

agricultural disorders of the chest

jud w gurney md

charles a dobry professor of radiology



Farm Economy

60,000 farms

47,000,000 acres

3rd corn, 11th wheat, 3rd beans

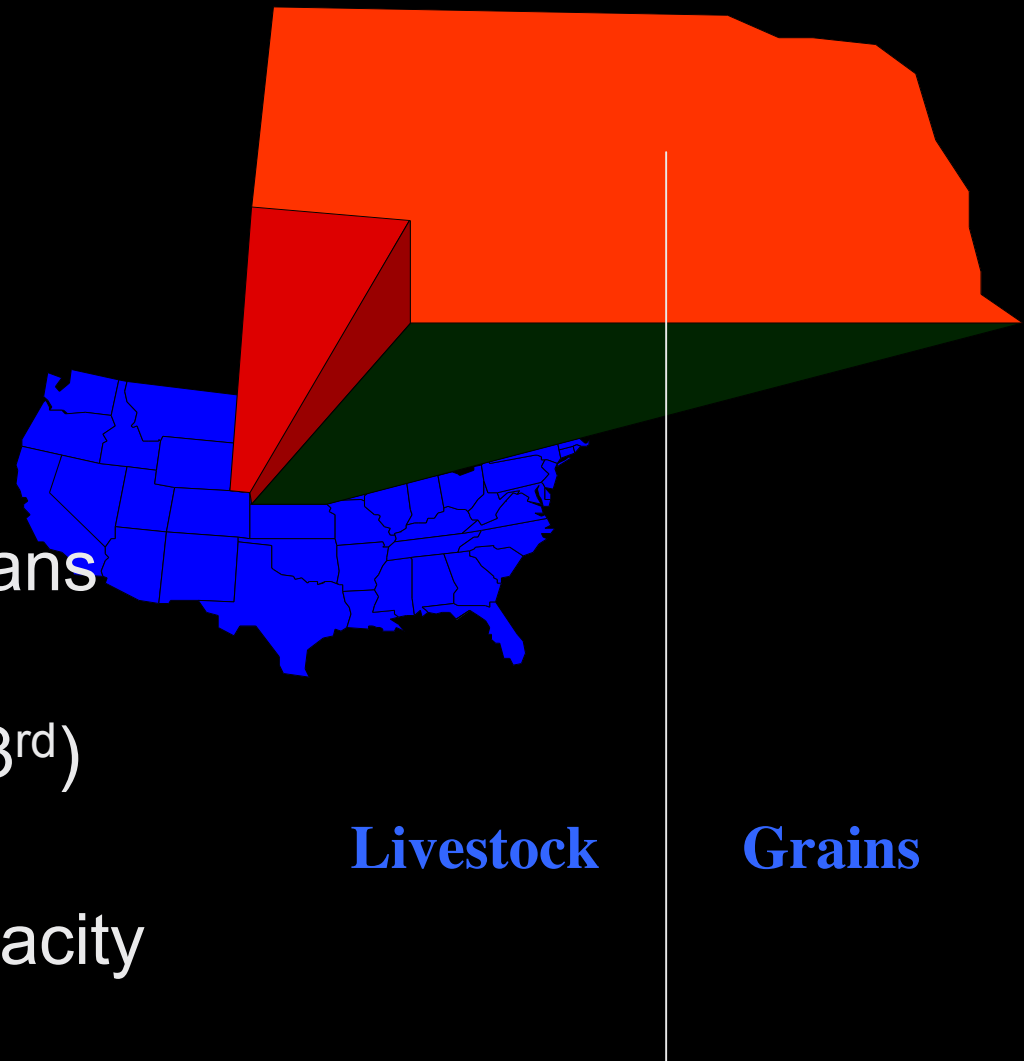
1,800,000 Cattle (2nd)

3,800,000 Feedlot Cattle (3rd)

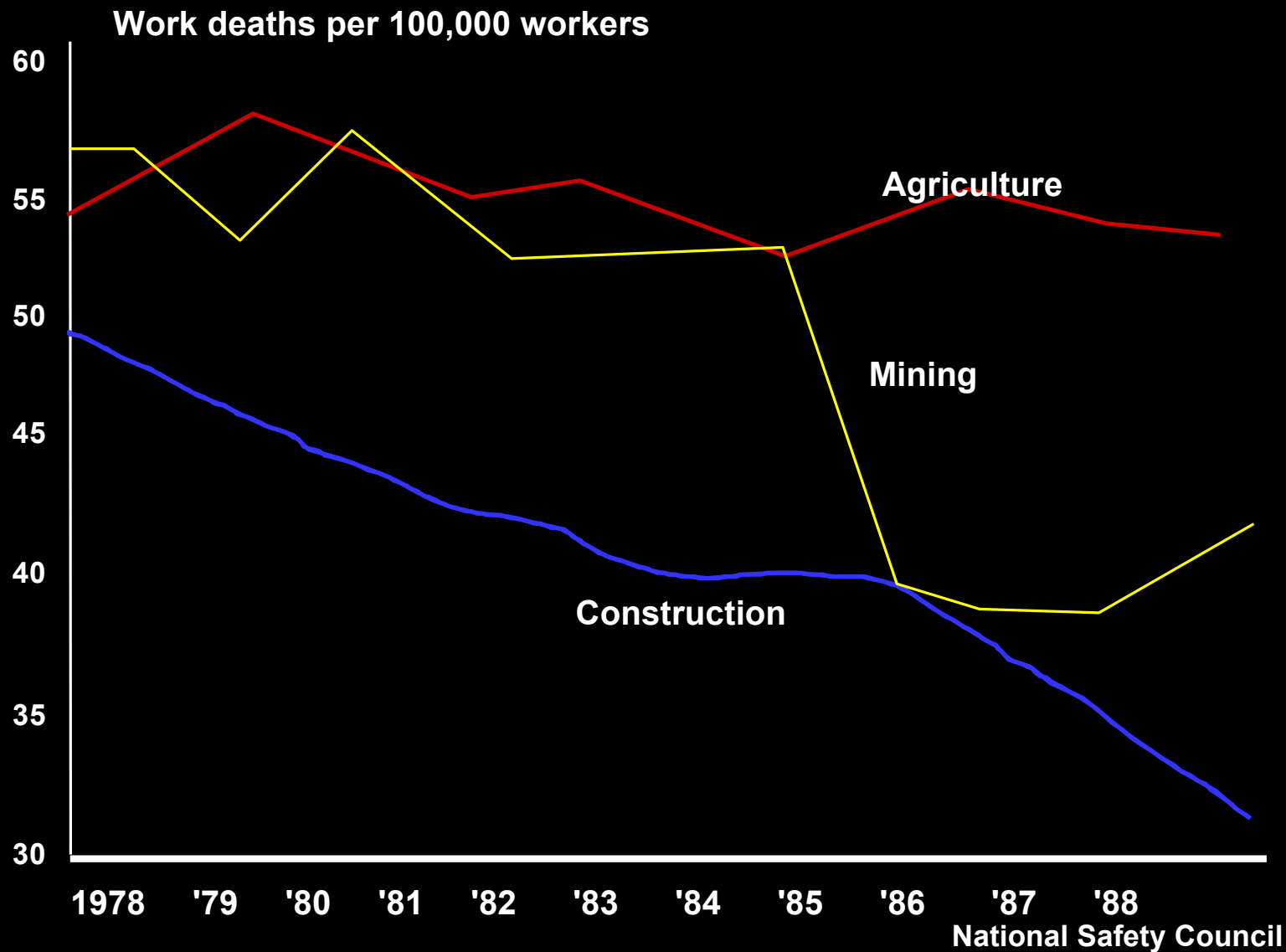
3,900,000 Hogs (5th)

Omaha Grain Storage Capacity

32,500,000 bushels



Farming: The Most Dangerous Game



Grain production

Almost all who make a living by a sifting or measuring grain are short of breath and cachectic and rarely reach old age

Ramazzini 1713

Chronic bronchitis	50%
Asthma	15%
ODTS	1%
Farmers lung	2-4 / 1000
Chemical poisoning	6 / 15 million
Silo Fillers disease	1 / 30,000

Grain dust



Organic

Fungi

Insects

Mites

Bacterial Endotoxins



Inorganic

Dirt

Silica

Grain dust asthma



Grain elevators (Prairie Castles)

