

tributed to a decrease in automobile traffic near elementary schools during morning and afternoon rush hours (9). Implementing SR2S programs and removing or alleviating barriers that prevent children from walking to school might foster progress toward achieving the national health objective. Information about programs and resources related to SR2S is available at <http://www.cdc.gov/nccdphp/dnpa/kidswalk/index.htm>, <http://www.walktoschool-usa.org>, <http://www.walkingschoolbus.org>, and <http://www.nhtsa.dot.gov/people/injury/pedbimot/bike/safe-routes-2004>.

#### References

1. US Department of Health and Human Services. Physical activity and health: a report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, CDC; 1996.
2. US Environmental Protection Agency. Travel and environmental implications of school siting. Washington, DC: US Environmental Protection Agency; 2003. Available at [http://www.epa.gov/smartgrowth/pdf/school\\_travel.pdf](http://www.epa.gov/smartgrowth/pdf/school_travel.pdf).
3. US Department of Transportation, Federal Highway Administration. Summary of travel trends: 2001 National Household Transportation Survey. Washington, DC: US Department of Transportation; 2004. Available at <http://nhts.ornl.gov/2001/pub/STT.pdf>.
4. US Department of Health and Human Services. Healthy people 2010: understanding and improving health. 2nd ed. Washington, DC: US Department of Health and Human Services; 2000. Available at <http://www.health.gov/healthypeople>.
5. US Department of Transportation, Federal Highway Administration. 1969 National Personal Transportation Survey: travel to school. Washington, DC: US Department of Transportation; 1972. Available at <http://www.fhwa.dot.gov/ohim/1969/q.pdf>.
6. CDC. Barriers to children walking and biking to school—United States, 1999. *MMWR* 2002;51:701–4.
7. US Department of Education, National Center for Education Statistics. Digest of education statistics, 2003. Washington, DC: US Department of Education; 2004. Available at <http://nces.ed.gov/programs/digest/d03/index.asp>.
8. Staunton CE, Hubsmith D, Kallins W. Promoting safe walking and biking to school: the Marin County success story. *Am J Public Health* 2003;93:1431–4.
9. IWALK Steering Committee. Tempe transit/pedestrian program. Chapel Hill, NC: Pedestrian and Bicycle Information Center, University of North Carolina. Available at [http://www.iwalktoschool.org/award\\_app\\_template.cfm?ID=121](http://www.iwalktoschool.org/award_app_template.cfm?ID=121).

## Outbreak of Pruritic Rashes Associated with Mites — Kansas, 2004

In late August 2004, the Kansas Department of Health and Environment (KDHE) received reports from the Crawford County Health Department (CCHD) of approximately 300 residents of Pittsburg, Kansas (2000 population: 19,243), seeking care for a pruritic rash of unknown etiology. In early September, three neighboring counties in Kansas and two neighboring states (Missouri and Nebraska) also reported such

cases. These events prompted KDHE to request assistance from CDC. Additional cases subsequently were reported in Oklahoma and Texas. This report describes the investigation in Crawford County, Kansas, by public health agencies and entomologists to identify the etiology of the pruritic rash and to assess the extent of the outbreak. A microscopic itch mite (*Pyemotes herfsi*) was identified as the likely cause of the outbreak, which affected an estimated 54% of the Crawford County population (2000 population: 38,242). Entomologists confirmed the return of *P. herfsi* in Kansas in August 2005 and have recommended prevention measures, such as use of DEET-containing products, to help minimize exposure for persons outdoors.

Through initial reports, KDHE characterized the rash as closely resembling an insect bite (i.e., pruritic, erythematous, and papular), but few persons reported seeing or feeling a bite. The rash, often with multiple papules, occurred primarily on the limbs, face, and neck. The rash typically resolved after a few days through use of topical steroids. Initial reports did not clearly associate rash with age, sex, or occupation among affected persons.

