Is This Really an Outbreak?

Introduction to Outbreak Investigation

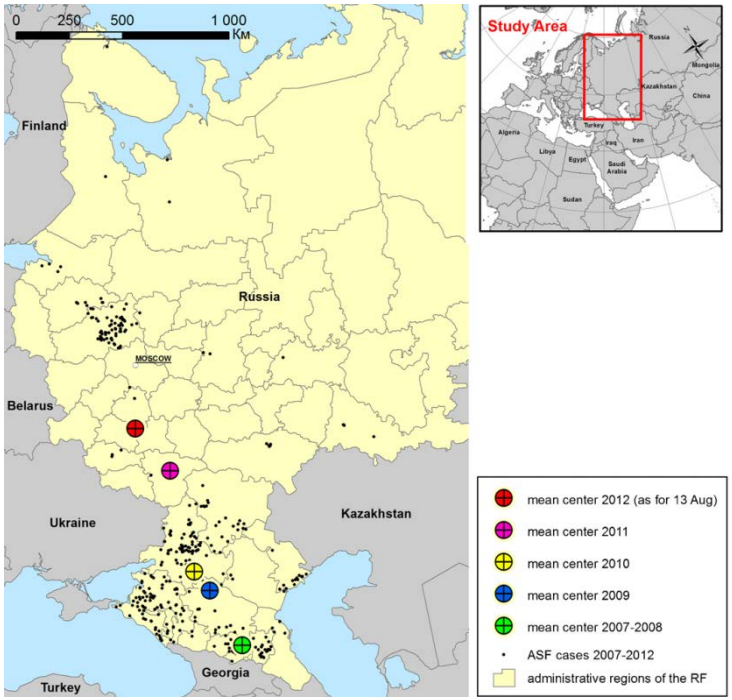
Module 1 – Confirming the Existence of an Outbreak

Learning Objectives

- Understand the difference between outbreak, epidemic and cluster
- Review methods to determine sources of baseline case data
- Understand factors that may be associated with an increase in the number of cases without an outbreak occurring

Definitions

Outbreak – an epidemic limited to a localized increase in the incidence of disease (e.g. a county or other geopolitically determined area)

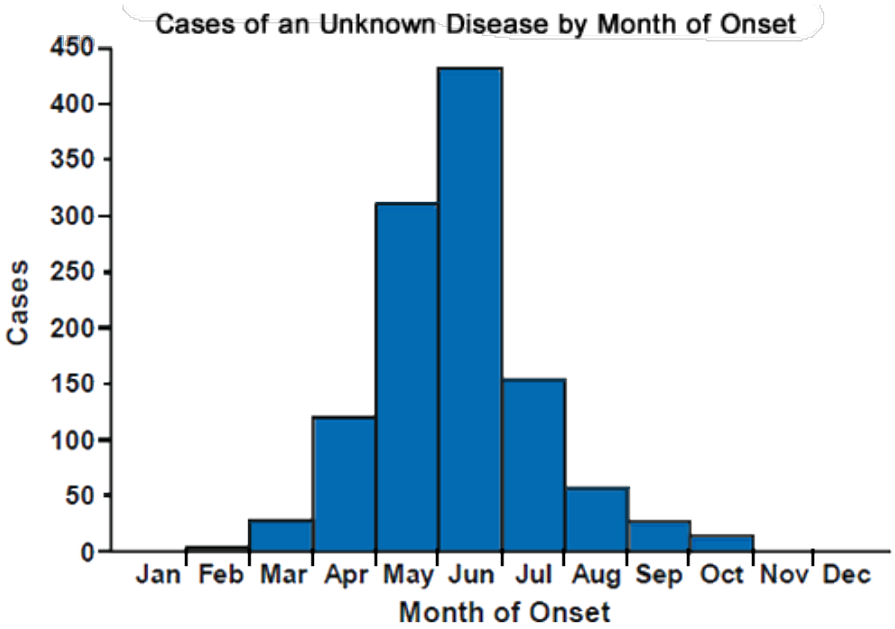


ASF Outbreaks in Russian Federation

From: A dictionary of Epidemiology, 4th edition, ed. John Last, 2001

Definitions

Epidemic – the occurrence in a defined population or a region of cases of disease in excess of normal expectancy