3rd largest particulate polluter

Dust concentration 5 - 50 mg/m³

1,800,000 tons dust/yr





entinel

IN "HOME ON THE RANGE" COUNTRY

1980

16 Pages

15 Cents a Copy

Clayton Gurney Retires After 40 Years In Ag

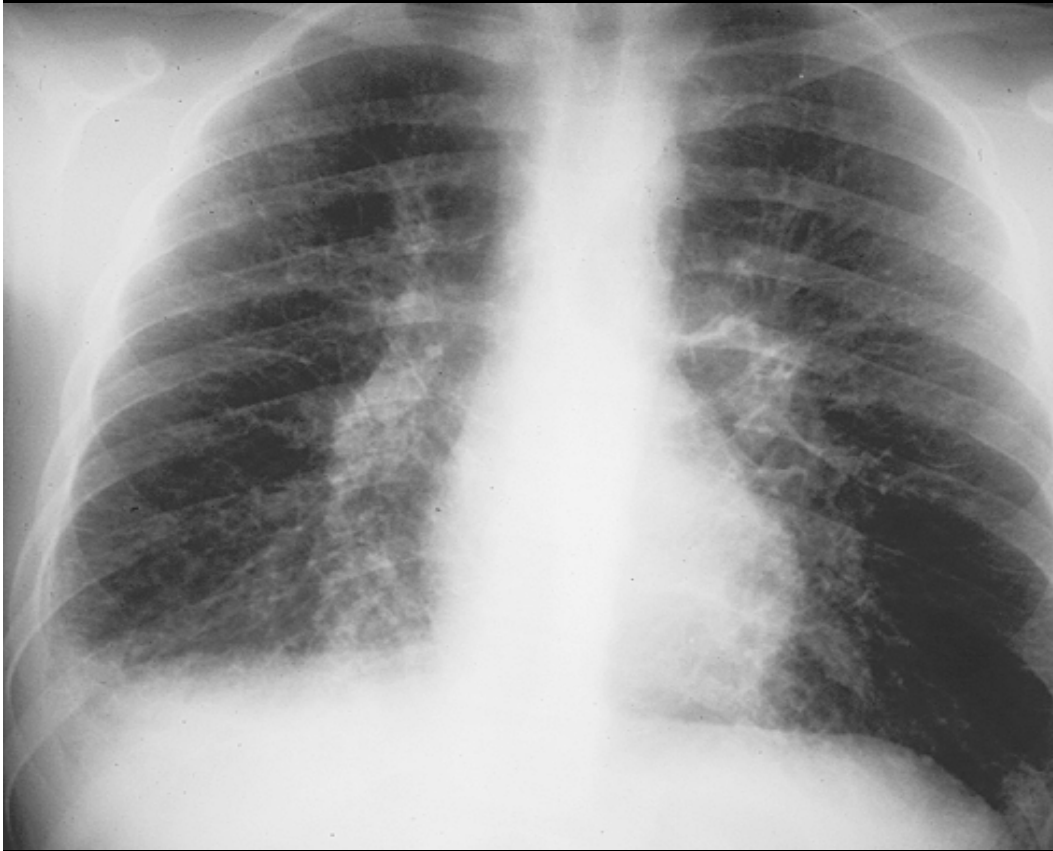


West Point Nebraska

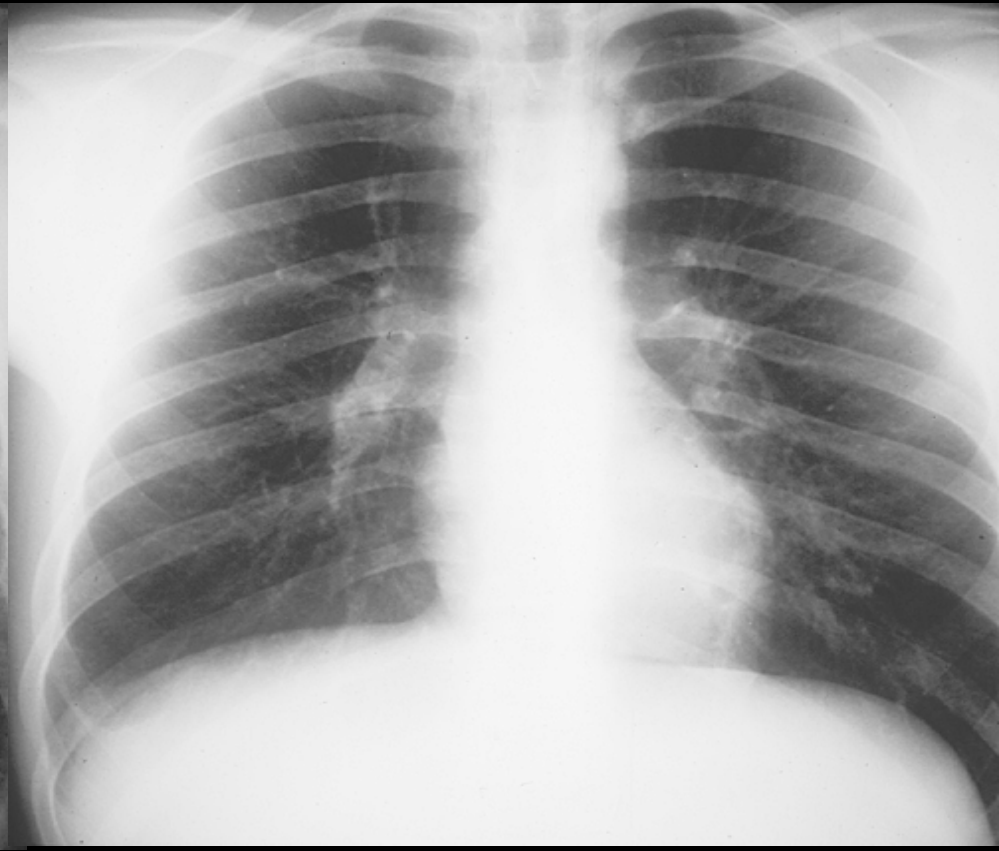




Organic dust toxicity syndrome

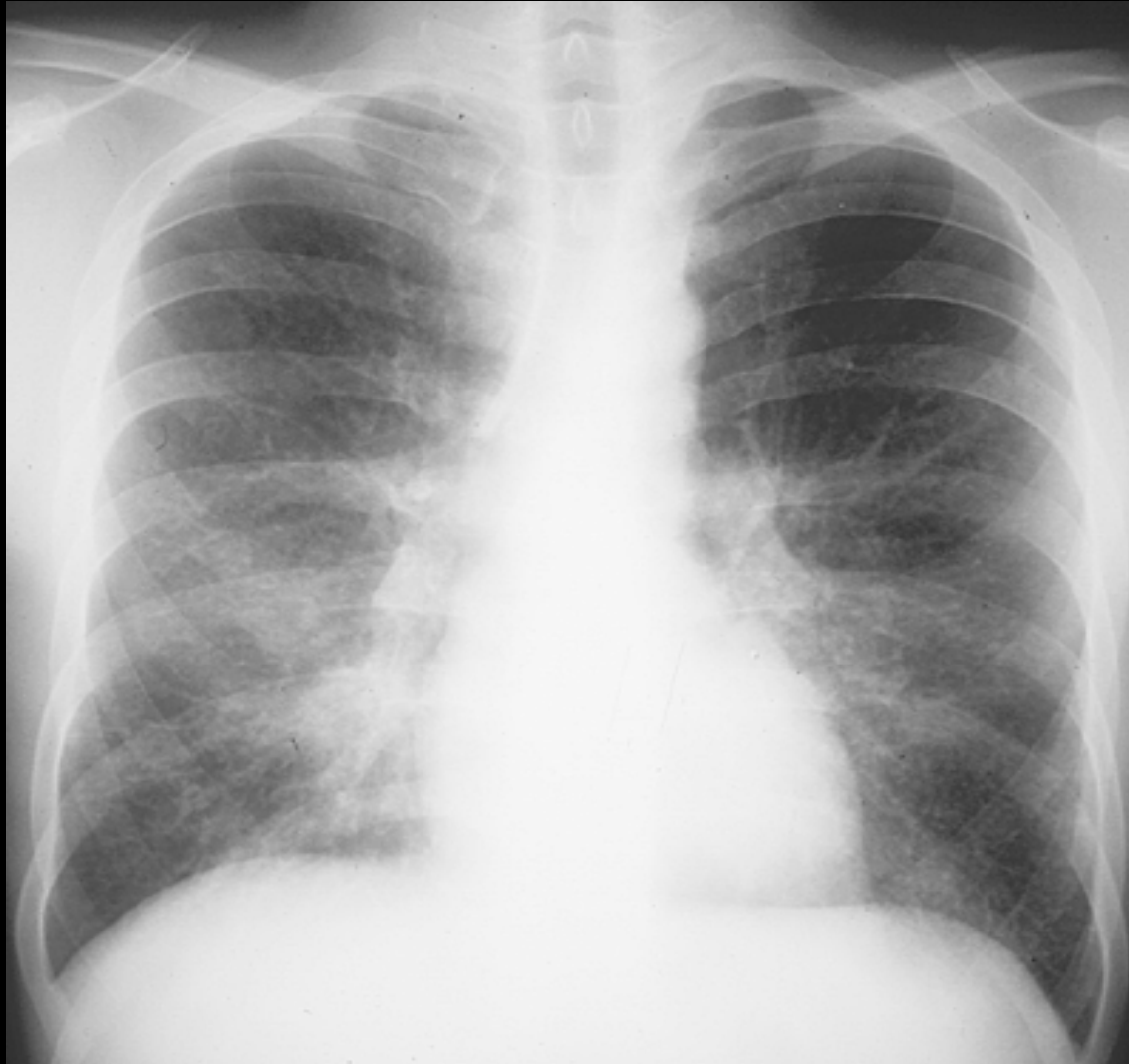


