu/flusurv.htm

The Influenza Branch, CDC, conducts surveillance for influenza in the United States each year from October through mid-May. Influenza surveillance is designed to:

- Determine when influenza viruses are circulating, identify circulating strains, and detect changes in the viruses.
- Monitor influenza-related ill in the U.S.
- Measure the impact of influe on deaths in the U.S.

The four components of influenza surveillance are:

- **World Health Organization Collaborating Laboratory System.** Approximately 75 World Health Organization collaborating virology laboratories and approximately 50 laboratories from the National Respiratory and Enteric Virus Surveillance System located throughout the United States report the total number of respiratory specimens tested and the number positive for influenza by type and subtype each week. A subset of the influenza viruses isolated is sent to CDC for antigenic characterization.
- **122 Cities Mortality Reporting System.** Each week, the vital statistics offices of 122 cities report the total number of death certificates filed and the number of those for which pneumonia was identified as the underlying cause of death or for which influenza was mentioned in any position.
- **State and Territorial Epidemiologists Reports.** State health departments report the estimated level of influenza activity in their state each week. When activity occurs, it is reported as sporadic, regional, or widespread which are defined as follows:
  - Sporadic - Influenza cases, either laboratory-confirmed or influenza-like illness (ILI), are reported, but reports of outbreaks in places such as schools, nursing homes, and other institutional settings have not been received.
  - Regional - Outbreaks of either laboratory-confirmed influenza or ILI are occurring in geographic areas containing less than 50% of the state's population. A geographic area could be a city, county, or district.
  - Widespread - Outbreaks of either laboratory-confirmed influenza or ILI are occurring in geographic areas representing more than 50% of the state's population.
- **U.S. Influenza Sentinel Physicians Surveillance Network.** Approximately 260 physicians around the country report each week the total

Continued on facing page

Respiratory viruses… *from page 7*

First discovered in the early 1950s, adenovirus infections occur worldwide in sporadic and epidemic form. Adenoviruses can be recovered for months after infection and can also be recovered from asymptomatic infections. This causes problems interpreting the significance of adenovirus recovery.

Although certain syndromes may be more commonly associated with certain serotypes, other serotypes can also be involved in these syndromes and these serotypes can also cause other illnesses. The table on page 7 lists the adenovirus serotypes and the syndromes with which they are commonly associated, but is not all-inclusive.

Antiviral treatment of adenovirus infections has not been successful to date. Prevention of infection is dependent on good hygiene and disinfection practices for some types of infection. A vaccine for adenovirus types 4 and 7 has been used by the military, but is not available for civilian use.

It is believed that antibody produced in response to an adenovirus infection will provide protection from re-infection by that serotype. Adenoviruses have been demonstrated to establish a form of persistent or latent infection; re-isolation of adenovirus two years after infection of normal humans has been documented. Further work needs to be done, however, to clarify this.

Testing for adenoviruses is available by culture in virology laboratories and by serology. Antigen detection by immunofluorescence has been reported to be less sensitive than culture techniques. Antigen detection by commercially available enzyme immunoassays is available in some of Wisconsin's virology laboratories.

from previous page

number of patients seen and the number of those patients with influenza-like illness by age group.

Through its surveillance systems, CDC develops a national picture of influenza virus activity, the geographic distribution of influenza viruses, and the impact of influenza on different age groups. In developing this national picture, the following limitations are important to note:

- States are not required to report influenza activity. All reporting is completely voluntary.
- The reported information answers the questions of where and when influenza is occurring and which influenza viruses are circulating. The information cannot be used to determine how many people have become ill with influenza during a given season, nor to project or derive rates of influenza infection in the general population.

The following general information may be useful for understanding influenza:

- Every influenza season is unique.
- It is estimated that during most influenza seasons, approximately 10% to 20% of the population is infected with influenza, although rates of infection vary among different age groups and from one season to another.
- Approximately 1% of those infected will require hospitalization.
- Among those hospitalized with influenza or its complications, as many as 8% can die.
- On average, approximately 20,000 Americans die from the complications of influenza each year.

National Center for Infectious Diseases Centers for Disease Control and

Monitoring flu in Wisconsin

Influenza activity in Wisconsin is monitored using both laboratory and physician reports.

Volunteer physicians (Wisconsin's sentinel physicians) report to the CDC every week on the total number of patients seen during the previous week and the number of patients seen who had "influenza-like illness". These data are incorporated into reports in *Morbidity and Mortality Weekly Report* (*MMWR*) and on the CDC web site (http://www.cdc.gov/ncidod/diseases/flu/flusurv.htm). The data provided by Wisconsin's sentinel physicians is also collated by personnel of the state Division of Public Health, Communicable Diseases Epidemiology Section, who then provide summarized data to the participating physicians.