Entomologists from Kansas State University (KSU), Pittsburg State University (PSU), and the University of Nebraska—Lincoln, hypothesized that mites from the *Pyemotes* genus probably caused the insect bites. They based their hypothesis on the similar distribution of rash among persons with reported bites and observations of an infestation of a species of *Pyemotes* mites in leaf galls\* in pin oak trees in the area. KDHE, CCHD, and CDC conducted a community-based survey to assess the extent of the outbreak in Crawford County and to characterize the nature of the rash. Environmental samples were collected to help characterize the mite and to examine the extent of the mite population in Crawford County.

After initial investigation of case reports and consultation with a dermatologist, a case was defined as a rash or three or more pruritic, erythematous, and papular lesions or rash that occurred during August 1–September 23, 2004, in a Crawford County resident. Investigators developed an instrument to gather individual demographic, rash, and environmental exposure data.

Investigators used a modified cluster-sampling method to estimate the extent of pruritic rash among Crawford County residents (1). They created a random sample of 30 clusters by using data from the 2000 U.S. Census. The clusters were assigned with a probability proportionate to the size of the population; every person in the population had the same probability for selection. Within each cluster, seven households were randomly selected for interview. Investigators recorded

\* Irregular plant growths caused by reactions between plant hormones and growth-regulating chemicals produced by some insects or mites.

the age, sex, and case status of all persons in each selected household and then systematically selected one person in each household for interview. If one household member had a rash or lesion consistent with the case definition, that person was interviewed. If more than one person had a rash or lesion consistent with the case definition, investigators used the randomly generated list of numbers to select an interviewee from among them. If no one in the household had a rash consistent with the case definition, one person was selected randomly.

Each survey team had at least one member who was a health-care provider and who completed the checklist of clinical signs for persons who had rash or lesions at the time of interview. In addition, investigators collected a minimum of two pin oak leaves with galls during the community-based survey at each surveyed home that had at least one pin oak tree on its lot.

Of 187 respondents selected for interview, 108 (58%) had a rash consistent with the case definition. The mean age of all case respondents was 39.0 years (range: 2.0–80.0 years; median: 37.0 years). Sixty-four (59%) were female, and most classified themselves as white (103 [95%]) and non-Hispanic (104 [97%]). The mean age of the 79 (42%) persons interviewed whose condition was not consistent with the case definition was 54.0 years (range: 2.0–93.0 years; median: 59.0 years).

Three (3%) respondents whose condition was consistent with the case definition recalled having similar rash or lesions before August 1, 2004; more than 70% recalled rash onsets after August 20 (Figure 1), when students began to return to PSU for the fall semester and residents in the county began attending PSU functions, such as football games.

Forty-eight (48%) and 37 (37%) of the 100 case respondents who answered the question regarding location of rash

reported rash on the neck and arms, respectively. Other commonly affected areas included the shoulders and upper torso. Of the 65 (60%) respondents without active rash or lesions at time of interview and who reported rash duration, 38 (62%) reported that the rash resolved within 1–7 days. Fewer than 20% of persons with rash reported accompanying symptoms, including fever, runny nose, and wheeze.

A total of 103 (95%) case respondents reported spending time outdoors 24 hours before onset of rash or lesions; 12 (12%) of them used a DEET-containing product. Six (6%) case respondents recalled an insect bite within 24 hours before the appearance of the rash or lesion. Respondents consistently described the rash as extremely itchy. Forty-four (42%) of the 106 case respondents who reported scratching their rash indicated that scratching did not alleviate the itch, and 44 (42%) reported that scratching the rash caused pain. Seventy-six of the 105 (72%) case respondents who provided an answer to treatment of rash reported using an over-the-counter (OTC) or prescription medication to alleviate the itch; topical steroids were used most frequently.