initial



24 hours

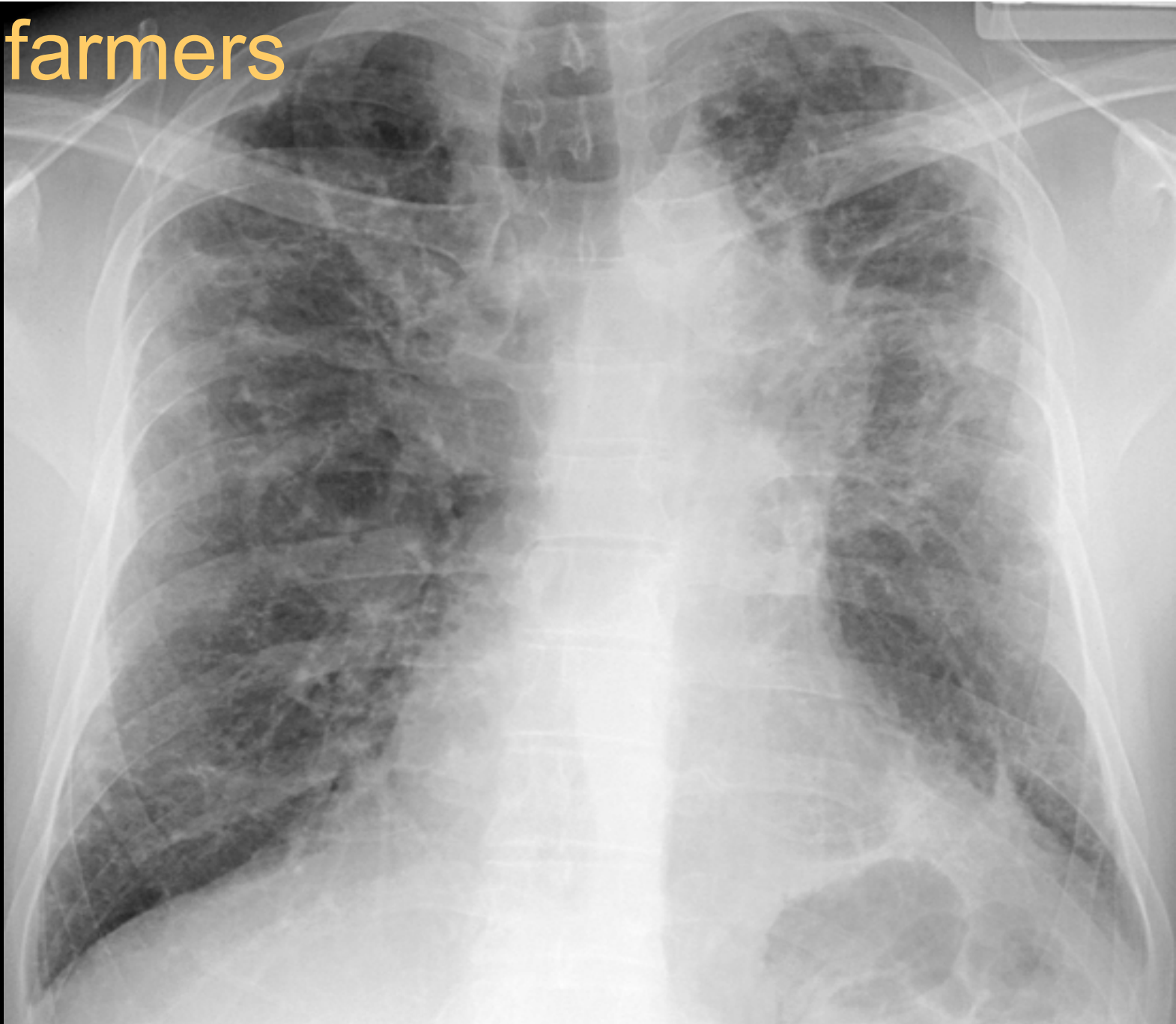
Acute farmers lung

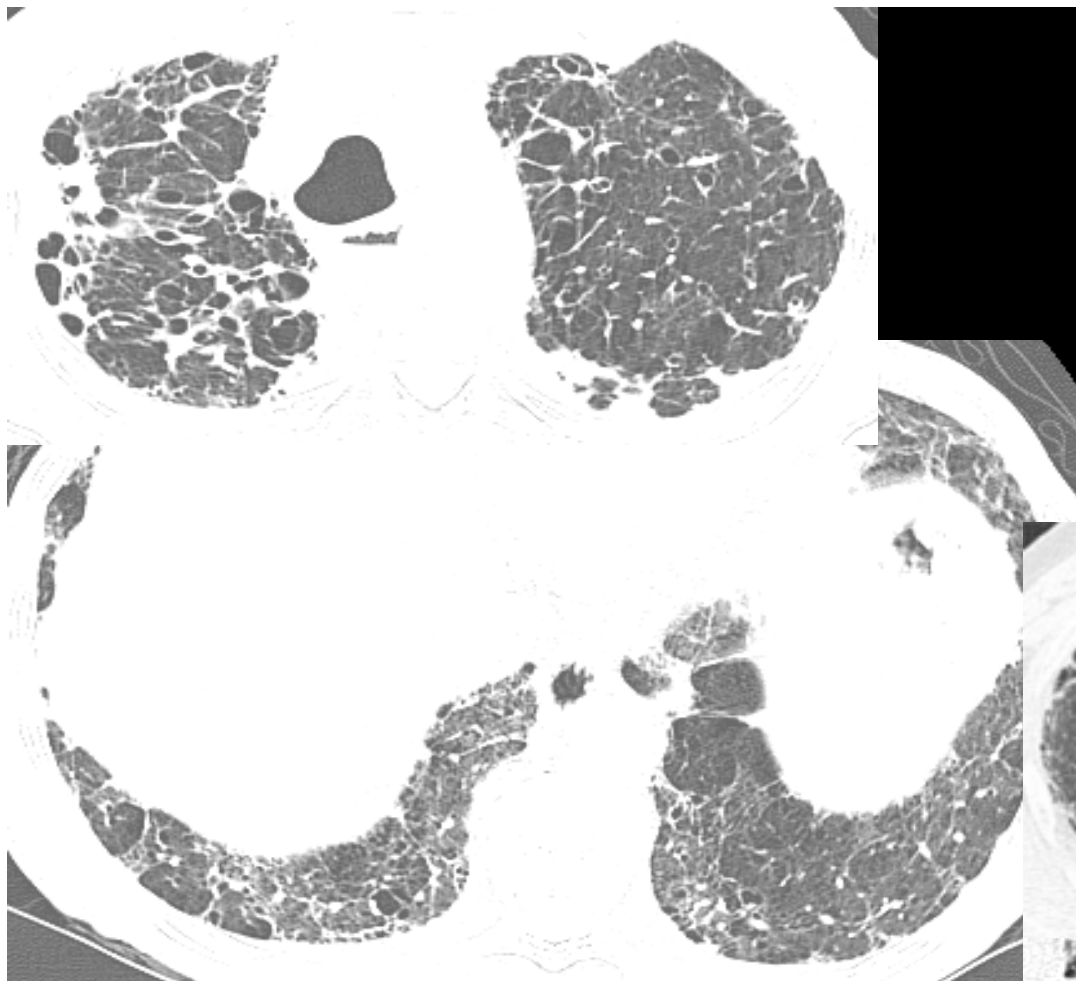


Farmer's lung ODTS

Exposure	Moldy hay	Moldy hay
Latent time	4 - 8 hr	4 - 8 hr
Insult	Spores	Bact endotoxins
Clinical	Fever, cough	Fever, cough
PFT's	Restriction	Normal
Lymphocytes	Neutrophils	Lymphocytes
BAL	Allergic	Non-allergic
Chronic Disease	Possible	No

