

Three Mysterious Diseases

Characters

Public Health Official

Farmer

Homemaker

Family Doctor

Segment 1: The Assignment

Public health office

PUBLIC HEALTH OFFICIAL: I am swamped with mysterious disease cases. Anytime a cluster of people with an unidentifiable disease shows up in an area hospital, I get the call. It's my job to follow up, identify the disease, and marshal resources to prevent a possible epidemic. I mobilize my staff and send them out to interview the patients, their families, and their co-workers, check out the area where the disease first appeared, and so on. I get copies of the lab tests and find out what treatments have been tried and whether they worked. This information is plugged into the national database, which can sort through the information and find parallel cases—which might tell me what the disease is, where it's coming from, why it's happening, and what we can do about it. If I work fast enough, we can nip a problem in the bud, before it becomes an epidemic. Here are three strange cases. Can you sort through the information and figure out what is going on?

Segment 2: Mystery Disease 1

Front porch of farmhouse

FARMER: Bill and I, we've had a lot of years together. But that's what a brother's for, I guess, to share the years, long and short, good and bad. We had rain all last winter, a perfect spring, and one of our best wheat crops yet. Yeah, a good, long year. Once the harvesting was done, Bill was so happy he got it into his head that the barn needed a whole new roof. He was in a workin' mood I guess, and that roof was going bad. We went at it hard. Bill never stopped. He was workin' four, five hours past when I'd go home to the wife and kids. When we got done, Bill went to bed with chills and a fever. Overwork I figured. Then he had trouble breathing, so we took him right to the hospital. Two days later, he was dead. And he was only 46 years old.

Segment 3: Mystery Disease 2

Kitchen of suburban home

HOMEMAKER: I love my home. I see deer and pheasant out the window . . . It makes me feel like I live in the woods. Two centuries ago, this was all woods, then it was mostly cleared for farming. Then, about 10 years ago, I think, they turned this whole area into a housing development. Fortunately, they left a lot of the woods, and a lot of the farmland has started returning to forest again. Everybody loved it here until our kids started having problems. My son Michael started complaining that his knees hurt. I thought it was just growing pains, but it didn't get better so we took him to the doctor. After extensive testing, they finally said

it was rheumatoid arthritis. But then I found out other children, like Mary Martinez and Zack Jones, were diagnosed with the same thing. The pediatricians told us juvenile arthritis is not contagious—but three kids in the same area suddenly getting the exact same thing? Can that just be coincidence?

Segment 4: Mystery Disease 3

Doctor's office in hospital

FAMILY DOCTOR: Jennifer went to Sierra Leone as a medical volunteer. The hospital she was working in over there was dealing with some strange epidemic, so they put her right to work. The patients she was working with were very sick. But they just airlifted her back to the States because she is desperately ill now, too. She arrived here in the hospital last night in terrible pain with a raging fever. Her throat is so raw she can't swallow, so we're administering nourishment and medications intravenously. I think she may be bleeding internally. Her parents are in the waiting room hoping I've got some answers.

Documents from Physician's Investigation File

Physician's Notes and Database Searches

10-17

Assisted in treatment of farmer with acute respiratory distress syndrome (ARD) last week - he died 2 days ago. We were unable to determine the cause, so death was listed as due to "ARDS of unknown cause." The case was particularly disturbing because the man was relatively young (46 yrs.) & had been in good health prior to this illness. Yesterday, I talked with a colleague in New Mexico who mentioned a similar case involving a teen-ager; he died at her hospital last August. I became concerned that we might be witnessing beginning of an epidemic & took the following actions:

- Initiated computer search of diseases with ARDS-type symptoms common in southwest U.S.
- Initiated computer search of chemicals that cause ARDS-type symptom
- Called records offices in hospitals in New Mexico, Arizona, & Colorado to get info. on all deaths in those hospitals attributed to ARDS of unknown cause in last 6-month period

* 10-23

10-27

Results of these actions collected in this file

Received specimens from the 5 victims
& sent them by courier to the national
lab for analysis

