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Rift Valley Fever Outbreak --- Kenya, November 2006--January 2007

In mid-December 2006, several unexplained fatalities associated with fever and generalized bleeding were reported to the Kenya Ministry of Health (KMOH) from Garissa District in North Eastern Province (NEP). By December 20, a total of 11 deaths had been reported. Of serum samples collected from the first 19 patients, Rift Valley fever (RVF) virus RNA or immunoglobulin M (IgM) antibodies against RVF virus were found in samples from 10 patients; all serum specimens were negative for yellow fever, Ebola, Crimean-Congo hemorrhagic fever, and dengue viruses. The outbreak was confirmed by isolation of RVF virus from six of the specimens. Humans can be infected with RVF virus from bites of mosquitoes or other arthropod vectors that have fed on animals infected with RVF virus, or through contact with viremic animals, particularly livestock. Reports of livestock deaths and unexplained animal abortions in NEP provided further evidence of an RVF outbreak. On December 20, an investigation was launched by KMOH, the Kenya Field Epidemiology and Laboratory Training Program (FELTP), the Kenya Medical Research Institute (KEMRI), the Walter Reed Project of the U.S. Army Medical Research Unit, CDC-Kenya's Global Disease Detection Center, and other partners, including the World Health Organization (WHO) and Médecins Sans Frontières (MSF). This report describes the findings from that initial investigation and the control measures taken in response to the RVF outbreak, which spread to multiple additional provinces and districts, resulting in 404 cases with 118 deaths as of January 25, 2007.

Teams of investigators conducted patient interviews and reviewed medical records from December 1 forward in major health-care facilities in the districts from which cases were first reported. The teams detected additional cases by meeting with elders, other leaders, and health-care providers in villages where cases had been reported and in adjacent villages. Blood samples from patients with suspected RVF were collected and maintained at 39.2°F (4.0°C). Samples from NEP and surrounding areas were transported to a field laboratory established at Garissa Provincial Hospital by CDC, KEMRI, and KMOH; samples from other areas were sent to KEMRI laboratories in Nairobi and to a laboratory in Malindi that was supported by a team from Health Canada.

A suspected case was defined as acute onset of fever (>99.5°F [>37.5°C]) with headache or muscle and joint pain since December 1 in a person who had no other known cause of acute febrile illness (e.g., malaria). A probable case was defined as acute onset of fever in a person with unexplained bleeding (i.e., in stool, vomit, or sputum or from gums, nose, vagina, skin, or eyes), vision deterioration, or altered consciousness. A confirmed case was defined as a suspected or probable case with laboratory confirmation of the presence in serum of anti-RVF virus IgM by enzyme-linked immunosorbent assay (ELISA) or RVF virus RNA by reverse transcription--polymerase chain reaction (RT-PCR).

The index case was reported in Garissa District in a patient who had symptom onset on November 30, 2006. Retrospective analysis of sera collected during July—November 2006 at Garissa Provincial Hospital revealed no evidence of earlier acute RVF infections. As of January 25, 2007, a total of 404 cases of RVF had been reported in Kenya with 118 deaths, a case-fatality rate of 29%. Of the reported cases, 115 (29%) were laboratory confirmed by anti-RVF virus IgM by ELISA (64 cases, 56%) or RT-PCR (79, 69%), including 28 cases (24%) confirmed by both. Of the remaining 289 cases, 109 were classified as probable.

Of the 230 patients with available demographic information, 140 (61%) were male (Figure 1). Patients ranged in age from 4 to 85 years, with a median age of 27 years (30 years for females and 25 years for males). RVF cases were reported from three districts in NEP (Garissa [175 cases], Ijara [125], and Wajir [26]); five districts in Coast Province (Kilifi [38], Tana River [16], Malindi [eight], Isiolo [eight], and Taita Taveta [one]); two districts in Central Province (Kirinyanga [two] and Maragua [one]); one district in Rift Valley Province (Kajiado [three]); and one from Nairobi Area (Figure 2). The patient from Nairobi had traveled to NEP during the week before illness onset but was hospitalized in Nairobi. Ijara (population 79,932) and Garissa (population 420,918) districts had the highest RVF incidence rates: 156 and 42 per 100,000 population, respectively.