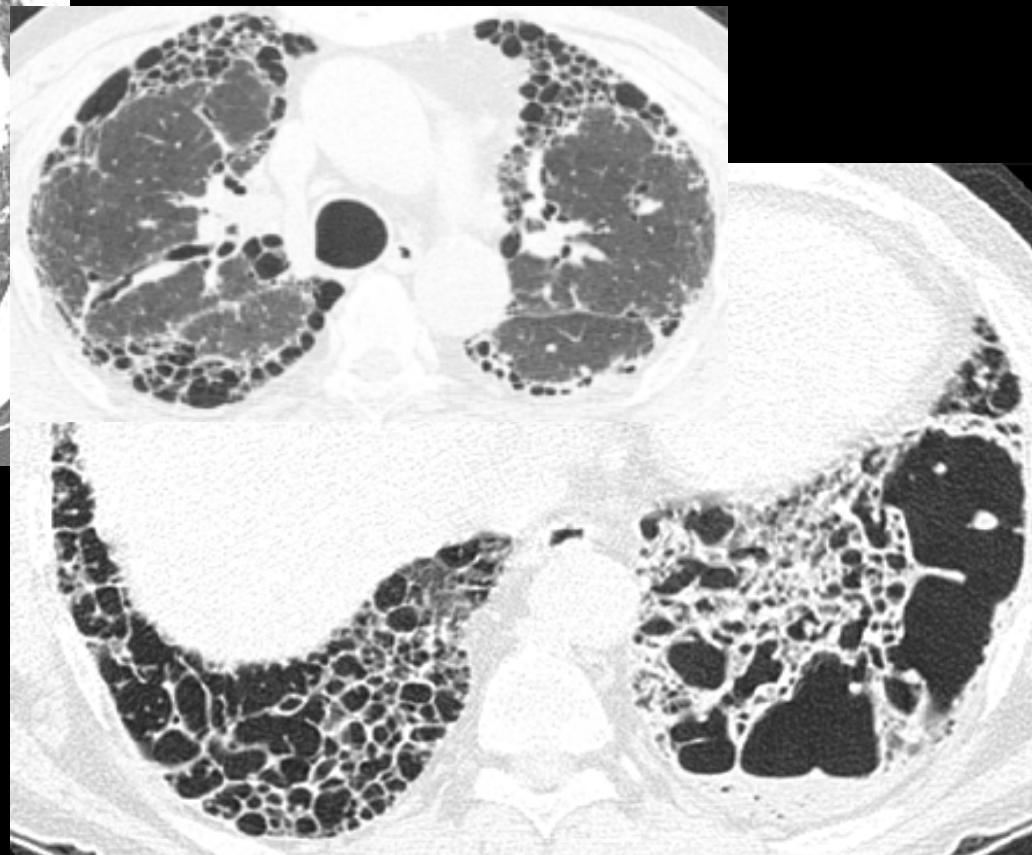
Chronic farmers lung

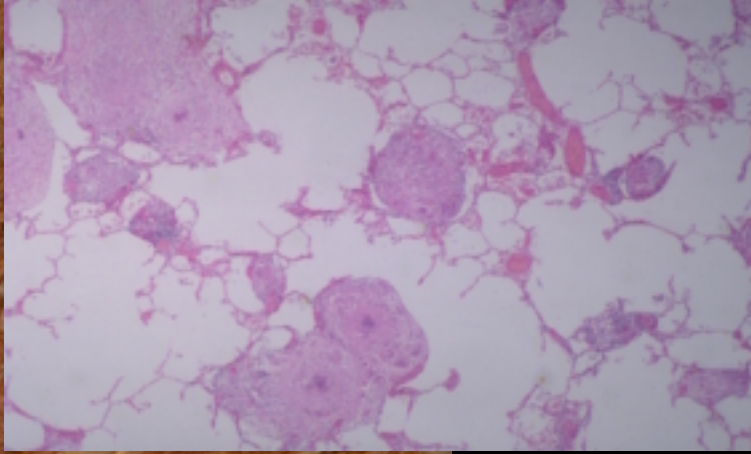
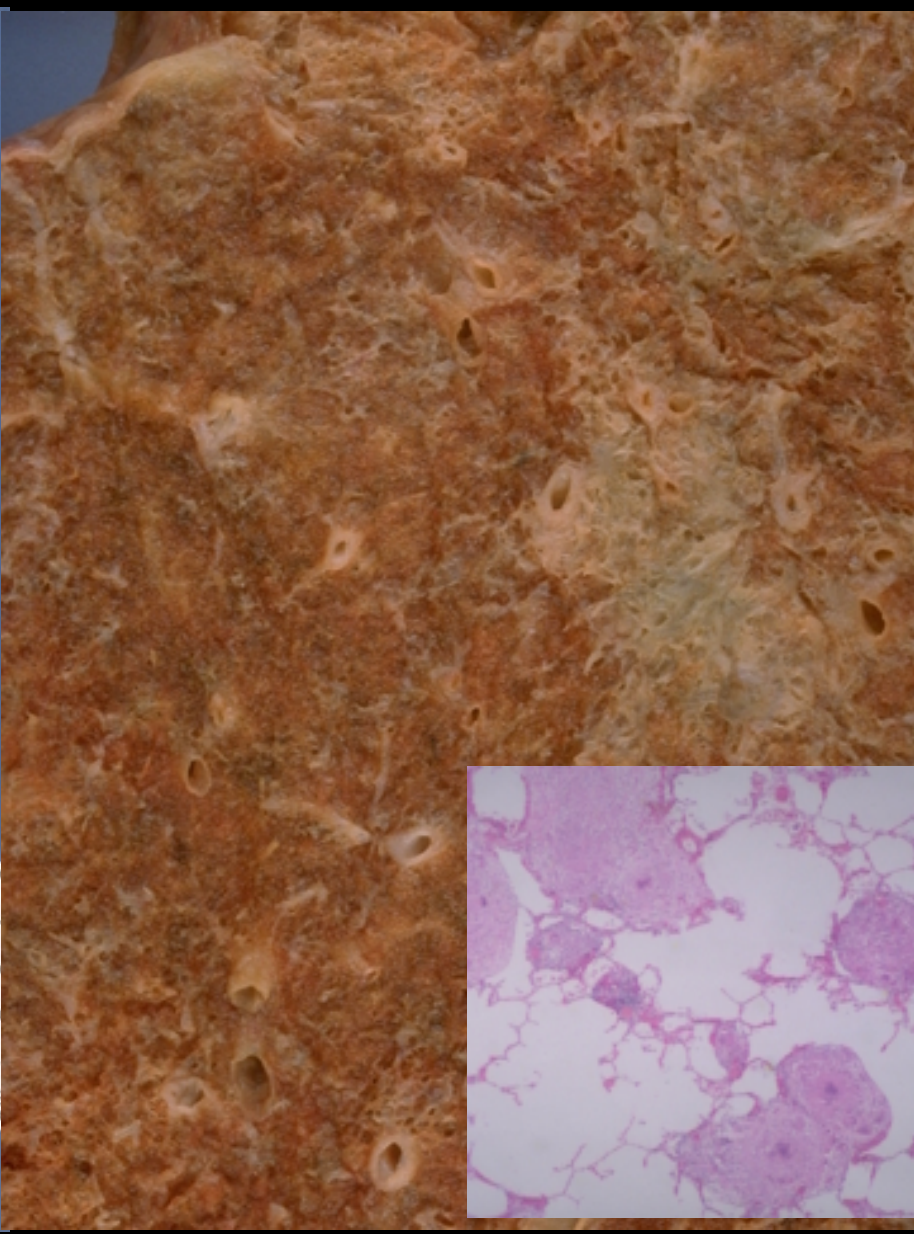


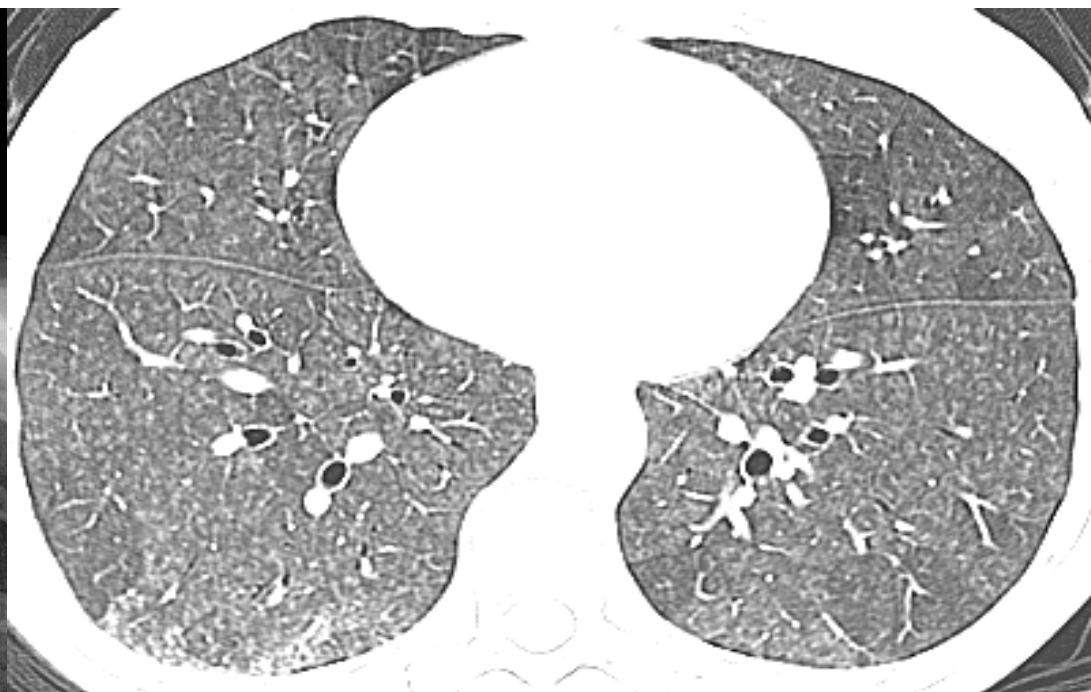
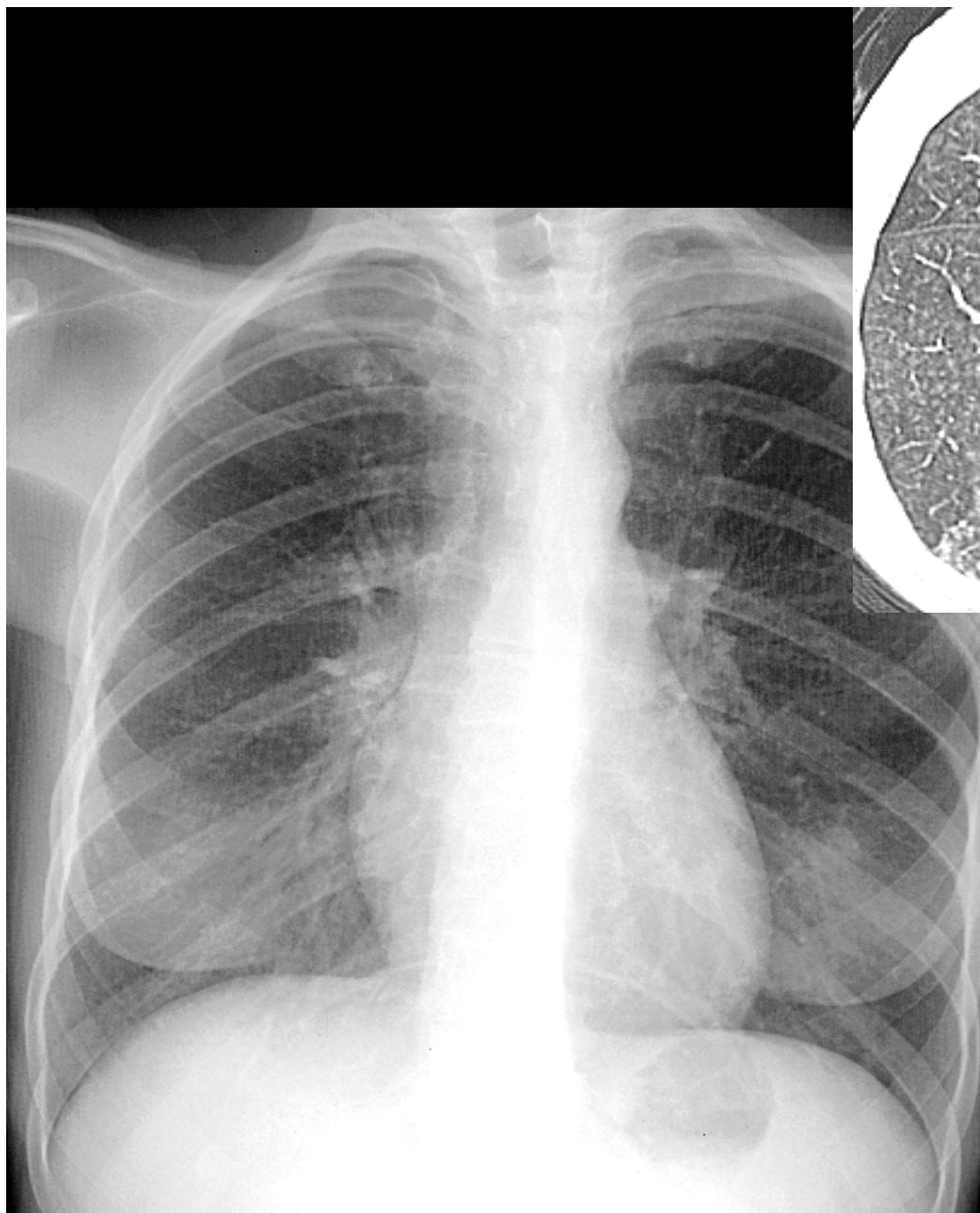