From: A dictionary of Epidemiology, 4th edition, ed. John Last, 2001

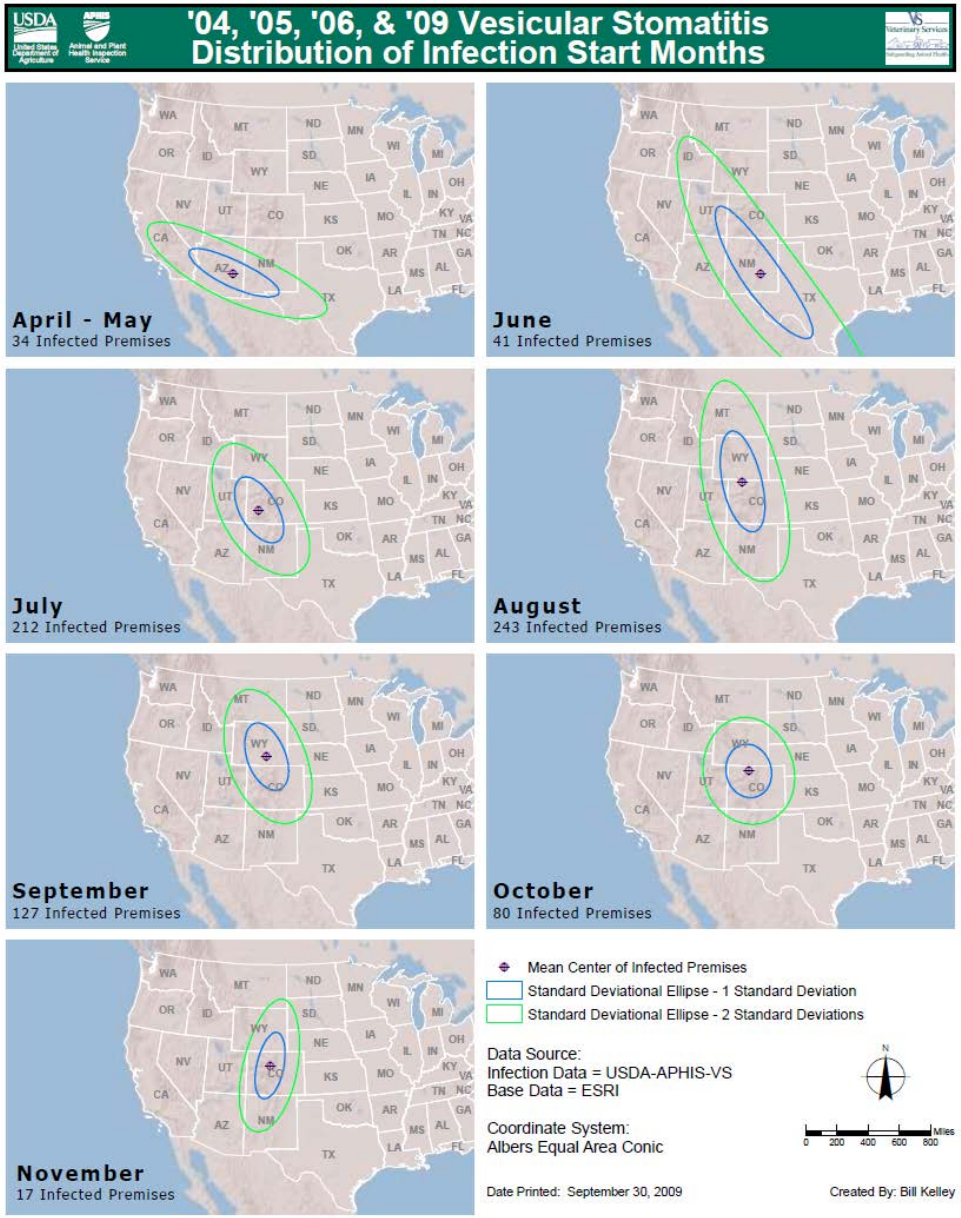
Definitions

Cluster – aggregation of relatively uncommon events or diseases in space or time in amounts believed or perceived to be greater than could be expected by chance

From: A dictionary of Epidemiology, 4th edition, ed. John Last, 2001

In Excess of Normal Expectancy

- What are the expected number of cases of:
  - Vesicular stomatitis in New Mexico?
  - Vesicular stomatitis in New Jersey?
  - Pseudorabies in domestic pigs in the U.S.?
  - Trichomoniasis in Texas?
  - Salmonella braenderup XbaI pattern JBPX01.0767 in humans in the U.S.?