Call Mary -
520-879-4592
No. AZ - Record

10-18

Began calling hospitals in NM, AZ & CO - requested info. on deaths due to "ARDS of unknown cause"

Results -

<u>Victim</u>	<u>Symptoms</u>	<u>Died</u>	<u>Hospital</u>	<u>Notes</u>
Male, 46 yrs. (talked to Sue)	fever, respiratory distress	10-15	Western CO Health Center	(case classified work) farmer; re-roofed barn just prior to illness
Male, 17 yrs. (talked to Sue)	fever, respiratory failure	8-26	Gallup Memorial Hospital	(Sue's case) track star; spent 3 days backpacking prior to symptoms
Male, 19 yrs. (talked to Brett in Records office)	fever, headache, resp. distress	4-30	Central NM Med. Center	long-distance runner; lived in trailer in rural area
Female, 22 yrs. (talked to Dr. Simons, attending physician)	fever, cough, resp. failure	5-6	Indian Health Service Clinic	lived in trailer in rural area
Female, 39 yrs. (talked to Mary in Records)	fever, headache, resp. distress	5-14	Northern AZ Health Center	prior to symptoms, victim spent several days cleaning out garden shed

* These were brother & sister; sister had returned to college after visit home & prior to symptoms appearing

SEARCH**acute respiratory
distress syndrome (ARDS)****SCREEN****Southwest United States****4 matches
results printed below****Begin Search****Bacterial Pneumonia**

Incidence	throughout the world; in temperate zones, highest incidence in winter and spring; often accompanies epidemics of influenza
Infectious Agent	90% of U.S. cases due to 1 of more than 80 strains of <i>Streptococcus pneumoniae</i> ; other bacteria that cause pneumonia include <i>Hemophilus influenzae</i> (usually in children), <i>Klebsiella pneumoniae</i> (typically among alcoholics, diabetics, or those with cardiopulmonary disease), <i>Pseudomonas aeruginosa</i> (typically among those with cystic fibrosis)
Symptoms	sudden onset of chills, fever, cough, chest pain
Diagnosis	isolation of bacteria from blood or lower respiratory tract secretions
Transmission	droplet spread or oral contact
Fatality Rate	20 to 40 percent if untreated; death more common among infants, elderly, and those with other illnesses
Reservoir	humans
Treatment	penicillin G, erythromycin

Influenza

Incidence	annually throughout the world, usually during colder months
Infectious Agent	viral—myxoviruses
Symptoms	sudden onset of fever, muscle aches, sometimes sore throat; slow recovery with overexertion leading to relapse
Diagnosis	molecular methods for direct identification of virus in nasal and throat cells; antibody response to the virus in patient's blood
Transmission	contact with droplets from respiratory secretions of infected individual, followed by transfer to mouth
Fatality Rate	varies depending on viral strain; usually more serious among elderly
Reservoir	humans; possibly other warm-blooded animals
Treatment	treat symptoms

Plague

Incidence	10 to 20 cases per year, usually in the Southwest
Infectious Agent	bacterial— <i>Yersinia pestis</i>
Symptoms	bubonic form: painful, swollen lymph nodes; fever; circulation blocked in toes and fingers; may progress to the pneumonic form pneumonic form: pneumonia, followed by blood poisoning
Diagnosis	microscopic observation of <i>Y. pestis</i> in material taken from affected lymph nodes or sputum
Transmission	bubonic form: bites from infected fleas pneumonic form: progression from bubonic plague or inhalation of droplets from another person with pneumonic plague
Fatality Rate	bubonic form: 50 percent if untreated pneumonic form: near 100 percent if untreated
Reservoir	rodents and their fleas. In Southwest United States, prairie dogs and ground squirrels are permanent reservoirs. Cats and dogs that host infected fleas may also bring plague bacteria in contact with humans
Treatment	streptomycin, tetracycline