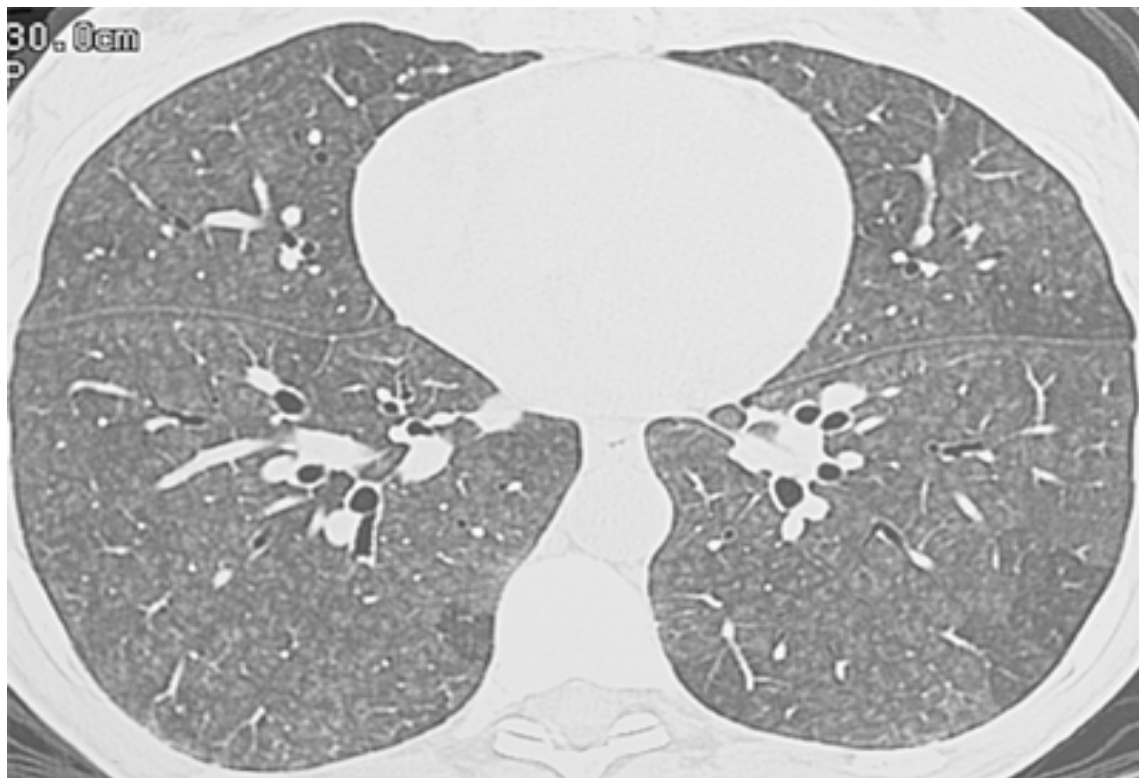
chronic farmers lung

idiopathic pulmonary fibrosis

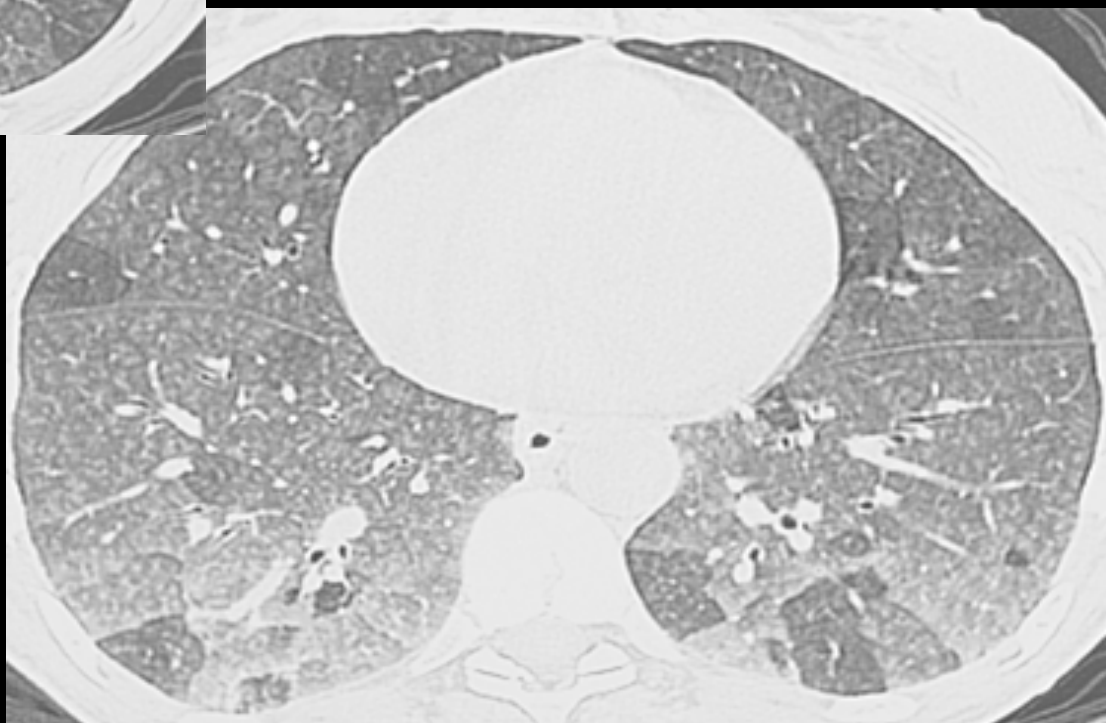








inspiration



expiration

Chemical Poisoning

Insecticides

Herbicides

Fertilizers



Organophosphate insecticides

Diazinon, Parathion, Malathion

Related to nerve gas

Inhibit acetylcholinesterase

Respiratory paralysis

Increased airway secretions

Bronchospasm

Noncardiac pulmonary edema - Aspiration



Organophosphate insecticides

Today's Top Story

Area cattle found poisoned

The owner of 250 cattle found dead in a Colfax County feedlot believes they were intentionally poisoned.

Jim Barta, 61, of Fremont said today he believes someone dumped pesticide, a neurotoxin, into a bag of feed put out for the cattle.

"I've tried to find a way that this could be an accident," said Barta, also a longtime pharmacist in

Fremont. "The only way it could be an accident is if somebody loaded a mineral bag at the factory with a neurotoxin."



CATTLE DEATHS - The carcasses of 250 cattle were found dead Saturday at a Colfax county feedlot, pictured here, near Richland. Officials with the State Patrol are investigating whether the cattle were poisoned accidentally or intentionally. Telegram photo by Todd Stepanek



News Front Page



Africa

Americas

Asia-Pacific

Europe

Middle East

South Asia

UK

Business

Entertainment

Science/Nature

Technology

Health

Talking Point

Country Profiles

In Depth

Programmes

BBC SPORT

BBC WEATHER

SERVICES

Internet zone

You are in: **Middle East**

Wednesday, 28 August, 2002, 19:32 GMT 20:32 UK

Iraq shows 'pesticide factory'



AP

Iraq says the plant makes regular pesticides

Iraqi officials have given reporters a tour of a factory suspected of producing chemical weapons.

In the third such visit in a month, the journalists were shown Falluja-3 - about 80 kilometres west of Baghdad - which Iraq says is a pesticide factory.

“**Accusations that Iraq has rebuilt the site and started using it for producing chemical and biological weapons are false and groundless**”

Conflict with IRAQ

Full coverage

Key Stories

- System to control Iraq
- Draft resolution
- Stopping inspections?
- Q&A: Security Council

Politics and diplomacy

- Who backs war?
- Who's who in Iraq
- Arab fears of attack
- UN resolutions on Iraq

IN PICTURES

Inside Iraq

IN DEPTH

- Key maps
- Personal perspectives

TALKING POINT

- A breakthrough in the crisis?

See also:

- 28 Aug 02 | Middle East

Herbicide

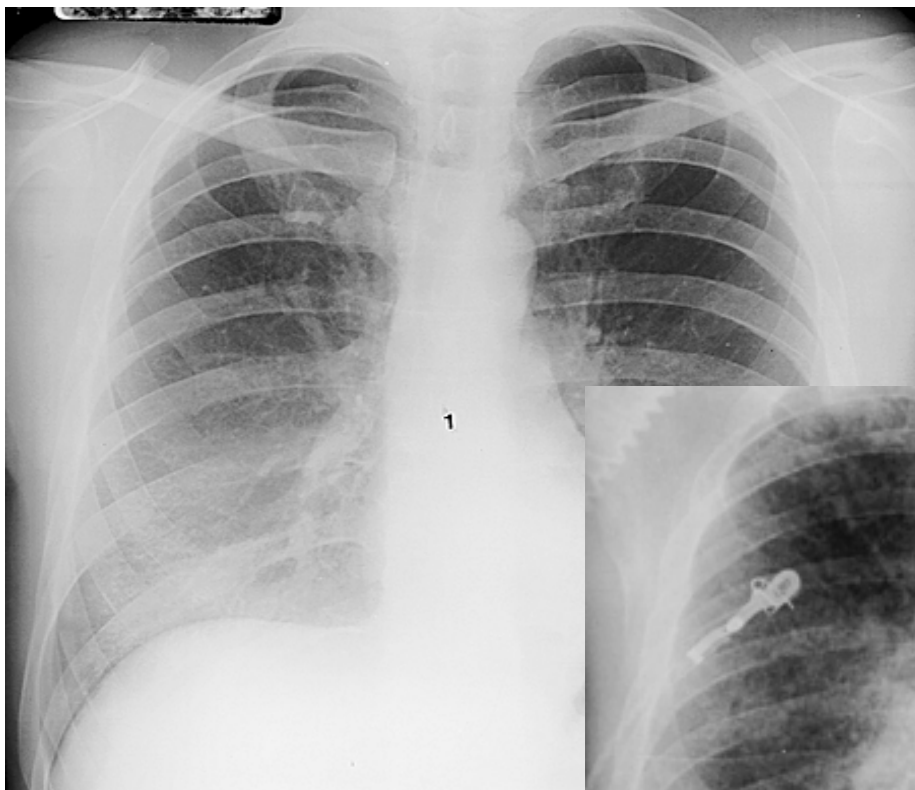
Paraquat

Absorbed skin

Acute toxicity: noncardiac pulmonary edema

Subacute: rapid pulmonary fibrosis

Im AJR 1991



Day 1

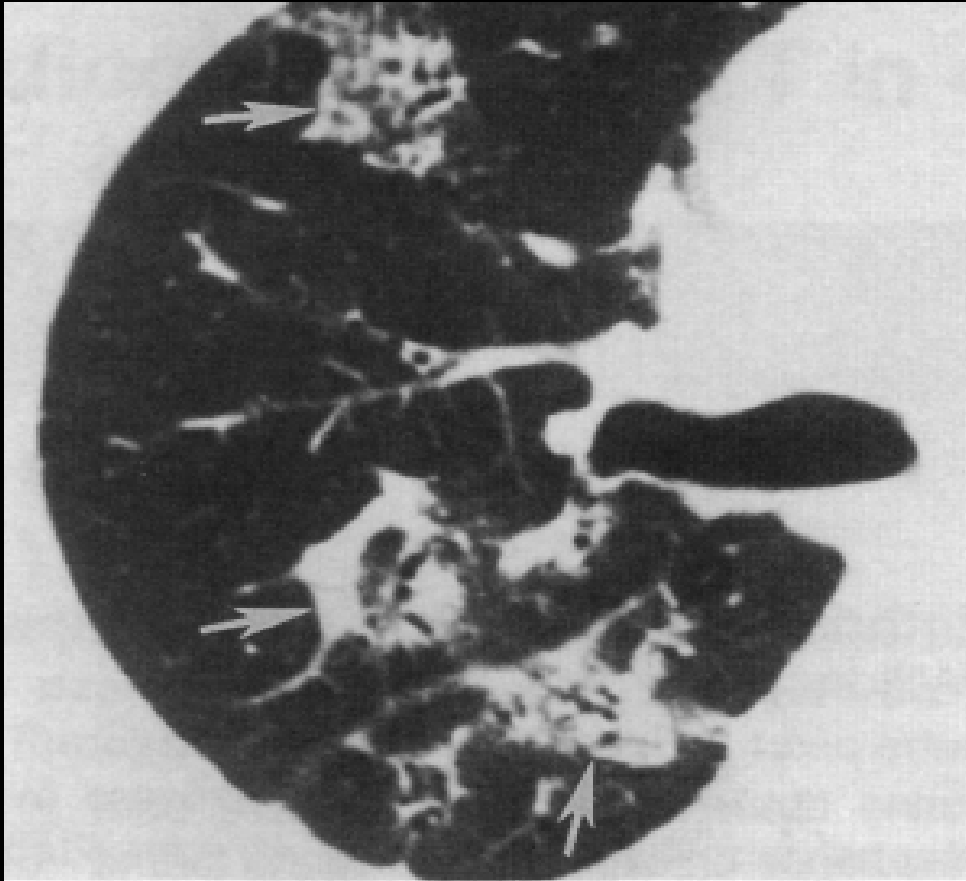


Day 9



Day 29

Paraquat poisoning CT



Im AJR 157 1991

Fertilizer

Anhydrous ammonia

Tracheal bronchitis

Pulmonary edema

Bronchiolitis obliterans



Anhydrous ammonia



Anhydrous ammonia





Tracks blocked after ammonia theft goes awry

By: JEFF HUMPHREY / KREM 2 News

4/8/03

Union Pacific Railroad tracks were blocked for more than 12 hours in Rockford, Wash. Monday after somebody tried and failed to steal a form of fertilizer also used to make methamphetamine

SPOKANE - Union Pacific Railroad tracks were blocked for more than 12 hours in Rockford, Wash. Monday after somebody tried and failed to steal a form of fertilizer also used to make methamphetamine.

The would-be thieves' heist went awry, however, when their rented van became stuck in the mud, forcing the group to flee on foot.

There were no suspects in custody Monday night, but police were combing the scene for fingerprints.

The van, along with a variety of tools, including a large drill rig, were left behind, but not before the group caused thousands of dollars in damage as they attempted to steal hundreds of pounds of anhydrous ammonia.

Spokane County Sheriff's Deputies say the ammonia would likely be used in what has become known as the "Nazi" way of making methamphetamine.



Thieves try and steal ammonia from rail tank car

Flagman



Lonely Crusade

One Man's Suffering Spurs Doctors to Probe Pesticide-Drug Link

Tom Latimer, Tagamet User,
Fell Ill After He Mowed
Lawn That Was Treated

A Problem Little Understood

By FRANK EDWARD ALLEN

Staff Reporter of THE WALL STREET JOURNAL

DALLAS—Thomas Latimer used to be a vigorous, athletic man, a successful petroleum engineer with a bright future.

Then he mowed the lawn.

On a summer Saturday in 1985, Mr. Latimer spent an hour or so cutting the grass, picking up the clippings and edging the walkways around his modest two-bedroom home. Soon, something was terribly wrong. He felt dizzy and nauseated. His nose was running and his chest was tight. He had a pounding headache.

Ten days later, he was still sick, so he went to see a doctor. But he kept getting worse. He suffered constant head pain. His eyes began to jerk uncontrollably. In November 1985, he developed testicular cancer. Now, six years and 20 doctors later—after liver biopsies, spinal-fluid taps, CAT scans, radioactive brain blood-flow studies, sleep studies and many other tests—Mr. Latimer, 38, ac-



Thomas Latimer

25 million lbs herbicide

30 million lbs insecticides

EPA estimate

Toxic Gas Generation



"... from grain which has been long conserved in a closed chamber, for example in underground places as is the custom of Tuscany, arises an exhalation so dangerous as to be sufficient to cause death to anyone who enters such a place to collect the grain, unless the pernicious air is first allowed to escape for a while

Ramazzini 1713

Silo

Loader

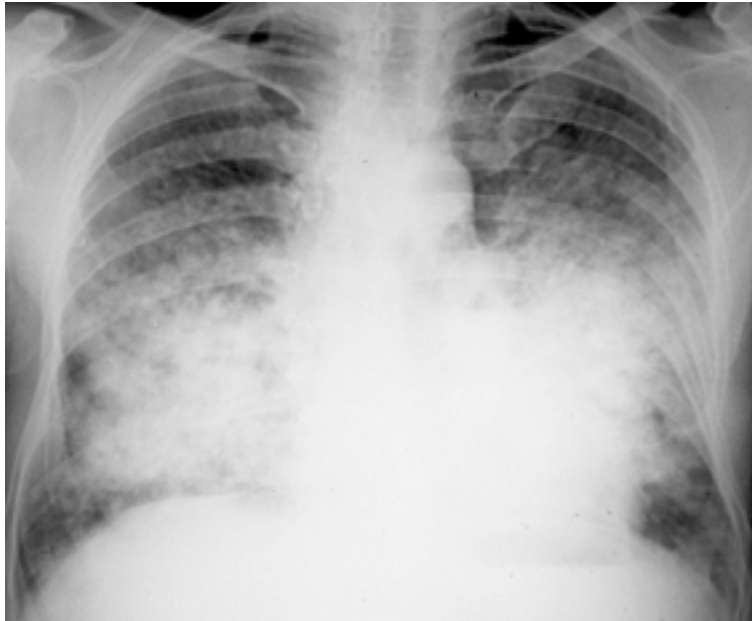
Ladder

Unloading

Safe $\text{NO}_2 < 5 \text{ ppm}$
Silos $> 2000 \text{ ppm}$



Blower



Initial



1 week



1 month

Cleveland Clinic May 1929



123 patients and employees
die

Fire in Radiology (~70,000
films or 4,200 lbs
nitrocellulose) release NO₂
gas that fills the building

Livestock Production disorders



I am inclined to think some volatile acid is given off by this carnerine of filth when workers disturb it... such effuvia aught, one would think, to impair the lungs.

Ramazzini 1713

Livestock Production disorders

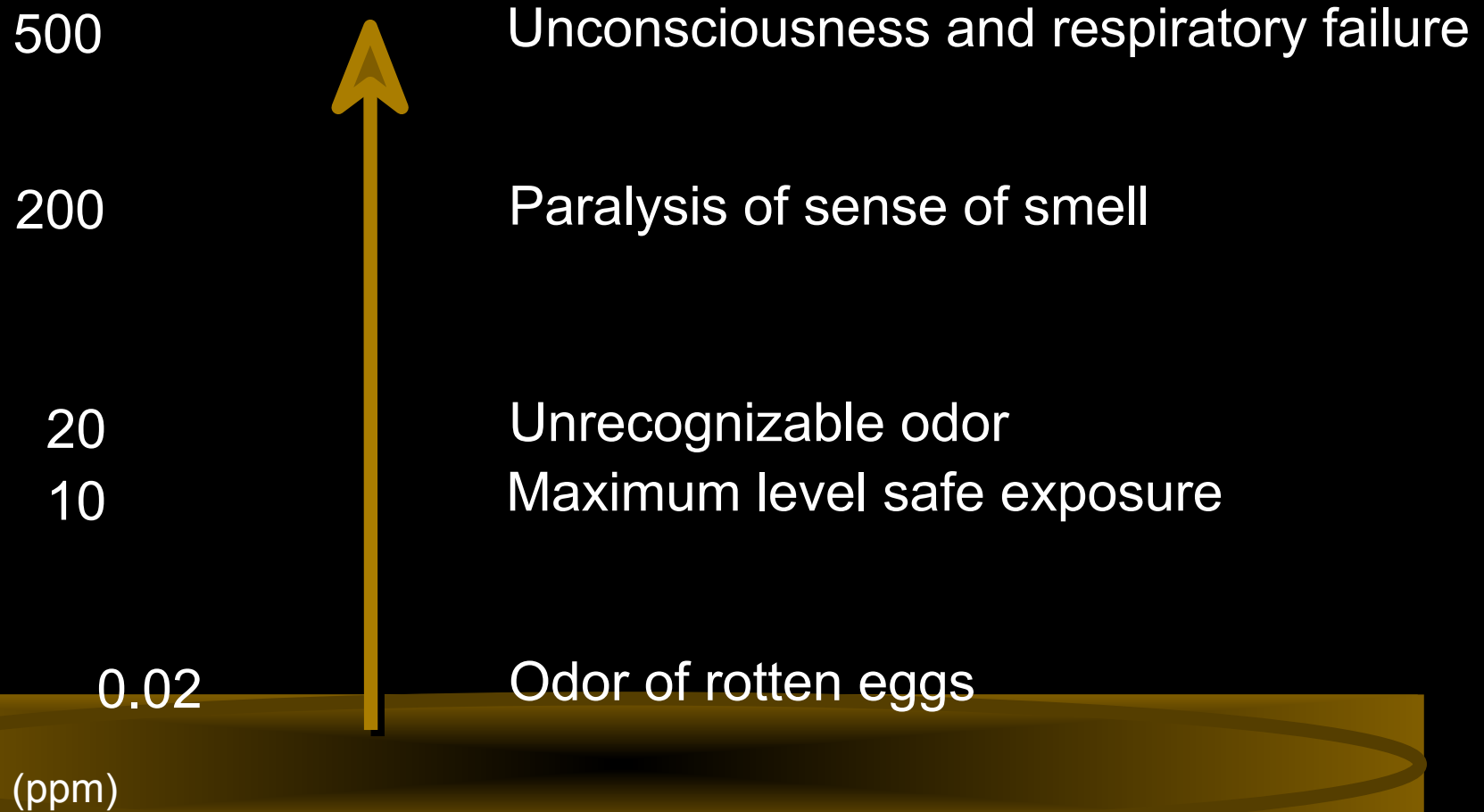
Chronic bronchitis	70%
Asthma	15%
Farmers Lung	1%
Toxic manure exposure	1/100,000
Zoonosis	?