Sources of baseline case data:

Reportable disease lists, FAD databases

While the likelihood of finding a case of Vesicular Stomatitis in New Mexico is much higher than finding a case in New Jersey, a single case of Vesicular Stomatitis is considered an outbreak because it is a foreign animal disease

Sources of baseline case data:

Program disease surveillance data bases

Disposition of cull sow-boar slaughter samples submitted to USDA laboratories for PRV testing in FY 2012.

Sample disposition	Number of samples
Submitted for testing	566,662
Tested, negative	277,808
Tested, non-negative	0
Discarded (not in targeted surveillance population)	278,405
Not tested**	10,449

From: NATIONAL PSEUDORABIES VIRUS SURVEILLANCE SYSTEM ANNUAL SUMMARY REPORT FOR FISCAL YEAR 2012 – October 1, 2011 – September 30, 2012

Sources of baseline case data:

State laboratory or reportable disease databases

Texas Animal Health Commission

Trichomoniasis Test Record

TVMDL Account: **Accession #:**

State	TAHC Area	Herd Owner Last First Initial	Vet Printed Name	Vet Code
County Code		Route-Street-Road	Vet Signature	Specimen Collection Date
Herd Number		Post Office - State - ZIP	Route-Street-Road	Vet Phone
Ranch Name		NAIS	Post Office - State - ZIP	Vet Fax

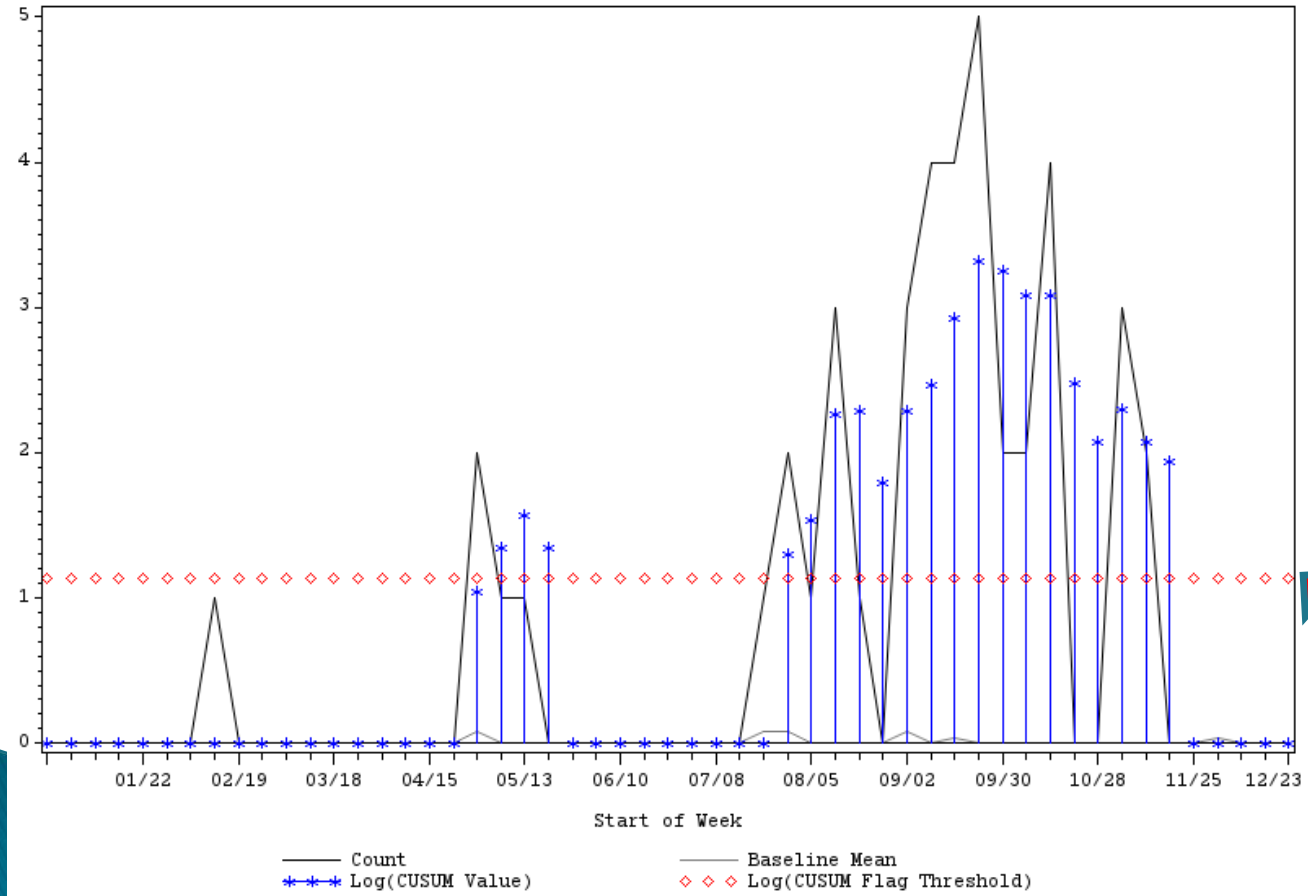
Reason for Test ❑ Initial ❑ ReTest	Complete herd test of all eligible bulls? ❑ Yes ❑ No	Remarks
❑ Diagnostic ❑ Herd Cert/Valid.	Number of bulls in herd:	
❑ Private Sale ❑ Post Move Quar. & Test	Herd Type:	
❑ Other (specify)	❑ Dairy ❑ Other (specify)	
Test Requested: ❑ PCR ❑ Culture	❑ Mixed ❑ Beef	
Clinic Incubation (PCR Only): ❑ None ❑ 24 ❑ 48	Pouch Expiration Date:	