Viral Pneumonia

Incidence	throughout the world; in temperate zones, occurs most often during fall and winter
Infectious Agent	a variety of viruses, including adenoviruses and parainfluenza viruses
Symptoms	gradual onset, less pronounced fever than bacterial pneumonia
Diagnosis	identification of viral antigens in respiratory secretions; antibody response to virus in patient's blood
Transmission	droplet spread or oral contact
Fatality Rate	low
Reservoir	humans
Treatment	treat symptoms

Welcome to Chemical Databases

To initiate your search,

1. Select database desired:

Database	Toxic Chemicals	▼
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2. Identify additional characteristics:

Symptoms	Acute respiratory distress syndrome	▼
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3. Click here:

Begin search

2 matches
Results printed below

Phosgene

Reports indicate that symptoms of acute respiratory distress syndrome (ARDS) may occur 24 hours or more after exposure to the chemical.

Use(s)	Used by Germany during World War I
Current status	Banned in the United States

Phosphene

Causes acute respiratory distress syndrome (ARDS) more rapidly than related compound, phosgene.

Use(s)	Used to kill prairie dogs
Current Status	Legal in the United States for prairie dog eradication

Documents from Laboratory Scientist's Investigation File

Results of Laboratory Analyses from National Laboratory

INTEROFFICE

Date: 24 October
To: Lori
From: Yolanda
Subject: Samples

Lori,

Contained in this packet are tissue samples from five patients from the Southwest United States who died of ARDS of unknown cause. Test the samples for the presence of bacteria and viruses that cause diseases with ARDS-type symptoms and are common in the Southwest: bacterial and viral pneumonias, influenza, plague.

Thanks,
Yolanda

MEMORANDUM

DATE: October 25
TO: Y. Johnson
FROM: L. Kauffman
RE: Results of tests on tissue samples from patients who died of ARDS

Yolanda, here are results of the tests on the tissue samples from the five victims of “ARDS—Unknown Cause” that you requested. As directed, I tested samples for the presence of bacteria and viruses that cause diseases with ARDS-type symptoms and are common in the Southwest United States.

Lori

Results of Tissue Samples

Disease	Infectious Agent	Test Result
bacterial pneumonia	<i>Streptococcus pneumoniae</i>	all samples negative
influenza	myxovirus	sample from Victim 4 positive; all other samples negative
plague	<i>Yersinia pestis</i>	all samples negative
viral pneumonia	adenoviruses, parainfluenza, viruses, and others	all samples negative

LAB NOTES - Additional tests requested on samples from patients who died of ARDS of unknown cause

SCIENTIST - R. Kauffman

DATE: 10-27

PURPOSE: Received autopsy samples (blood) from 5 victims of acute respiratory distress syndrome (ARDS) of unknown cause to test against antibodies for viruses we have in stock.

PROCEDURE: ① Placed each victim's blood into 5 test tubes labeled: "Arenaviruses," "Filoviruses," "Hantaviruses," "Myxoviruses," and "Retroviruses." *
 ② Added antibodies against each of viral types above to the appropriate tubes.
 ③ Examined for clumping (indicates reaction of virus in patient's blood with antibodies added).

RESULTS:

Blood from:	Antibodies added: **				
	A	B	C	D	E
Victim 1 male, 46 yrs.					
Victim 2 male, 17 yrs.					
Victim 3 male, 19 yrs.					
Victim 4 female, 22 yrs.					
Victim 5 female, 39 yrs.					

= no reaction; = clumping

** A = arenaviruses
 B = filoviruses
 C = hantaviruses
 D = myxoviruses
 E = retroviruses

* The 5 classes of viruses known to cause the following diseases:

Virus Type	Disease(s)
arenaviruses	Bolivian Argentine hemorrhagic fever; Lassa fever
filoviruses	Ebola; Marburg fever
hantaviruses	hemorrhagic fever with kidney involvement
myxoviruses	influenza
retroviruses	AIDS; adult T-cell leukemia

INTEROFFICE

Date: October 30
To: Mario
From: Yolanda
Subject: Testing specimens from trapped animals

Mario,

Lori found that blood samples from patients from Colorado, Arizona, and New Mexico who died of "ARDS of unknown cause" strongly reacted with antibodies against hantaviruses. Field investigators in those states trapped a variety of animals in the areas where the victims resided; tissue samples from those trapped animals are in this packet. Please test them for the presence of hantaviruses and get the results to me as soon as possible. Thanks!

