In this update:

[1] ECDC: final update
[2], [3] Commentary

[1] ECDC: final update
Date: Wed 27 Jul 2011
Source: European Centre for Disease Prevention and Control (ECDC) [edited]

In the EU/EEA, only 2 non-HUS [hemolytic uremic syndrome] STEC [Shiga toxin producing _Escherichia coli_] cases were reported to have fallen ill within the last 10 days (17 Jul-26 Jul 2011), all in Germany.

These are 2 probable cases, not yet confirmed as STEC O104. The last known date of illness onset in a patient with confirmed STEC O104 was 7 Jul 2011. The last reported date of illness onset among all (probable and confirmed) cases was 17 July 2011.

As of today, 27 Jul 2011, the cumulative number of confirmed STEC cases in the EU/EEA is 941. This includes 264 HUS STEC cases and 677 non-HUS STEC cases. Additionally, there are 518 probable HUS STEC and 2451 probable non-HUS STEC cases, with no confirmation of STEC O104 at present time. In total, in the EU, 46 persons have died of confirmed or probable STEC infection. Of these, 29 were HUS STEC cases and 17 were non-HUS STEC cases. The table below shows the distribution of cumulative probable and confirmed STEC cases per country.

The Robert Koch Institute declared on 26 Jul 2011 the outbreak in Germany as officially over, as the last date of onset for a case with an epidemiological link, was 4 Jul 2011, 3 weeks ago. Since the last update on 26 Jul 2011, Germany has reported 9 non-HUS STEC cases and 1 HUS STEC case.

Cases reported with onset after 4 Jul 2011 are considered by Germany as having no epidemiological link with the initial outbreak or for which no laboratory confirmation is available.

Other Member States have not reported any new cases since the last update.

Total of probable and confirmed cases:
Member States / HUS cases (deaths) / non-HUS cases (deaths)

<table>
<thead>
<tr>
<th>Member States</th>
<th>HUS cases</th>
<th>non-HUS cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>1 (0)</td>
<td>4 (0)</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>0 (0)</td>
<td>1 (0)</td>
</tr>
<tr>
<td>Denmark</td>
<td>10 (0)</td>
<td>16 (0)</td>
</tr>
<tr>
<td>France</td>
<td>9 (0)</td>
<td>4 (0)</td>
</tr>
<tr>
<td>Germany</td>
<td>733 (28)</td>
<td>3 052 (17)</td>
</tr>
<tr>
<td>Greece</td>
<td>0 (0)</td>
<td>1 (0)</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>1 (0)</td>
<td>1 (0)</td>
</tr>
<tr>
<td>Netherlands</td>
<td>4 (0)</td>
<td>7 (0)</td>
</tr>
<tr>
<td>Norway</td>
<td>0 (0)</td>
<td>1 (0)</td>
</tr>
<tr>
<td>Poland</td>
<td>2 (0)</td>
<td>1 (0)</td>
</tr>
<tr>
<td>Spain</td>
<td>1 (0)</td>
<td>1 (0)</td>
</tr>
<tr>
<td>Sweden</td>
<td>18 (1)</td>
<td>35 (0)</td>
</tr>
<tr>
<td>UK</td>
<td>3 (0)</td>
<td>4 (0)</td>
</tr>
<tr>
<td>Total</td>
<td>782 (29)</td>
<td>3128 (17)</td>
</tr>
</tbody>
</table>

= 3910 cases and 46 deaths
These numbers can still change if additional suspected cases are either confirmed or ruled out. We await further information on this quite unusual epidemic caused by a chimeric enterohemorrhagic/enteroaggregative _E. coli_ O104:H4 causing the largest number of deaths in an EHEC [enterohemorrhagic _E. coli_] outbreak and affecting primarily adults rather than children. Besides more epidemiologic and clinical observations, it will be important to see if 2 modalities of therapy, a monoclonal antibody eculizumab directed against a complement component and the use of certain antimicrobials especially imipenem as adjuvant treatment.

As the commentaries below spell out, there is much we have learned so far about this epidemic but substantially more to learn from it. Once more, Mother Nature has shown herself to be the world's best bioterrorist. - Mod.LL

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[2] Commentary
Date: Wed 27 Jul 2011
Source: CIDRAP (Center for Infectious Disease Research & Policy) News [edited]
<http://www.cidrap.umn.edu/cidrap/content/fs/food-disease/news/jul2711coli_(2)-br.html>

Germany's infectious disease institute has declared that the _E. coli_ O104:H4 outbreak is over, now that the incubation period for the most recently confirmed case with links to the sprout seed-related event has passed.

Because of reporting delays, additional cases are still slowly trickling into the ECDC. Health officials are also still sorting out confirmed and probable cases. So far the ECDC has received reports of 3910 infections, including 782 with hemolytic uremic syndrome (HUS), a serious kidney complication. So far 46 deaths have been reported. A few cases, most with links to German travel, were also reported in the United States and Canada.

The ECDC, in an 8 Jul 2011 risk assessment, warned that sporadic cases and new clusters would likely continue to be reported, because some of the contaminated seeds could still be on the market or in people's homes, cross-contamination during food handling could occur, and foodborne transmission could be linked to people with asymptomatic infections.

Craig Hedberg, PhD, a foodborne disease expert at the University of Minnesota School of Public Health, said that though the outbreak might be considered "over," there are still concerns about fenugreek seeds from potentially contaminated lots that have not been accounted for. He said the outbreak has taught some useful lessons and raised some issues that warrant follow-up discussion.