The Division of Public Health, Communicable Diseases Epidemiology Section, also analyzes the available information and reports the level of influenza activity in the state, which is also incorporated into the weekly updates provided in the *MMWR* and the CDC web site.

Virology laboratories across the state voluntarily report the number and type of specimens tested and the viruses detected. The WSLH collates this information and reports it back to the laboratories, along with graphs, maps and summarized information from CDC reports. This information is also transmitted to the Division of Public Health, Communicable Diseases Epidemiology Section, and to a limited number of other recipients.

The laboratory network data, the sentinel physician data, and summarized information from CDC reports are then analyzed at the WSLH. All of the information provided by the systems described above is incorporated into biweekly reports, which are available via e-mail or fax from the WSLH.

Everything you wanted to know about G-I viruses, but were afraid to ask

In polite company we call it an "upset stomach", "queasiness" "stomach flu", "nervous stomach," etc., although we may have other descriptive terms that we share with family and close friends.

The combination of nausea, vomiting, diarrhea and abdominal cramps to which we refer are collectively known as gastroenteritis. According to several studies, each person in the U.S. suffers one to two enteric illnesses per year. Although diarrheal diseases are responsible for as many as 15-34 percent of all deaths each year in some developing countries, diarrheal diseases are not considered a significant cause of mortality in the U.S.

While gastroenteritis symptoms can be a "side effect" of many infections, they are the predominant symptoms caused by a number of agents, both bacterial and viral. Viral gastroenteritis affects people of all ages throughout the world, occurring both in epidemic and endemic forms. The most common viral culprits include rotavirus, calicivirus, adenovirus and astrovirus. Although other viruses occasionally have been implicated in gastroenteritis, further studies are necessary to determine the extent of their involvement and their classification. All the gastroenteritis viruses have been discovered relatively recently-since 1972-with the advent of electron microscopy.

Rotaviruses

Rotaviruses are the most well-known gastroenteritis viruses, as they are the leading cause of diarrheal illness in infants and young children worldwide. More than 90 percent of children have antibody to rotavirus by age three, according to one U.S. study. Although these viruses primarily affect infants and young children, infection and disease in older children and adults also occur and outbreaks among adults have been reported.

There are actually three serogroups of rotaviruses (A, B, and C) which infect humans; each group may represent several strains of the virus. Group A viruses cause significant diarrheal disease in the young worldwide. Group B rotaviruses have been associated with severe diarrhea in adults in China but are infrequent elsewhere. Group C rotaviruses have been detected in feces sporadically, but their clinical significance is unclear.

According to the CDC, rotavirus infections in the U.S. cause an estimated 3.5 million cases of gastroenteritis among children less than five years of age. These infections result in approximately 500,000 clinic or emergency room visits and 50,000 - 70,000 hospitalizations, contributing an estimated $264 million to healthcare costs and $1 billion in total medical and non-medical costs. Although rotavirus infections have a low mortality rate in the U.S., it's estimated that more than 870,000 infants and young children die from rotavirus diarrheal illness each year in developing countries.

In temperate climates, rotavirus infections follow a striking seasonality, with peak activity occurring in the cooler months. In the U.S., the increase in activity begins in the West during fall, then moving eastward. In Wisconsin, activity begins to increase in January, with peak activity occurring during mid-March through mid-May.

Primarily spread by the fecal-oral route, rotavirus infections have an incubation period of one to three days. Symptoms of rotavirus infection commonly consist of watery diarrhea, vomiting, mild dehydration and possibly fever, usually lasting four to six days. Mild or asymptomatic reinfection of adults appears to be common, although severe symptoms have been reported. Viruses are shed in large numbers in the feces of children with diarrhea.

Antibody produced in response to rotavirus infections lessens the severity of subsequent infections, although it may not prevent all symptoms. Subsequent infections also seem to produce cross-reactive antibodies, providing some protection to infection by other strains of rotaviruses.

Treatment of symptomatic infections usually consists of replacement of fluids lost by vomiting and diarrhea. Good handwashing techniques and disinfection of contaminated materials have been the only real prevention methods available. Although a vaccine for rotavirus was licensed in 1998, it was subsequently withdrawn from the market due to safety concerns

Testing for rotaviruses is widely available in the U.S., with most laboratories utilizing commercially available enzyme immunoassay or latex agglutination methodologies.

Adenoviruses

Adenoviruses were first discovered in the early 1950s. Additional serotypes continued to be found

through the 1980s bringing the total number of serotypes to at least 49. Adenoviruses have been recovered from virtually every human organ system and have been associated with a wide variety of illnesses. It is therefore no surprise that they can also cause gastroenteritis. Although many adenovirus serotypes can cause enteric illnesses, adenovirus serotypes 40 and 41, known as the enteric adenoviruses, are consistently associated with gastroenteritis.