11-2

Yolanda — Here are the results:

<u>Animal</u>	<u>% with Positive Hantavirus Test</u>
Chipmunks	3%
Deer mice	33%
Prairie dogs	0.5%
Raccoons	0%
Rats	2%
Skunks	1%

Mario

Documents from Field Researcher's Investigation File

Epidemiology Reports and Other Notes

Phone Call	
<p>Southwest Regional Public Health Office</p> <p>For: D. Martinez Date: 10-20 Time: 10:00 a.m.</p> <p>From: Western CO Health Center Phone: 970-555-1212</p> <p>Message: Phone call noting a number of deaths due to acute respiratory distress syndrome (ARDS) of unknown cause in Colorado, Arizona, and New Mexico. Dave wondered whether these deaths might be related and expressed concern about a possible epidemic.</p> <p>Action: Date: 10-20 1. Alerted L. Morton (CO), A. Garcia (AZ), and J. McDonald (NM) to the cases of ARDS of unknown cause in their regions. Requested field surveys of deceased victims' homes and workplaces and interviews with surviving family members and friends about events surrounding the deaths. Asked them to complete investigations as soon as possible and return reports to me. Also asked them to trap animals in area of disease cluster and forward tissue samples to the national laboratory for analysis.</p> <p>2. Contacted weather bureau and wildlife association for information on unusual climate and environmental events in the past year.</p> <p>Results: Results of these actions follow in this file.</p>	<p>Phoned <input checked="" type="checkbox"/></p> <p>Returned your call <input type="checkbox"/></p> <p>Please call <input type="checkbox"/></p> <p>Will call again <input type="checkbox"/></p> <p>Came to see you <input type="checkbox"/></p> <p>Wants to see you <input type="checkbox"/></p>

Interview Transcript**Investigator:** A. Garcia**Victim's Sex and Age:** Female, 39 years**Interview with:** Husband**Date of Interview:** October 28

AG: Thank you for agreeing to talk with me. I know this is very difficult for you, so I'll make this as brief as possible.

Husband: If anything, I can tell you will help prevent this tragedy from happening to anyone else . . .

AG: First, when did your wife first become ill?

Husband: Oh, I guess it was May 9th, 10th . . . Jan said she thought she was getting the flu. She took aspirin and went to bed, but the next day she didn't feel any better. And the day after that . . . well, I knew that it was more than just the flu. She kept coughing and coughing and said she couldn't breathe. She said she'd make a doctor's appointment, but I said, no, we're going to the emergency room now. And they admitted her to the hospital right away, but nothing they did helped. Jan just kept getting worse, and two days after she got to the hospital . . . we lost her.

AG: Was your wife doing anything unusual or out of the ordinary for her the day she got sick?

Husband: No, just the usual stuff. You know, getting the kids off to school, she had a part-time job at the local newspaper in the mornings, then home. She made dinner, kept the house and yard up . . . she took such good care of us . . . I don't know what we'll do without her.

AG: Did she work with any unusual chemicals at her job? Or anything at home?

Husband: No, not at her job—she mostly used the phone, you know, calling clients who advertise in the paper. Not at home either, except your basic cleaning stuff . . . Well, maybe in the garden shed . . . hmmm. I'd have to check. Jan's passion was the garden, you know. And she had been spending lots of time out there last May cleaning it out and getting ready to do some planting. Would that be "unusual activity"?

AG: Maybe. So you don't know what kinds of garden sprays or other chemicals she might have had out there?