NO.	RE-TAG?	OFFICIAL IDENTIFICATION NUMBERS	AGE	BREED	SEX	RESULTS PCR	RESULTS CULTURE	REMARKS & ADDITIONAL INFO

Baseline data of an outbreak strain of Salmonella braenderup

Sources of Baseline Data:

Pulsenet, a national network of public health and food regulatory agency laboratories coordinated by the CDC.



Baseline threshold

Sources of baseline data:

Media reports

Outbreak Confirmed

Define and identify cases

Describe and orient data in space, time and by animal/farm (descriptive epidemiology)

Develop hypotheses

Evaluate hypotheses (analytical epidemiology)

Implement control strategies

Communicate findings

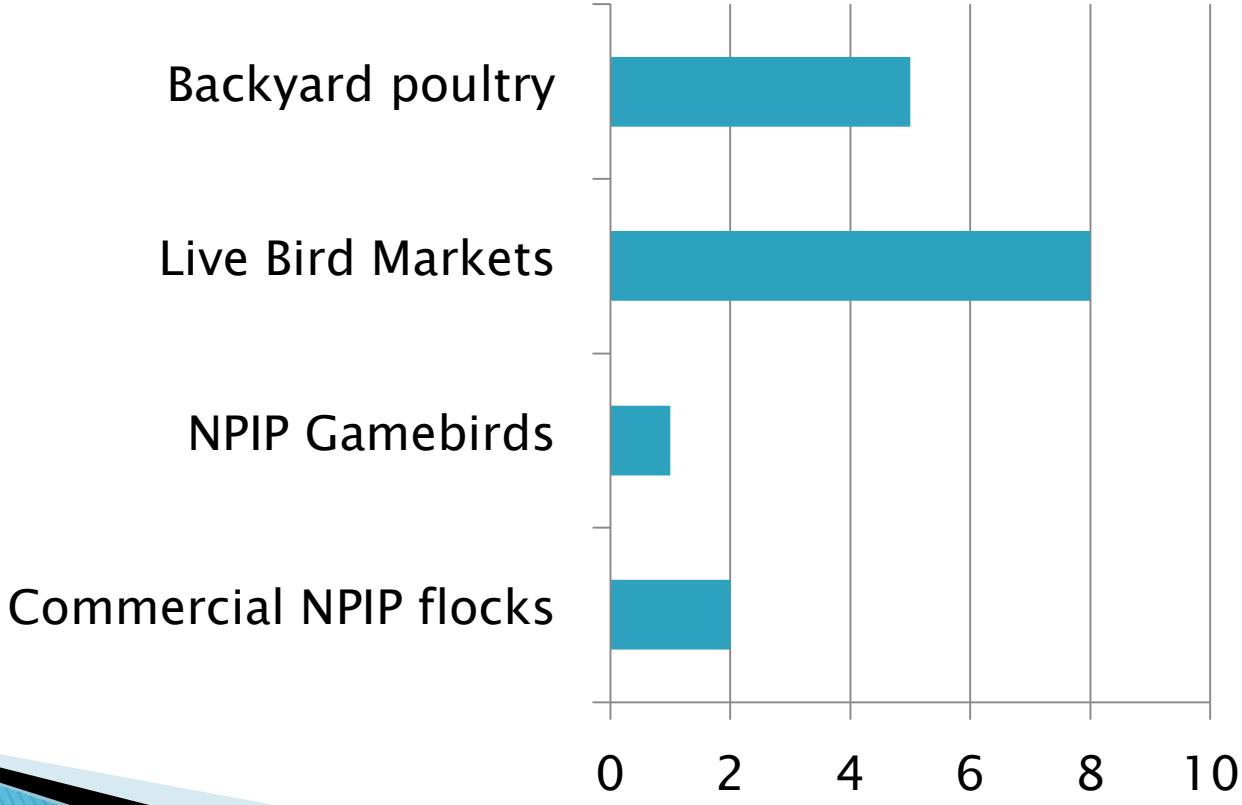
Establish disease monitoring/surveillance

More cases but not an Outbreak

- Changes in reporting
- Changes in case definition
- Increased local awareness of disease
- Improved diagnostic tests
- Change in population size or composition

Changes in Reporting

Addition of a new stream to a surveillance program



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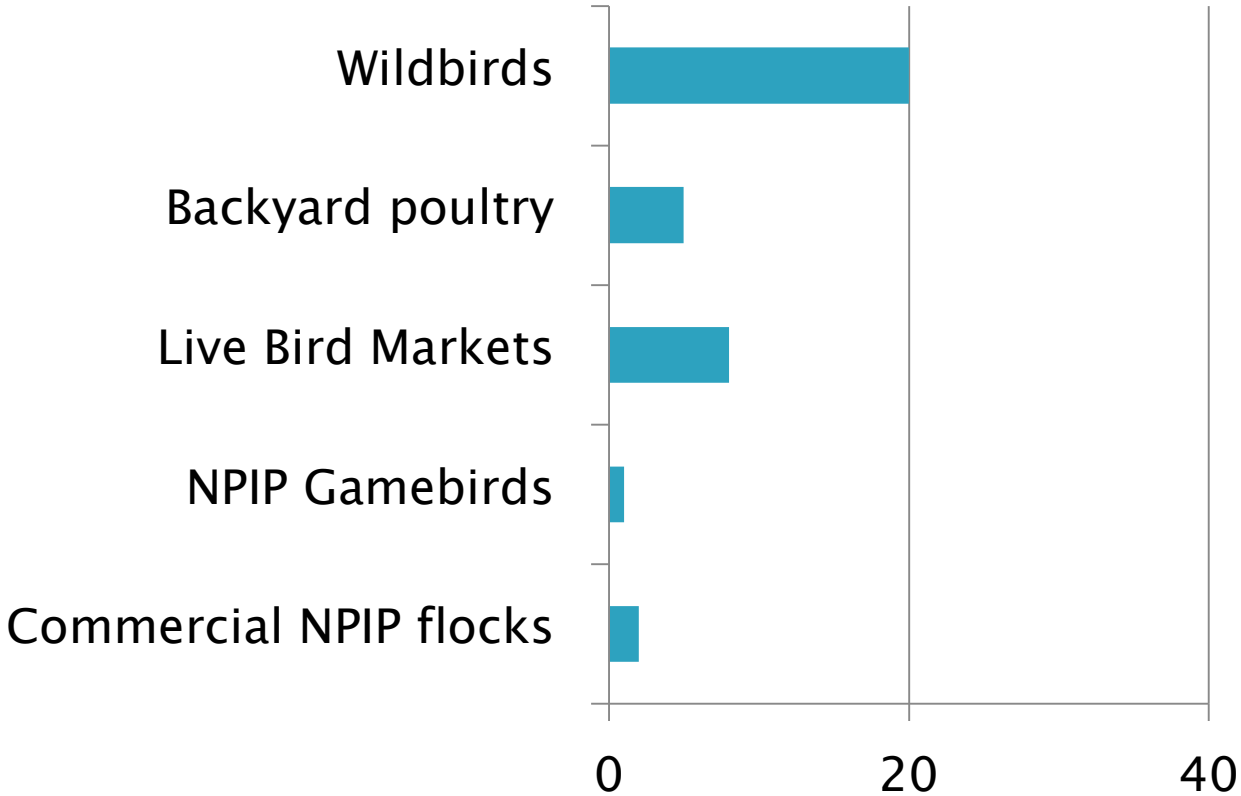