Agent	Incubation Period	Duration Of Illness	Symptoms
Rotavirus	1-3 days	4-6 days	Watery diarrhea, vomiting, mild dehydration, possibly fever
Calicivirus	24-48 hours	24-48 hours	Diarrhea, vomiting, nausea
Enteric Adenoviruses	3-10 days	Up to 9 days	Diarrhea, possibly with fever or vomiting

Symptoms of enteric adenovirus infection consist primarily of diarrhea, possibly with mild fever and vomiting; respiratory symptoms have also been reported. Symptoms may last up to nine days. Estimates of adenovirus involvement in pediatric gastroenteritis have ranged from 1.5 percent to 12.0 percent, with asymptomatic infection in approximately 2 percent of those studied.

Viruses are shed in large numbers in the feces of children with diarrhea. Transmission appears to be person-to-person, with an incubation period of 3-10 days. These viruses are less frequently associated with gastroenteritis in adults.

Antibodies produced in response to adenovirus infections are believed to provide long-term protective immunity. Prevention of adenovirus infections depends primarily on good hygiene practices and disinfection of contaminated materials.

Testing for the enteric adenoviruses is available in some laboratories, using commercially available enzyme immunoassays.

Caliciviruses

The caliciviruses include Norwalk virus and other Norwalk-like viruses. Because the viruses in the calicivirus group cannot be cultured, classification and investigation of their relationships have been difficult and is still ongoing. These viruses are recognized as a major cause of epidemic nonbacterial gastroenteritis in families, schools, camps, institutions and cruise ships. These viruses are hardy and resist inactivation by chlorine at levels that will inactivate polioviruses and rotaviruses.

Calicivirus outbreaks most commonly affect school-aged children and adults and are most commonly caused by contaminated shellfish, foods that do not require cooking and water. Secondary or person-to-person transmission of these viruses can also occur.

The most common symptoms of calicivirus infection are diarrhea, vomiting and nausea. About 30 percent of cases also experience headache, fever and abdominal pains. The duration of illness for caliciviruses is usually 24-48 hours and the incubation period is 24-48 hours. Asymptomatic infection with these viruses can also occur.

Antibody studies have shown that Norwalk virus occurs worldwide. In the U.S., studies have demonstrated that antibody is acquired during adolescence, although antibody may be acquired at an earlier age in other parts of the world. About two-thirds of adults in the U.S. have antibody to Norwalk virus. Other studies have demonstrated antibody to other caliciviruses in 65 percent of children by age five.

Immunity to Norwalk virus (which is the most studied virus in this group) is not clearly understood yet. In volunteer studies, antibody produced after infection with Norwalk virus protected from reinfection for 6-14 weeks, but only protected against that specific virus, not related viruses. Long-term immunity studies have produced mixed results.

Because the illness is usually self-limited, treatment usually consists of replacement of fluid loss; severe dehydration occurs rarely. Prevention measures consist of hand washing and disposal or disinfection of contaminated material. Hygienic food processing and measures to increase the purity of drinking water should also decrease outbreaks.

Testing for these viruses is not routinely available in diagnostic laboratories at this time.

TO BE CONTINUED IN THE SPRING 2000 ISSUE

Join us at Health Summit 2000 - June 15-16

Health Summit 2000: Our Promise to Future Generations is scheduled for June 15-16, 2000, at the Monona Terrace Convention Center in Madison and will be addressing many of the emerging issues confronting the public's health. Organizers anticipate attendance in excess of 600 people from varying segments of health care.

Featured presenters include:

- Dr. Henry Foster, President Clinton's Advisor on Teen Pregnancy Reduction and Youth Issues
- Dr. Barry Levy, Past President of the American Public Health Association
- Joe Leean, Secretary, Wisconsin Department of Health and Family Services
- Jim Doyle, Wisconsin's Attorney General
- U.S. Rep. Tammy Baldwin (D-2nd Congressional District)
- Dr. Trevor Hancock, Health futurist and pioneer of Healthy Communities project
- Dr. Ruth Sidel, Professor of Sociology, Hunter College, NY
- Dr. Victor Sidel, Professor of Social Medicine, Montefiore Medical Center, NY
- Carolyn Scott Korge, Award-winning journalist, author and race-walker
- Barry Alvarez, Coach, University of Wisconsin Badger Football

Other prominent speakers will cover topics such as: emergency preparedness, safe food supply, violence-free communities, clean water, mental health, nutrition, new technology, and family issues. There also will be poster presentations, software demonstrations and social events. For more information check the WPHA web-site at www.wpha.org or call 800-545-0635/608-283-5486.

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