Husband: No, we can go look. I haven't had the heart to go into her special place since she passed on . . . I guess I felt kind of guilty because she'd been after me for a couple weeks to get out to the shed and set up some mouse traps. She'd seen several mice while she was working and, even though I told her mice are supposed to be out by the garden, she didn't like them at all. Maybe she went out and got some mouse poison. Do you think that could have made her sick?

A.G. It's possible, but I doubt it. I don't want to take any more of your time. Thank you so much for talking with me; you've given me some really useful information. Maybe we could take a look at the garden shed on my way out?

Epidemiology Report Form E4

Investigation of Victim's Home

Victim's sex and age: Female, 39 yrs.

1. Description of dwelling
Victim lived in suburban, ranch-style home with 3 bedrooms, kitchen, dining room, living room, & 2 bathrooms. Full, finished basement ~~also~~ included a family room, guest room, & half-bath. Screened in porch ^{off} the dining room looked out over yard, which included a garden shed.
2. Condition of dwelling
Home showed evidence of good care, recently painted, beautifully decorated. Victim's family - husband & two children still live in the home. Lawn & gardens well-landscaped. Interior of garden shed equally tidy with garden tools hanging on peg board, seed & soil containers lidded & labeled on wooden work bench or on dirt floor of shed, etc. Mouse poison had been put out beneath work bench.
3. Unusual chemicals or equipment found
Typical household chemicals in the home; the garden shed included, in addition to the mouse poison, fertilizer & insecticide sprays. All were relatively new and capped and stored appropriately.
4. Other comments
none

Date of investigation: 10-28

Signature of investigator: A. Garcia

Interview Transcript**Investigator:** L. Morton**Victim's Sex and Age:** Male, 46 years**Interview with:** Sister-in-law**Date of Interview:** October 21

- LM: Thank you for taking this time to talk with me. I'll try to be brief, but any information you can give me about your brother-in-law's activities before he became ill could help us determine what caused his death and how to prevent more deaths like his from occurring.
- Sister-in-law: Of course . . . my husband just couldn't do this; his brother's death was just so sudden . . .
- LM: I understand. Tell me, when did your brother-in-law first complain of not feeling well?
- Sister-in-law: I remember exactly. Bill was never sick, you see—at least, nothing more than a cold . . . that's part of why this is all so shocking. He and John—that's my husband—had finished the harvest early, on October 8. I was so pleased; it had been such a good year. But I've been married to a farmer long enough to know that their work is never done! Bill and John decided since the weather was still good and they had time before the snows, they'd just go ahead and reroof the old barn. They started right in, putting in long, hard days just like during harvesting. Bill usually had dinner with us since he's not married, and I know he just went back out to work on the barn after dinner, even though I insisted John stay home and spend some time with us. Well, two days after they started on the roof, Bill complained to John that he was exhausted and not feeling well. What else would you expect after all that work! But when I checked on him the next day, he really looked bad, had a fever, and was having trouble breathing. We got him to the hospital that day, and . . . well, you know the rest.
- LM: Did your brother-in-law live with you and your family?
- Sister-in-law: Oh, no. He lived in the little house . . . you see, this is a family farm; the boys inherited it from their folks. My husband grew up in this house and, after we married, we lived in the little house for a while until my in-laws retired and moved to Arizona. By then we'd had our first baby, so we moved in here and Bill moved to the little house.
- LM: I see. Would it be possible for me to see your brother-in-law's home? Maybe something would give me a clue about what caused his death.
- Sister-in-law: Oh, of course, we have a key. We've only gone in long enough to get a funeral suit . . . (sob) . . . we haven't been up to going in to pack up Bill's stuff, so everything should be pretty much as it was. Would you like to see the barn they were working on too?
- LM: Yes, that would be helpful. Do you have livestock in the barn?
- Sister-in-law: No, it's a hay barn, mostly. A little bit of equipment. We used to have a cat out there—really helps with the rodent population!—but the poor old thing died last spring and we haven't gotten another one yet.
- LM: Thank you for your time. We'll just take a look at the barn and your brother-in-law's home and then I'll be out of your way.