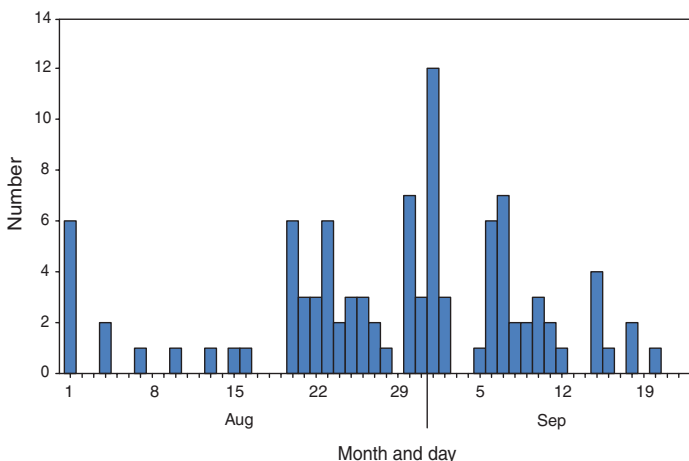
Health-care providers evaluated 40 (37%) case respondents who had rash at the time of interview. Approximately 77% of rashes were erythematous, well demarcated, and papular; less than 22% were pustular, macular, or confluent.

Household-specific data also were collected from 29 of the 30 clusters that had households available for interview. In 28 of the remaining 29 clusters, at least one household had a resident whose rash was consistent with the case definition. Most of the households with at least one case were located in or near Pittsburg or Girard, two urban areas in Crawford County. In 70 (37%) of the 187 households, all residents reported no rash or had a rash that was not consistent with the case definition. Lots of 90 (48%) of the 187 households had at least one pin oak tree with leaf galls.

The 187 households surveyed had a total of 504 residents. Information about case status was missing for nine (2%) of the household residents. Mean age of the household residents ( $n = 499$ ) was 37.4 years (range: 0.6–101.0 years; median: 33.0 years). Residents with rashes typically were younger (mean age: 33.1 years; range: 0.6–82.0 years; median: 27.5 years) than residents without rashes (mean age: 43.6 years; range: 0.8–101.0 years; median: 43.0 years).

Data on household residents were used to calculate the prevalence of pruritic rash in Crawford County through a weighted analysis (2). Approximately 54% of the county population was affected by pruritic rash. Investigators hypothesized that environmental risk factors for having rash, including residence in an urban area or presence of a pin oak tree, varied by age. The regression model revealed a statistical interaction between

**FIGURE 1. Number of rash cases, by onset date — Crawford County, Kansas, August 1–September 23, 2004**



risk factors and age. For ease of analysis, age was stratified by the median age of 33 years. For residents aged  $\leq 33$  years, the odds of having rash were 4.9 times greater for an affected resident of an urban area compared with those aged  $\leq 33$  years who did not reside in urban areas, and 3.9 times greater for residents who had at least one pin oak tree on their lot compared with those aged  $\leq 33$  years who did not report having a pin oak on their lot. Conversely, among residents aged  $> 33$  years, no statistically significant association was found (Table).

Of the 20 clusters identified with pin oak leaf galls, 17 clusters had leaf galls infested with a *Pyemotes* spp. itch mite. Fifty-nine percent of galls analyzed were infested with a *Pyemotes* spp. itch mite, indicating that the density and population of mites present for dispersal were high. Entomologists later characterized the species of itch mite as *P. herfsi*.

**Reported by:** G Hansen, DVM, C Taylor, PhD, Kansas Dept of Health and Environment; J Goedeke, ARNP, Crawford County Health Dept; A Broce, PhD, Kansas State Univ. L Lewis, MD, L Backer, PhD, E Azziz-Baumgartner, MD, C Rubin, DVM, Div of Environmental Hazards and Health Effects, National Center for Environmental Health; F Yip, PhD, EIS Officer, CDC.

**Editorial Note:** The species of mite (*P. herfsi*) that likely was associated with the pruritic rash (Figure 2) in Crawford County is not native to the United States, and the Kansas outbreak might be the first recorded domestic outbreak involving this mite. *P. herfsi*, a European species of itch mite that preys on gall-making midge larvae on oak leaves, was first documented in Europe in 1936. The characteristics of the rash described by clinicians and affected persons in Kansas support the findings of an itch mite because these bites produce a rash-like dermatitis consistent with the outbreak. Participants also consistently reported multiple pruritic bites without recalling being bitten, supporting the source of bites as other than mosquitoes or chiggers. Humans typically feel itch from mite bites 10–16 hours after contact (A Broce, PhD, KSU, personal communication, 2005).