Confinement House

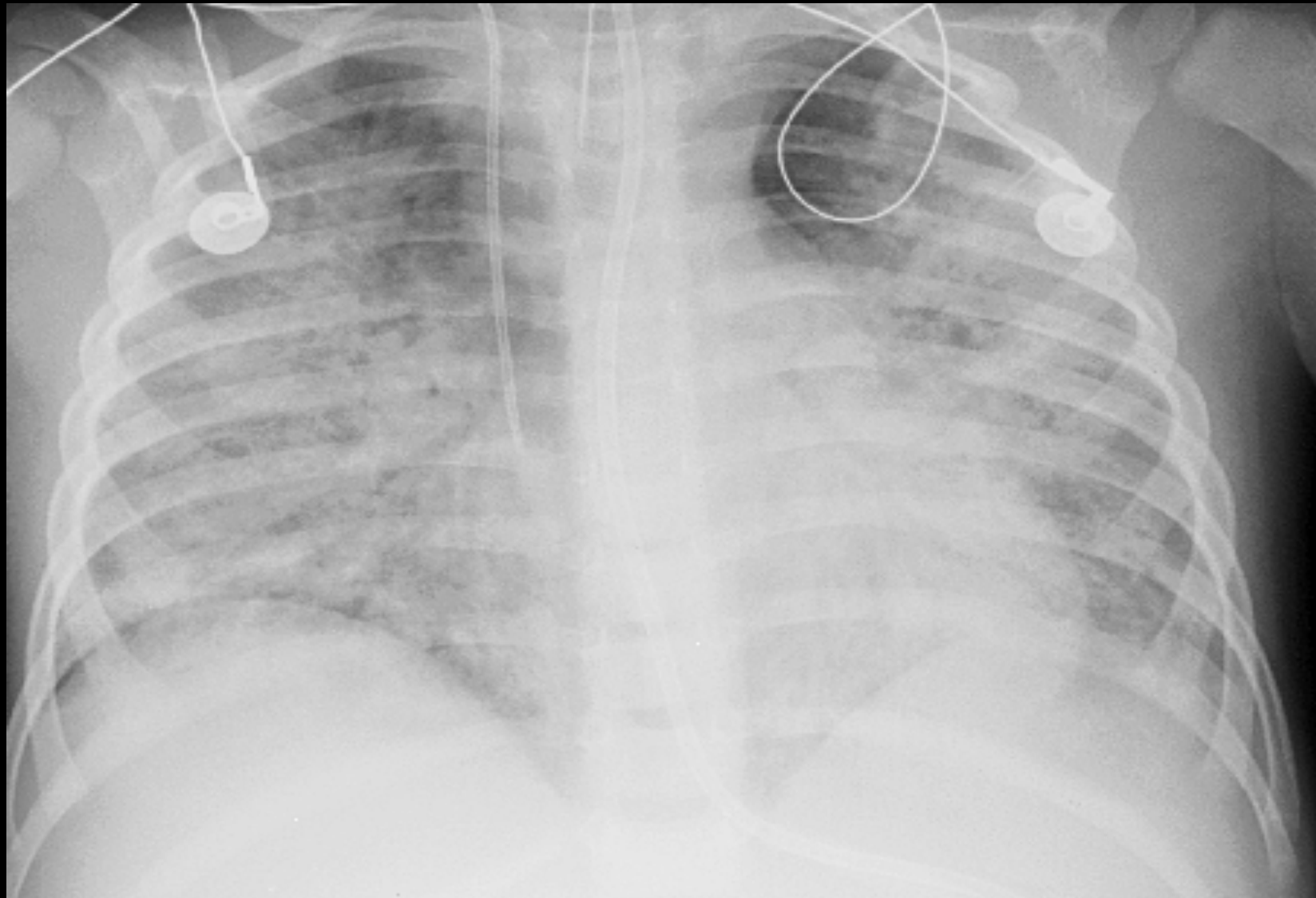


Hydrogen sulfide generation



Dung Lung: A Report of Toxic Exposure to Liquid Manure

LIDA N. OSBERN, M.D.; and ROBERT O. CRAPO, M.D.; Salt Lake City, Utah



Deaths of Five Men Devastate Farm Family

By Paige St. John

Menominee, Mich. (AP) — On the first day without wakes or funerals since the tragedy, children are running in the farmyard, spraying each other with a garden hose while their mothers shout for them to cut it out.

It would be a normal day but for one thing. Elmsbrook, the dairy farm nurtured by five generations of Theuerkauf men over 108 years, has no one to run it but the widows and children.

Inside the great white farmhouse, Linda Theuerkauf and her children gather in a circle, surrounded by memories, and say the names:

"First Tom..."

Tom Theuerkauf, 27, was the first one into the manure pit, through a narrow hole and down the ladder to clear the drain 12 feet below.

"...then Danny..."

Dan Theuerkauf, 15, quiet and thoughtful like his uncle Tom, had been cutting hay by himself for two years, already part of the circle of Theuerkauf farmers. Dan saw Tom's head hit the ladder and slip into the dark. He sent his 8-year-old brother Brian for help and then went down.

"...and Brian got Bill first."

Bill Hofer, 63, was the third man down, a cousin who grew up across the lane from the Theuerkaufs, went to school with them and farmed with them.

"...and I lost my Grandpa."



The Associated Press

In the wake of the tragedy, life goes on... Brian Theuerkauf, 8, and his sister Carrie, 10, feed the calves on the family farm.

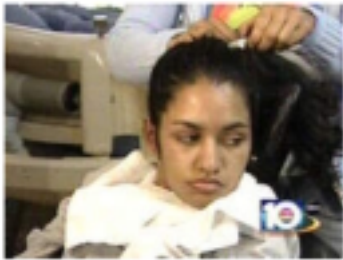
Zoonosis

South Florida Woman Treated For Mad Cow Disease

Controversial Treatment Gives Parents Hope

POSTED: 5:39 PM EST January 9, 2004
UPDATED: 6:02 PM EST January 9, 2004

BROWARD COUNTY, Fla. -- A young South Florida woman is the only known person in the United States to have the human form of mad cow disease -- and a new treatment being administered locally is giving her family hope.



Charlene is 24 years old. Doctors said the disease is destroying her brain. She has lost the ability to walk and talk and care for herself.

Charlene's parents believe she contracted the disease in London, where she was born. She came to the United States as a teenager.