Among the first 97 reported cases from Garissa and Wajir districts with detailed epidemiologic information available, 71 (73%) met the probable case definition; 38 of the 62 patients who provided blood samples tested positive by IgM ELISA, RT-PCR, or both. The most frequently reported symptoms among the 97 patients were fever (100%), headache (90%), bleeding (76%), malaise (70%), muscle pain (62%), back pain (60%), vomiting (56%), and joint pain (51%).

Two thirds of the 66 patients who provided information on potential risk factors reported having an animal that was recently ill. The most frequently reported RVF risk factors during the 2 weeks preceding illness onset were drinking unboiled (raw) milk (72%); living within 100 meters of a swamp (70%); having an ill animal (67%); drinking milk from an ill animal (59%); working as a herdsman (50%); having a dead animal (50%); and slaughtering an animal (42%). Approximately 9% of patients reported contact with another ill human.

The outbreak peaked on December 24, 2006, and the number of daily cases has been declining since December 27, 2006 (Figure 3). A ban on livestock slaughtering in Garissa District went into effect on December 27 and was expanded as RVF was detected in additional districts. Vaccination of animals with live, attenuated RVF vaccine began on January 8, 2007. Prevention messages were developed in three languages (English, Kiswhali, and Somali), and public meetings (known as barazas) were held to spread information rapidly to the community. Messages also were disseminated via radio, a widely used communication medium in NEP. Village elders, chiefs, and religious leaders were consulted throughout Garissa District, leading to a district ban on the slaughter of livestock and closure of the livestock market. Health-care workers were trained to care for persons suspected to be infected with RVF virus.

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Editorial Note:

RVF is an acute, febrile zoonotic disease caused by Rift Valley fever virus, which belongs to the family Bunyaviridae and genus *Phlebovirus*. The virus is primarily a vector-borne zoonotic pathogen. Humans acquire RVF through bites from infected mosquitoes or, more frequently, through exposure to the blood, body fluids, or tissues of animals that have been bitten by infected mosquitoes. Direct exposure to infected animals can occur during slaughter or through veterinary and obstetric procedures. RVF was first described in sheep in the early 20th century, and the virus was first isolated in humans in Kenya in 1930 (*1,2*). In livestock, RVF causes abortion and death. Livestock epizootics can occur after heavy rainfall and flooding that result in hatching of *Aedes* mosquitoes (thought to be the initial vector and inter-epizootic reservoir of RVF) and other vectors that feed on nearby mammals (*3*). Eastern Kenya experienced unusually heavy rainfall during October—December 2006, three times the average for that period during the preceding 8 years and 13 times the rainfall in 2005 (Kenya Meteorological Department, unpublished data, 2007).

Patients with RVF usually have initial signs and symptoms of influenza-like illness; less than 8% of patients subsequently have severe disease, including generalized hemorrhagic syndrome, encephalitis, or retinitis (*2*). The overall human mortality rate from RVF has been estimated at 0.5%—1.0% of those infected, but the rate is much higher among those with severe disease. The largest reported human outbreak occurred in Kenya during 1997—1998, in which an estimated 89,000 persons (based on a systematic serosurvey) were infected and 478 died; this outbreak also was centered in NEP (*3—5*). Previous RVF outbreaks among humans were not reported outside sub-Saharan Africa until 1977—1978, when approximately 18,000 persons became ill with RVF in Egypt, and in 2000, when approximately 800 persons in Saudi Arabia and 1,000 in Yemen had severe illness (*6—8*).

Like the 1997—1998 outbreak, the current outbreak was associated with heavy rainfall, which produced massive flooding in much of Kenya, and particularly in NEP. Climatic forecasting in conjunction with satellite imaging of flooded areas has been suggested as a method for predicting where and when RVF outbreaks might occur, potentially enabling earlier interventions (*9*).