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Changes in Case Definition

- *Confirmed positive case:* Any equid tested positive for equine piroplasmosis by NVSL or a laboratory designated by the Secretary of Agriculture by at least one of the following methods: CF ***OR*** cELISA

- *Confirmed positive case:* Any equid tested positive for equine piroplasmosis by NVSL or a laboratory designated by the Secretary of Agriculture by at least one of the following methods: CF ***OR*** cELISA ***OR*** an equid is epidemiologically linked to a test positive equid

Increased Local Awareness

NEWS RELEASE

Texas Animal Health Commission

"Serving Texas Animal Agriculture Since 1893"

Dee Ellis, DVM, MPA • Executive Director

P.O. Box 12966 • Austin, Texas 78711 • (800) 550-8242 http://www.tahc.state.tx.us

For more information contact the Communications & PR Dept. at 512-719-0710 or at bonnie.ramirez@tahc.state.tx.us

FOR IMMEDIATE RELEASE
August 1, 2012

Anthrax Case Confirmed in Sheep in Irion County

AUSTIN – A yearling female sheep in West Texas has been diagnosed with anthrax. This is the second confirmed case of anthrax in a Texas animal for 2012 and the first in livestock this year. The infected sheep was located near Mertzon, TX (Irion County,) which is approximately 26 miles southwest of San Angelo. The Texas Animal Health Commission (TAHC) has quarantined the premises. TAHC regulations require vaccinations of exposed livestock and proper disposal of carcasses before a quarantine can be released.

Anthrax is a bacterial disease caused by *Bacillus anthracis,* which is a naturally occurring organism with worldwide distribution, including Texas. It is not uncommon for anthrax to be diagnosed in livestock or wildlife in the southwestern part of the state. Basic sanitation precautions such as hand washing, wearing long sleeves and gloves can prevent accidental spread of the bacteria to people if handling affected livestock or carcasses.

Acute fever followed by rapid death with bleeding from body openings are all common signs of anthrax in livestock. Carcasses may also appear bloated and appear to decompose quickly. Livestock or animals displaying symptoms consistent with anthrax should be reported to a private practitioner or TAHC official.

"The TAHC will continue to closely monitor the situation for possible new cases across the state. Producers are encouraged to consult with their veterinary practitioner or local TAHC office about the disease and about preventative measures such as vaccination of livestock," Dr. Dee Ellis, State Veterinarian, said.

For more information regarding anthrax, contact your local TAHC region or 1-800-550-8242 or visit www.tahc.state.tx.us .

The Texas Animal Health Commission works to protect the health of all Texas livestock, including: cattle, swine, poultry, sheep, goats, equine animals, and exotic livestock.