Historically, cooler temperatures and moist conditions have led to increased mite populations. Similar trends have been observed in previous occurrences involving itch mites, and

**FIGURE 2.** Pruritic rash caused by the microscopic itch mite *Pyemotes herfsi*



Photo/A Broce, L Zurek, Kansas State University

researchers attributed a larger mite population and increased reports of pruritic bites among persons who handled straw to mild winter weather and cooler summer temperatures (3). Similar trends in temperature conditions in 2004 probably promoted the oak gall infestation with itch mites in Crawford County. Entomologists hypothesized that larvae of midges, or small nonbiting flies, were responsible for the leaf galls on pin oaks, and midges often served as prey for the mites. The increased exposure among persons in predominantly urban areas probably resulted from the frequent use of pin oak trees in landscaping, especially on the PSU campus. Similarly, an increased risk for rash among persons aged  $\leq 33$  years, especially if they resided in an urban area or had a pin oak on their lot, might have derived from their activities outdoors and type of clothing worn outside.

In the spring of 2005, entomologists at KSU and the University of Nebraska–Lincoln, observed colonies of midges on the leaves again in high proportions in areas in Kansas and Nebraska (4). After itch mites feed on the midge larvae inside the galls, an estimated 16,000 mites can emerge from the galls from one leaf and, when carried by the wind or falling from trees, can provide a ubiquitous source of exposure to persons nearby. According to KDHE and entomologists, reports of rash occurred again in Kansas in the late summer of 2005, and *P. herfsi* has been identified in leaf samples collected from Lincoln, Nebraska, and Pittsburg, Kansas.

In 2004, KSU and CCHD issued several press releases with recommendations to minimize exposure to the itch mites. Suggested prevention measures included using a DEET-

**TABLE.** Environmental risk factors for rash, by age group — Crawford County, Kansas, 2004

Age group (yrs)/Risk factor	OR*	(95% CI†)
<b><math>\leq 33</math></b>		
Reside in an urban area	4.9	(2.6–9.2)
$\geq 1$ pin oak with galls on lot	3.9	(2.0–7.5)
<b><math>&gt; 33</math></b>		
Reside in an urban area	1.6	(1.0–2.7)
$\geq 1$ pin oak with galls on lot	1.3	(0.8–2.1)

\* Odds ratio.

† Confidence interval.

containing product before going outdoors, because DEET is known to repel some mite species (5). Anecdotal reports from the Kansas outbreak, however, suggest that DEET might not provide complete protection against *P. herfsi*. Other recommendations include wearing light-colored and tightly woven clothing and immediately washing clothes and showering with soap and water after spending time in wooded or grassy areas. Persons working in the garden or yard should handle clippings and fallen leaves with gloves. Residents in areas where pin oaks predominate should keep windows closed. Similar precautions were recommended for the summer and fall of 2005. Treating the rash with calamine lotion, an oral antihistamine, or an OTC hydrocortisone product can help reduce the itching. Spraying the trees with insecticide is not recommended because the mites remain protected inside the leaf galls.

### References

1. Hoshaw-Woodard S. Description and comparison of the methods of cluster sampling and lot quality assurance sampling to assess immunization coverage. Geneva, Switzerland: World Health Organization; 2001.
2. Brogan D, Flagg D, Deming M, Waldman R. Increasing the accuracy of the Expanded Programme on Immunization's cluster survey design. *Ann Epidemiol* 1994;4:302–11.
3. Booth BH, Jones RW. Epidemiological and clinical study of grain itch. *JAMA* 1952;150:575–9.
4. Peter M. Beware of oak leaf gall mites; they may be coming back. K-State Research and Extension News; May 6, 2005. Available at [http://www.oznet.ksu.edu/news/sty/2005/oakleaf\\_gallmites050605.htm](http://www.oznet.ksu.edu/news/sty/2005/oakleaf_gallmites050605.htm).
5. World Health Organization, Division of Control of Tropical Diseases. Vector control—methods for use by individuals and communities. Geneva, Switzerland: World Health Organization; 1997. Available at [http://www.who.int/docstore/water\\_sanitation\\_health/vectcontrol/ch27.htm#mites](http://www.who.int/docstore/water_sanitation_health/vectcontrol/ch27.htm#mites).