Most of the cases before December 20 occurred in young men who herded livestock, perhaps because herdsmen are the first to identify and slaughter ill animals. Later in the outbreak, the distribution of cases broadened by age and sex. Young women also were overrepresented, perhaps because they handle uncooked animal products at home as they prepare meals for the family. Cases among children aged <5 years and the elderly have been rare, probably because they rarely interact with animals or handle raw animal products.

Most patients reported to KMOH had severe illness with bleeding, which likely accounts for the 29% case-fatality rate. Judging from previous studies, many mild, undetected RVF virus

infections likely occurred during this outbreak (5). Additional cases of severe disease also might have occurred in NEP but were not detected because of the inaccessibility of many areas of the province resulting from flooding. Many areas of NEP, including an entire division of Garissa District, were unreachable by road from early December to mid-January.

Since mid-January, RVF in livestock has been detected in districts surrounding Nairobi, signaling occurrence of the outbreak in new areas. Reports also have been received of livestock and humans with illness consistent with RVF across the border in Somalia, where disease assessment has been hampered by ongoing security concerns. Several international organizations are collaborating to control the spread of the outbreak within Kenya and to other countries. Travelers should take precautions when visiting RVF-affected areas. Generally, the risk for RVF infection among travelers to Kenya is low, unless they visit areas where an outbreak is occurring and are bitten by infected mosquitoes or come in contact with body fluids, uncooked tissue, or aerosols from infected livestock. No preventive RVF medications or licensed vaccines for humans exist. Travelers to affected areas should reduce their risk for infection by protecting themselves from mosquito bites and by avoiding direct contact with livestock. Specific recommendations for U.S. travelers are available at http://www.cdc.gov/travel/other/2006/rift_valley_fever_kenya.htm.

To control the outbreak, KMOH launched several interventions, some of which might have limited the public health impact of the outbreak. A ban on the slaughter of animals (including during Eid-ul-azha, a religious holiday) was imposed in NEP and strictly enforced. The Ministry of Livestock and Fisheries Development initiated a policy of vaccinating apparently unaffected herds of livestock in districts in which human or livestock RVF disease had been confirmed and also in adjacent districts; however, as of January 25, only a small proportion of livestock had been immunized. Other interventions included heightened disease surveillance among humans and animals, community mobilization, animal quarantines and restricted transport of livestock, and an integrated vector-control strategy, including indoor residual spraying and larviciding. RVF wards were established in which appropriate infection-control measures were encouraged.

Timely detection of this outbreak was aided by implementation of Integrated Disease Surveillance and Response* within most of the affected districts. A second factor contributing to timely detection was initiation of RVF laboratory-supported field surveillance of febrile patients at outpatient clinics in Garissa. Ongoing epidemiologic, entomologic, and veterinary studies related to this outbreak continue to 1) identify factors associated with severe forms of RVF illness and poor outcomes; 2) characterize the role of specific species of mosquitoes in transmitting, maintaining, and spreading RVF virus; 3) assess the economic impact of the outbreak; and 4) define the impact of livestock immunization with live, attenuated RVF veterinary vaccine on minimizing the spread of animal and human disease. Taking measures to decrease contact with mosquitoes through use of repellents and bednets and avoiding exposure to blood or tissues of animals that might be infected are important protective measures for preventing RVF. Livestock vaccination also can be an effective means of preventing cases of human RVF if adequate vaccination coverage and herd immunity are achieved.