Epidemiology Report Form E4

Investigation of Victim's Home

Victim's sex and age: Male, 46 years

1. Description of dwelling
Victim lived alone in a small farmhouse 2 miles from his brother + family who live in the larger house on the family farm. The 2-story farmhouse had a kitchen, living room, + 1 bedroom + bath downstairs; upstairs were 2 additional bedrooms. House also had a small root cellar.
2. Condition of dwelling
Neither upstairs room appeared to have been used recently; one was used as a storage room, the other was a study. Living room was tidy, w/ newspapers scattered on ottoman. Kitchen was clean, w/ little food in refrigerator: milk, apples, oranges, + package of cheese. House + rat poisons found in lower cupboards. Bed was unmade, but the bedroom was otherwise neat. Root cellar seemed unused,
3. Unusual chemicals or equipment found
(although mouse + rat poison had also been put out there.
Typical household chemicals found (detergent, cleanser, window cleaner, bleach), in addition to the mouse + rat poison.
4. Other comments
Also examined the barn the victim had re-roofed prior to death — a wood construction originally built about 50 years ago. Used mostly for storing hay, also housed tools + some smaller pieces of farm equipment. Found a dish — apparently used for water for cats.

Date of investigation: 10-21

Signature of investigator: R. Morton

Epidemiology Report Form E4

Investigation of Victim's Home

Victim's sex and age: male, 19 years
(female, 24 years)

1. Description of dwelling
The first victim lived with his mother in a trailer in a rural area, about 3 miles from the nearest town. The second victim, a college student & sister of first victim, visited the home prior to becoming ill. Trailer was small, including a kitchenette, small living/dining area, two bedrooms, and one bathroom.
2. Condition of dwelling
Trailer was somewhat cluttered with victim's clothes and books; dirty dishes were in sink and carton of milk and open loaf of bread were left on table. Mother had moved to her sister's home following her son's death. I presume trailer had been vacant since then. Mouse feces gave evidence of rodent infestation.
3. Unusual chemicals or equipment found
None. Only typical household chemicals were found (dishwashing detergent, floor wax, scouring powder, etc.) No unusual equipment or supplies found. Five mouse traps were found on the premises; one had caught a mouse.
4. Other comments
Victim's mother and aunt refused interviews. Learned from aunt's neighbors that, even prior to moving in, the victim's mother spent most nights at her sister's home in town where she was nearer to her job.

Date of investigation: 10-25

Signature of investigator: J. McDonald

10-21 - Jim at Weather Bureau

Record high snowfalls in mountains of CO & AZ this year - good water levels in reservoirs - led to good harvests

10-25

3:30 Met Sally

10-24 - Talked to Gretchen at Wildlife Assoc.

Noted high piñon nut harvest this year - food source for small mammals

- Gave me name of director of long-term ecological research survey team *Mike Lee 970-893-4582 - Call him *

10-25 - Mike Lee

Said most interesting finding of past yr. was size of deer mule pop. - 10x higher than any previous yr. of records.

Notes from the Physician's Investigation

Physicians are typically the individuals who first encounter and report a mysterious disease. They may collect information on the symptoms exhibited by victims and use that information to suggest possible causes.

Work with your fellow experts to review the investigation documents and complete this form. When your team meets again, you will pool your information to create a final report.

Disease Symptoms

Suspected Cause

Evidence:

Other Notes About the Disease

Notes from the Laboratory Scientist's Investigation

Laboratory scientists isolate and examine bacteria, viruses, or other infectious agents from samples of the victims' tissues and characterize those agents. They also test for antibodies against likely infectious agents in the victims' blood. They may also check possible vectors (nonhuman carriers for antibodies) and conduct tests to see what drugs will kill or limit the growth of the agent.

Work with your fellow experts to review the investigation documents and complete this form. When your team meets again, you will pool your information to create a final report.