Cases may be occurring but going unreported until awareness is elevated

Improved Diagnostic Tests

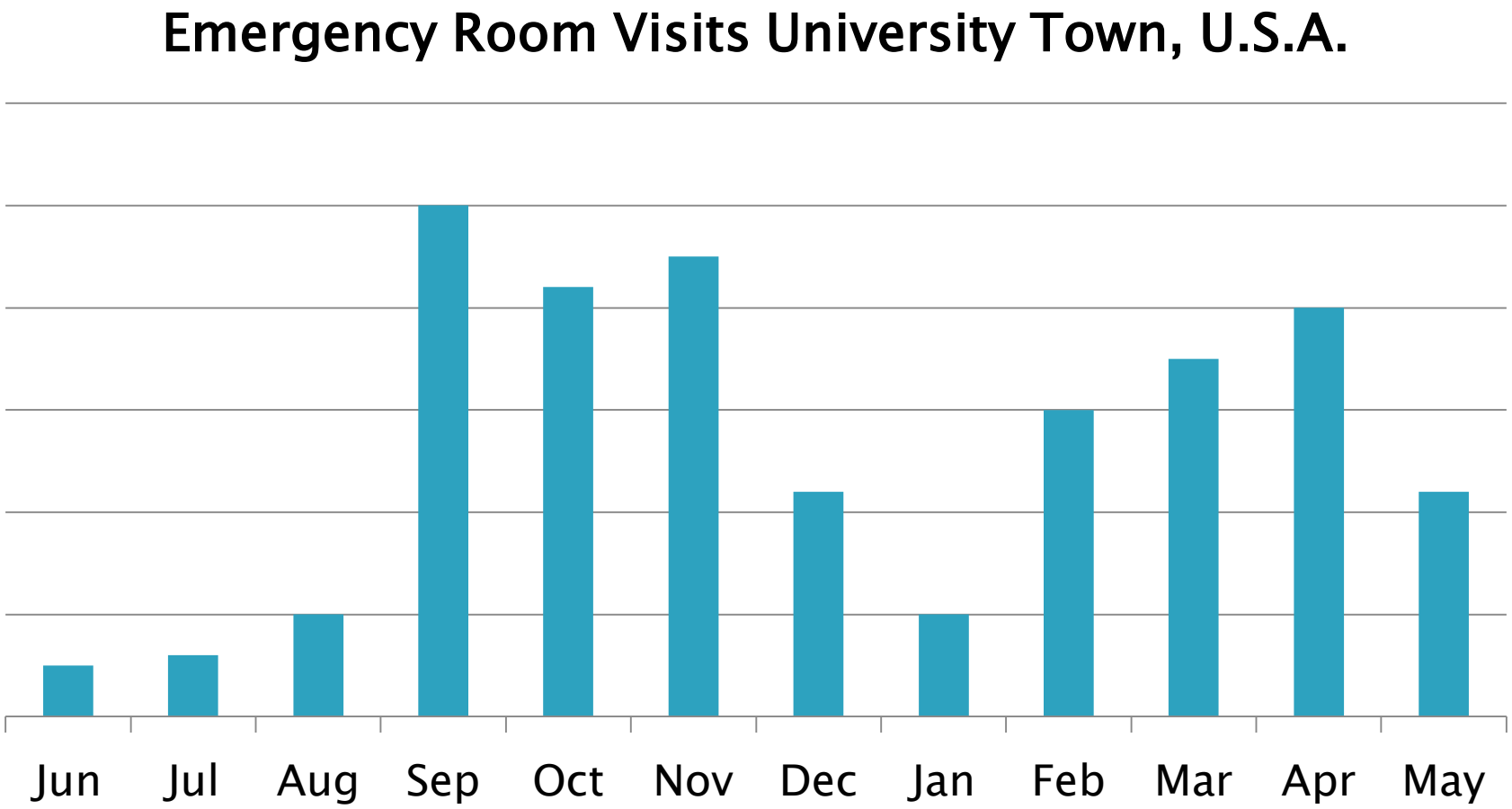
Test A	Infected	Not Infected	
Test Positive	70 cases	80	150
Test Negative	50	800	850
	120	880	1000

Sensitivity Test A = .58 Specificity Test A = .91

Test B	Infected	Not Infected	
Test Positive	119 cases	80	199
Test Negative	1	800	801
	120	880	1000

Sensitivity Test B = .99 Specificity Test B = .91

Change in Population Size or Composition



Summary

- Confirming that an outbreak is occurring requires:
  - Knowing the expected number of cases in the population over a given time period
  - Confirming that this is an increase in cases and not a reporting, diagnostic test, population or other type of anomaly