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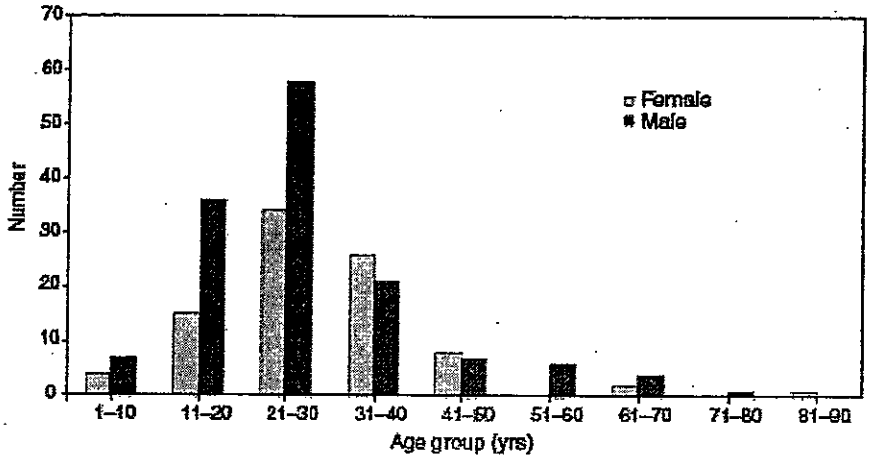
* A strategy of the African Regional Office of WHO that aims to improve availability and use of surveillance and laboratory data to control infectious diseases that are the leading causes of death, disability, and illness in the region.

Figure 1

FIGURE 1. Number of reported Rift Valley fever cases (n = 230), by sex and age group — Kenya, November 2006–January 2007*



*As of January 14, 2007.

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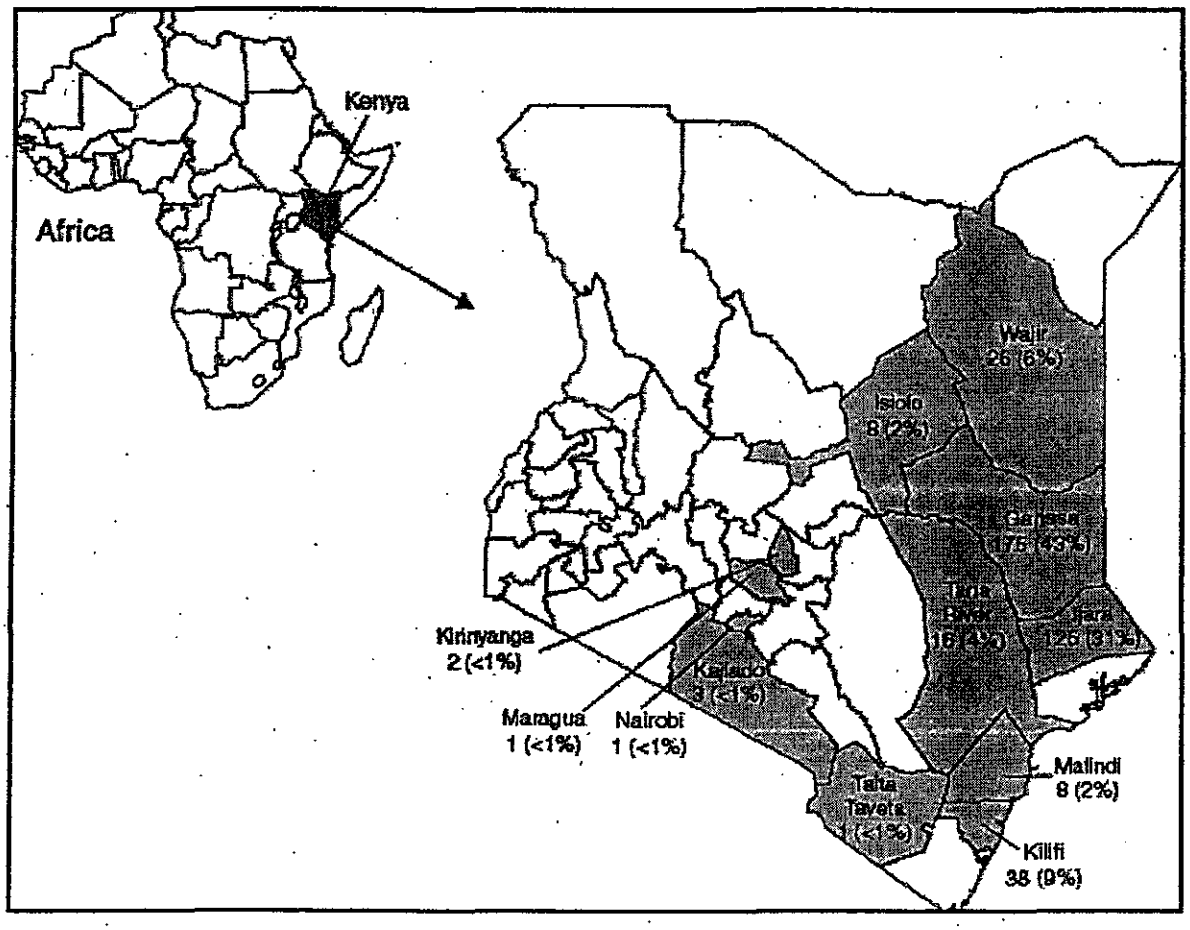
Figure 2