Disease Symptoms

Suspected Cause

Evidence:

Suspected Route of Transmission of Infectious Agent

Evidence:

Other Notes About the Disease

Notes from the Field

Researcher's Investigation

Field researchers interview victims or victims' family members and visit victims' homes, workplaces, or other places where they spent time to identify commonalities among victims that may give clues about the disease. They also collect information about unique environmental events that coincided with outbreaks of the disease.

Work with your fellow experts to review the investigation documents and complete this form. When your team meets again, you will pool your information to create a final report.

Disease Symptoms

Suspected Route of Transmission of Infectious Agent

Evidence:

Relevant Environmental Factors

Other Notes About the Disease

Mystery Disease 1 Final Report

Pool the information from all members of your team to complete each item below.

Disease Symptoms

Suspected Cause

Evidence:

Suspected Route of Transmission of Infectious Agent

Evidence:

Relevant Environmental Factors

Recommendations for Prevention of Disease

Classify This Disease As

☐ emerging ☐ re-emerging ☐ endemic

Evidence:

Mystery Disease 2 Final Report

Disease Symptoms

Initial symptoms are fever, fatigue, headache, and swollen lymph nodes, typically following the appearance of a distinctive, expanding, ringlike rash. Within four weeks to a year or more, swelling or pain in the large joints occurs, resulting in chronic arthritis.

Suspected Cause

A spirochete type of bacteria

Evidence: People diagnosed with this disease have antibodies against the spirochete, whereas people without the disease do not.

Suspected Route of Transmission of Infectious Agent

Spirochete bacteria infect humans through bites from infected deer ticks.

Evidence: Many people diagnosed with the disease recall a distinct rash radiating from the site of a tick bite; spirochetes were found in 61 percent of Ixodes dammini ticks (deer ticks), the type of tick suspected of biting victims of the disease.

Relevant Environmental Factors

Most cases occurred among suburban dwellers living in recently established residential areas near woods. Peak incidence of new cases of the disease occurs in summer and early fall; some research studies predict peak years for the disease will be two years following heavy acorn production.

Recommendations for Prevention of Disease

Wear socks, long pants, and long-sleeved shirts in wooded areas and check carefully for ticks after leaving the woods; if rash described above appears, see a physician for diagnosis and antibiotic treatment (if diagnosis is positive).

Classify This Disease As

☒ emerging ☐ re-emerging ☐ endemic

Evidence: The characteristics of the spirochete isolated from deer ticks did not match any known spirochetes.

Mystery Disease 3 Final Report

Disease Symptoms

Persistent fever, headache, fatigue, sore throat, vomiting and diarrhea, chest and abdominal pain; in some cases, bleeding from body orifices occurs.

Suspected Cause

A virus in the arenavirus family

Evidence: Specimens from victims failed to react with antibodies against more than 250 different viruses; one weak reaction was found against antibodies against a virus in the arenavirus family.

Suspected Route of Transmission of Infectious Agent

(1) Through close contact with hospitalized victims of the disease. (2) Through contact with urine and feces of the Mastomys natalensis rat.

Evidence: (1) clusters of disease cases that occurred in hospitals could be traced to an initial, hospitalized victim; (2) the virus found in victims of the disease was found in M. natalensis and no other animals tested.

Relevant Environmental Factors

The main competitor of M. natalensis is the more aggressive rat Rattus rattus. Where R. rattus is eliminated by antirodent control measures such as poisoning, M. natalensis may move into an inhabited area.

Recommendations for Prevention of Disease

Avoid contact with M. natalensis rats and their urine and droppings.

Classify This Disease As

☒ emerging ☐ re-emerging ☐ endemic

Evidence: Tests of antibodies from victims against more than 250 known viruses showed only one weak reaction, indicating the disease was caused by an unknown virus.

Mystery Diseases Summary Table

Mystery Disease	Infectious Agent Transmitted by	Emerging, Re-emerging, or Endemic?	Relevant Environmental Factors
1			
2			
3			

1. An important reason for the emergence of new diseases is . . .

2. This means that, in order to reduce the chances of new epidemics among people, we should . . .