European officials seemed in a rush to publish preliminary data that suggested the outbreak involved an unusually virulent enterohemorrhagic _E. coli_ (EHEC) strain when the full extent of exposure to the implicated food wasn't known, Hedberg said. "If we don't know the size of the denominator, the numerator is just a number."

Omitting sprouts in the original case-control study was an error that German health officials made and that led to the spurious association with cucumbers, lettuce, and tomatoes, Hedberg said. The same mistake has been made in other outbreaks elsewhere, he said, which should be a lesson for future outbreak investigations.

Hedberg said the reason given for omitting sprouts from the 1st case-control study was that fewer than half of the sick patients reported eating them. "This is not acceptable, because sprouts are a known previous vehicle, thus should have been part of any case-control study," he said. "And although they were reportedly eaten by fewer than half of cases, they were eaten by a higher proportion of cases.
than would have been anticipated, based on background rates of sprout consumption in the population.

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[3] Commentary
Date: Thu 4 Aug 2011
Source: Eurosurveillance edition 2011: 16(31) [edited]
<http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19938>

Enterohaemorrhagic _Escherichia coli_ O104:H4: are we prepared now?

[Author: AW Friedrich, Department of Medical Microbiology and Infection Control, University Medical Centre Groningen, University of Groningen, the Netherlands]

It is over. The outbreak of the _E. coli_ O104:H4 infection that had its major focus in Germany (1) and affected people in many other European countries has officially come to an end (2). While the media coverage has been decreasing, the scientific community has been working to understand the reason why this dramatic outbreak occurred.

We have learnt that the pathogen is not a totally new clone, but is a slight variant of a known, although rarely described organism, called HUSEC-41 (3) with an extended-spectrum beta-lactamase (ESBL) resistance. Furthermore, the strain carries genes typically found in 2 types of pathogenic _E. coli_, the enteroaggregative and enterhaemorrhagic pathotypes (4,5). It specifically carries the genes for the classical haemolytic uremic syndrome (HUS)-associated Shiga toxin 2.

Despite the efforts that have been made, major questions currently remain unanswered, such as why women were affected more than men, why the attack rate was so high, what the primary source was and what the reservoir is, how long people are carriers, what the role of secondary transmission is, what the infectious dose is for this outbreak strain, and what the importance of the ESBL resistance is, what the role of secondary transmission is via symptomatic or asymptomatic carriers, directly to other persons or indirectly via an index source, such as food.

It is known that up to 15 percent of EHEC cases can be a result of secondary transmission arising from household contact with people who have sporadic EHEC infections (6). In this issue of Eurosurveillance, 2 articles, Aldabe et al. (7) and Hauri et al. (8) report on secondary transmission during the EHEC O104:H4 outbreak.

The 1st reports on a symptomatic man who transmitted EHEC to his wife and young daughter during the EHEC O104:H4 infection in France (7). Interestingly, the EHEC that was isolated from the mother apparently lost its ESBL resistance, confirming the known mobility of plasmids carrying resistance genes. This fact should be taken into consideration in diagnostic laboratories if ESBL resistance of EHEC O104:H4 is used for primary selection of the pathogen from stools without using also non-selective enrichment and detection of Shiga toxin 2.

The 2nd article (8) illustrates in detail the history of 6 possible household transmissions, 2 possible nosocomial, and 1 possible laboratory transmission in the German State of Hesse, where satellite clusters occurred. These cases throw light on 3 crucial issues. First, secondary transmission of EHEC O104:H4 was shown not to be more frequent than expected. Second, the importance of microbiological serotyping was highlighted, as EHEC of other HUS-associated serogroups (0157, 091, and 0103) were also identified during the outbreak.
Serotyping data are rarely available, due to the need for time-consuming techniques usually only carried out in specialised reference labs. This shows the need for the development of rapid sero- and pathotyping methods for all HUS-associated _E. coli_ strains.

Third, infection control in hospitalized patients with EHEC infection needs specific consideration, as does laboratory safety in the handling of EHEC. It is not without reason that in most countries of the European Union EHEC is classified as a biosafety level (BSL)-3 microorganism (but no high-efficiency particulate air (HEPA) filter is required).

Both articles illustrate the importance of personal hygiene in preventing secondary transmission. In general, EHEC does not behave differently to any other organism transmitted via the fecal-oral route, but our "preventive doors" for such organisms seem to stay wide open. We have become used to the fact that hundreds of thousands of Europeans have diarrhea every year and a certain lack of basic hygiene seems to be acceptable, as usually nothing very severe happens. We often lack time for hand hygiene as we consider it not to be of great importance. However, diarrhea is not a normal state. We forget that most enteropathogens are less infectious than EHEC or do not lead to such severe disease with such social visibility. This brings us to the biggest challenge. Circulating highly pathogenic and/or multiresistant microorganisms can be detected at a very early stage, before large outbreaks of disease occur.

Preventive microbiology is a basis for preventive medical advice and decision-making to protect people from infections. In future, European-wide coordination of preventive microbiology will be crucial for early detection of major health threats caused by infectious diseases. Its success will depend on our international and interdisciplinary efforts to foster protection against infection.

This outbreak is over. Let us get prepared!

References
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[see also:
E. coli O104 - EU (34): update, non-identity of Korean strain
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