FIGURE 2. Number and percentage of reported Rift Valley fever cases (N = 404), by district — Kenya, November 2006–January 2007*



* As of January 25, 2007.

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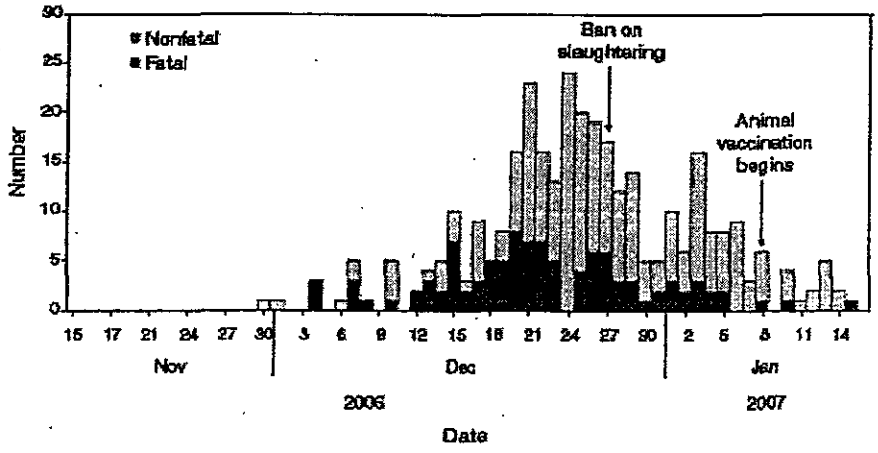
Figure 3

FIGURE 3. Number of reported Rift Valley fever cases (n = 330), by date of illness onset — Kenya November 2006–January 2007*



*As of January 25, 2007, for cases with known date of onset.

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医薬品 研究報告 調査報告書

識別番号・報告回数			報告日	第一報入手日	新医薬品等の区分	機構処理欄
				2006. 12. 26	該当なし	

一般的名称	(製造承認書に記載なし)	研究報告の公表状況	ProMED 20061223-3593, 2006 Dec 23. 情報源:[1]The Yomiuri Shinbun, 2006 Dec 22. [2]Kyodo News, 2006 Dec 21. [3]Japan Times, 2006 Dec 21. [4]China Daily, 2006 Dec 19. [5]The Yomiuri Shinbun, 2006 Dec 23.	公表国
販売名(企業名)	合成血「日赤」(日本赤十字社) 照射合成血「日赤」(日本赤十字社) 合成血-LR「日赤」(日本赤十字社) 照射合成血-LR「日赤」(日本赤十字社)			日本

研究報告の概要

○ノロウイルス最新情報－日本

[1]ノロウイルスによる感染性胃腸炎が増加している。この疾患は従来食中毒とされてきたが、昨年の症例のうち生の貝類摂食に関連したものは15%しかなく、患者の吐瀉物や排泄物から、あるいはウイルスが手を介して食物や食器に付着することで間接的に感染することが多い。予防には手洗いが重要である。寝具やカーペット、床の汚れは雑巾で丁寧に拭き取り洗浄する。洗濯は単独で手洗いし、洗濯機を汚染しないようにする。殺菌には次亜塩素酸ナトリウムと85℃以上で1分以上の加熱が有効である。不十分な場合、乾燥した布からウイルスが大気中に飛び散り、他の人がウイルスを吸入して感染するおそれがある。