## Use of Dietary Supplements Containing Folic Acid Among Women of Childbearing Age — United States, 2005

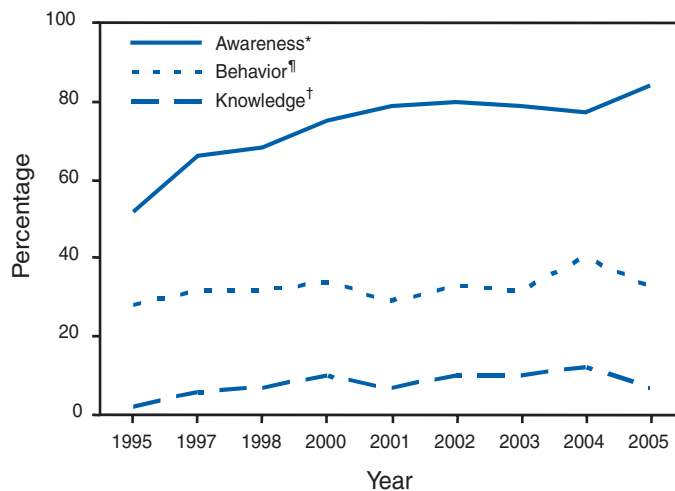
Neural tube defects (NTDs) are serious birth defects of the spine (spina bifida) and brain (anencephaly), affecting approximately 3,000 pregnancies each year in the United States (1). Daily periconceptional consumption of 400  $\mu\text{g}$  of folic acid, as recommended by the Public Health Service (PHS) since 1992, reduces the occurrence of NTDs by 50%–70% (2). The Food and Drug Administration ordered mandatory fortification with folic acid of U.S. cereal grain products, beginning in 1998. However, despite a 26% reduction in NTDs, not all women of childbearing age receive adequate levels of folic acid from their diets (1). Therefore, increasing the number of women who take dietary supplements containing 400  $\mu\text{g}$  of folic acid daily remains an important component of NTD

prevention (3). This report summarizes results from the 2005 March of Dimes Gallup survey, which determined a decrease in the proportion of childbearing-aged women who reported taking folic acid in dietary supplements daily,\* from 40% in 2004 to 33% in 2005, returning to a level consistent with that reported during 1995–2003 (Figure). These results emphasize the need for innovative programs to increase folic acid consumption to further reduce NTDs.

The Gallup survey has been conducted since 1995 using a random-digit-dialed telephone interview of a proportionate stratified sample. Response rate for the 2005 survey was 32%, with 2,647 women aged 18–45 years responding; response rates for previous surveys ranged from 24% to 52%. Statistical estimates were weighted to reflect the total population of women aged 18–45 years in the contiguous United States who resided in households with telephones. The margin of error for estimates based on the total sample was  $\pm 2\%$ . To assess awareness of folic acid, respondents were asked, “Have you

\* Women who reported taking a multivitamin, prenatal vitamin, or a folic-acid-only supplement in response to the question “What type of vitamin or mineral supplements do you take?” were coded as taking a vitamin containing folic acid (consistent with all previous surveys).

**FIGURE. Percentage of women aware of\* or knowledgeable about† folic acid and percentage using vitamins containing folic acid daily, by year — United States, 1995–2005§**



\* Includes women who responded yes to the question, “Have you ever heard, read, or seen anything about folic acid?”

† Includes women who said they knew that folic acid should be taken before pregnancy, in response to the question, “What have you heard, read, or seen about folic acid?”

§ Estimates weighted to reflect the total population of women aged 18–45 years.

¶ Women who reported taking a multivitamin, prenatal vitamin, or a folic-acid-only supplement in response to the question “What type of vitamin or mineral supplements do you take?” were coded as taking a vitamin containing folic acid (consistent with all previous surveys).