[2]今シーズンのノロウイルス流行は主にヒトーヒト感染によるものであり、変異による新たなウイルス株の流行と考えられる。「急激な感染拡大は、多くの人が免疫を持たないウイルスだったためと考えられる」と専門家は話している。2006年11月27日から12月3日までの間に、全国の約3000の医療機関から65,638人の感染患者が報告された。これは1医療機関あたり21.8人で過去最高である。ノロウイルス感染は1981年から統計を実施している。例年、症例数が最高となるのは12月中旬以降である。

[3]海外旅行の際には、ウイルスや細菌による旅行者下痢症、トリインフルエンザ、デング熱やマラリア、HIV、狂犬病などに注意が必要である。旅行者は、現地の感染症や病院の場所、治療を受ける方法を確認し、事前のワクチン接種を検討すべきである。

[4]日本は胃腸炎ウイルスのアウトブレイクに見舞われている。朝日新聞は12月18日、社会福祉施設の入居者4名がノロウイルス感染により死亡したと伝えた。

[5]読売新聞の調査では、ノロウイルスによる感染性胃腸炎のため、17都道府県の小・中・高等学校少なくとも69校が学校・学級閉鎖となった。ノロウイルスは感染性が強く、短期間で感染が広まる。学校は、流行が冬休み中に収まることを期待している。

使用上の注意記載状況・その他参考事項等

合成血「日赤」
照射合成血「日赤」
合成血-LR「日赤」
照射合成血-LR「日赤」

血液を介するウイルス、細菌、原虫等の感染
vCJD等の伝播のリスク

報告企業の意見	今後の対応
ノロウイルスによる感染性胃腸炎が日本で流行しており、大多数は従来考えられていた食中毒ではなく、吐瀉物や排泄物を介したヒトーヒト感染であるとの報告である。	日本赤十字社は、問診で下痢などの体調不良者を献血不可としている。今後も引き続き情報の収集に努める。

Archive Number 20061223.3593
Published Date 23-DEC-2006
Subject PRO/EDR> Norovirus update - Japan

NOROVIRUS UPDATE - JAPAN
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A ProMED-mail post
<http://www.promedmail.org>
ProMED-mail is a program of the
International Society for Infectious Diseases
<http://www.isid.org>

In this update:

[1] Decontamination instructions
[2] Node of transmission
[3] Travel advice
[4] Record high incidence
[5] School closures

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[1]
Date: Fri 22 Dec 2006
From: ProMED-mail <promed@promedmail.org>
Source: The Yomiuri Shimbun, Fri 22 Dec 2006 [edited]
<http://www.yomiuri.co.jp/dy/national/20061222TDY04006.htm>

Infectious [viral] gastroenteritis caused by norovirus is spreading, and in many cases patients were infected indirectly, as they touched other patients' vomit or excretion, or the norovirus was transferred to food or tableware via people's hands. The following advice from experts at the Health, Labor and Welfare Ministry offers possible preventive measures at home and advice on how to clean up vomit from sufferers of the virus.

The disease caused by norovirus is generally known as food poisoning that [may] occur after eating such bivalve shellfish as raw oysters and clams. However, only 15 percent of cases last year were attributed to such [uncooked] shellfish. Many cases in recent years resulted from people failing to wash their hands sufficiently after touching patients' vomit or other excretions containing a large amount of the virus, or failing to thoroughly clean rooms where patients were treated. Experts assume that the surviving virus infected others through food.

The most effective preventative measure is to wash hands carefully. Antiseptic solution, ethanol and soap available in ordinary stores cannot kill noroviruses, but it is thought that washing hands well is a good way to stop the virus from becoming attached to the fingers. It is important to wash hands well with soap before meals, cooking and after going to the toilet.

If you feel nauseous before going to bed, place a container at the bed side should you have to vomit. If the bed linen is stained with vomit, remove it carefully with a cloth, taking care to collect it all. Wash the bed linen by hand, separately from other laundry. Wash carefully and avoid inhaling the spray of the washing machine water.

To [destroy] noroviruses, bleach containing sodium hypochlorite and heating clothes at 85 C or higher for at least a minute are effective. Washing clothes with water or ordinary detergents cannot remove viruses. Bleach should be diluted with water according to the

label. Use carefully, as bleach can cause some types of material to lose color or become damaged.

It is recommended to soak the laundry in boiling water, dry at high temperature, and iron it. As a futon [a type of bed mattress used in Japan] is hard to wash, iron it with a steam iron after drying it well.

Remove vomit on the floor or carpet, with a paper towel or cloth and clean the patch repeatedly with a cloth or mop. After use, the cloth should be cleaned to kill any remaining viruses. If it is insufficiently cleaned, the virus might escape into the atmosphere when the cloth dries and others inhaling the viruses may become infected. Sodium hypochlorite also is contained in kitchen bleach, toilet bleach and mold-remover for bathrooms. But cleaning the floor with cloths containing sodium hypochlorite may damage and change the color of the flooring.

During the New Year's holiday, there will be more opportunities to dine out, so if you choose bivalve shellfish from the menu, make sure they are well cooked. Soaking cooking utensils and tableware in boiling water or cleaning them with kitchen bleach also kills the virus. Shoji Miyakawa, deputy chief of the ministry's Safety Division said, "It's important for each of us to make efforts to eliminate the virus as much as possible to prevent the disease from spreading."

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[2]
Date: Thu 21 Dec 2006
From: ProMED-mail <promed@promedmail.org>
Source: Kyodo News, Thu 21 Dec 2006 [edited]
<http://search.japantimes.co.jp/cgi-bin/nn20061221a7.html>

The record-breaking nationwide outbreak of gastroenteritis caused by norovirus may stem from a mutation of the disease, an expert said Wed 20 Dec 2006. The highly contagious virus has typically been transmitted by eating raw oysters and clams, but this season's epidemic comes mostly from human-to-human infections and can best be explained by a possible outbreak of a new virus strain by, for example, mutation, said Shigeo Matsuno, a senior researcher at the National Institute of Infectious Diseases. "The cause . . . is not eating raw oysters," Matsuno said. "It must be human-to-human infection in most cases. It is natural to think that the infection spread so rapidly because many people have no immunity to the virus."

Oysters and other bivalves often cause norovirus infection because they concentrate the virus after taking it in along with plankton in the water. Apart from [uncooked] bivalve consumption, infection occurs orally when viruses in substances excreted or vomited are somehow transmitted, and in places where people are in close contiguity, such as nursing homes and schools. Oral infection with only a small number of norovirus particles -- less than 100 -- is known to cause gastroenteritis that brings stomach pain, severe diarrhea and vomiting.

Some 3000 medical institutions across Japan reported they treated 65 638 infected patients between 27 Nov and 3 Dec 2006, a record-high average of 21.8 per institution, compared with 19.8 logged in the preceding week, also a record. Norovirus infection statistics have been compiled since 1981. In previous instances, the number of cases reached a peak after mid-December.

With the rapid increase, the institute is concerned that the outbreak of norovirus gastroenteritis may show "the largest-ever spread" and is calling for people to wash their hands with soap as a way to prevent an epidemic. On Monday, Prime Minister Shinzo Abe urged Health, Welfare and Labor Minister Hakuo Yanagisawa to initiate action against the epidemic.

A public junior high school in Kitami, Hokkaido, closed Tuesday following a suspected norovirus outbreak, with 58 of the school's 416 students, and one teacher, suffering symptoms that include vomiting and abdominal pain since Saturday.