Was rare medical curiosity
Mad Cow Disease
Anthrax
SARS

Respiratory Infections

Bacterial Disease

Q fever

Anthrax

Brucellosis

Psittacosis

Tularemia

Leptospirosis

Plague

Source

Sheep, cattle

Livestock

Cattle, pigs

Turkeys

Sheep

Cattle, sheep

Rats

Fungal Disease

Coccidiomycosis

Histoplasmosis

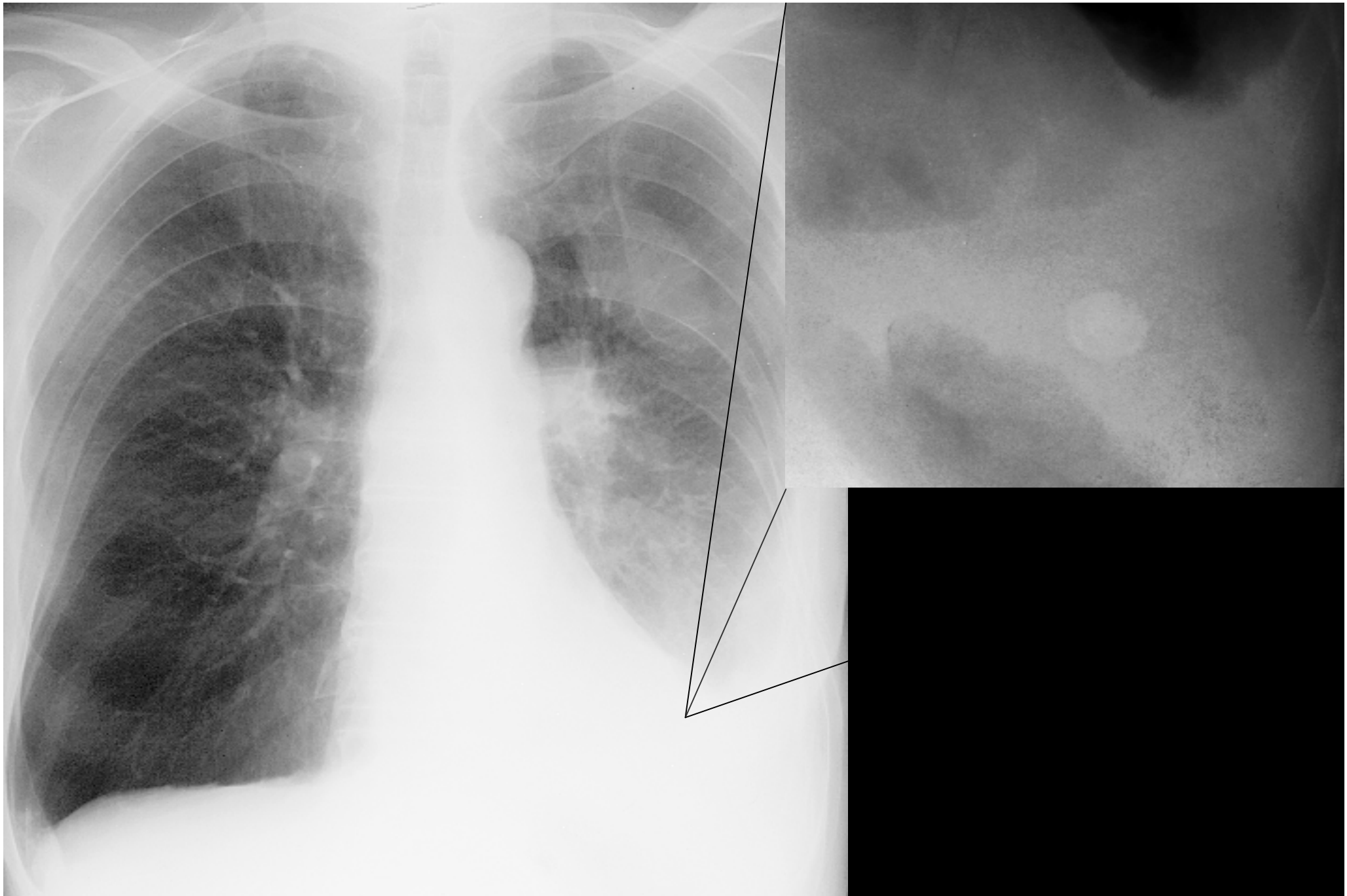
Farming contaminated soil

Poultry waste

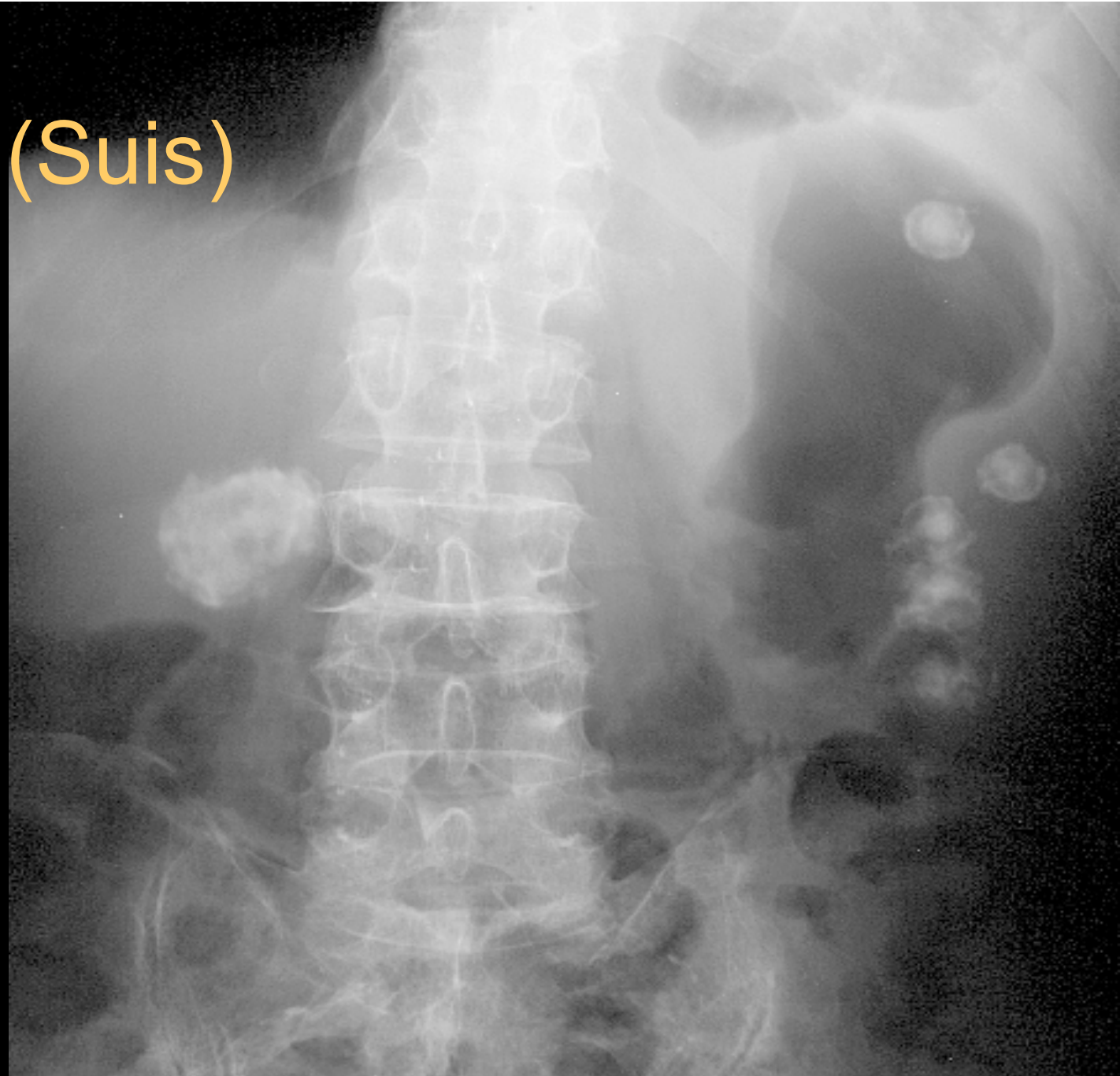
Viral Disease

SARS

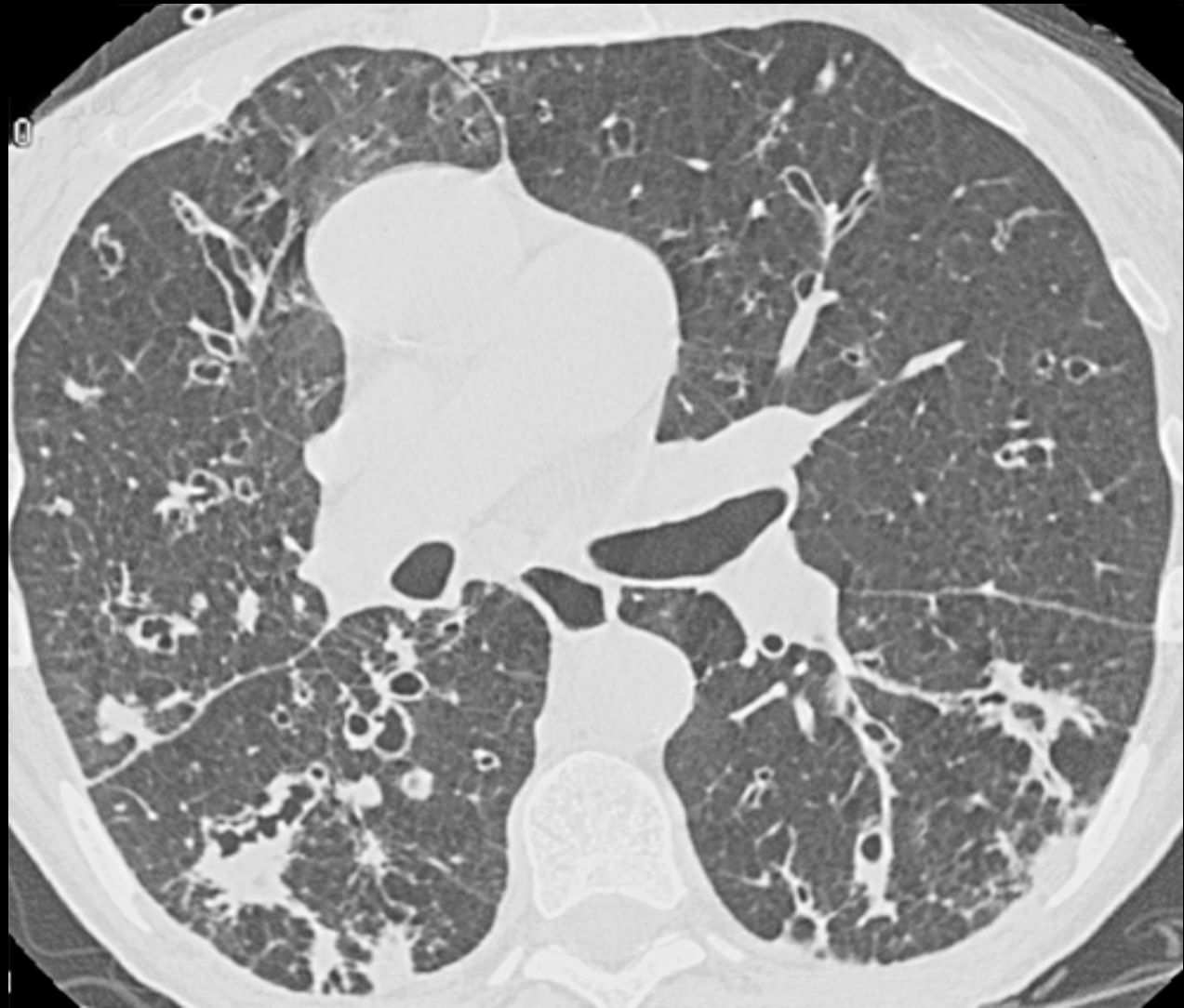
Civets



Brucellosis (Suis)



Pasturella multocida



Histoplasmosis

Disease forms

- Primary pneumonia

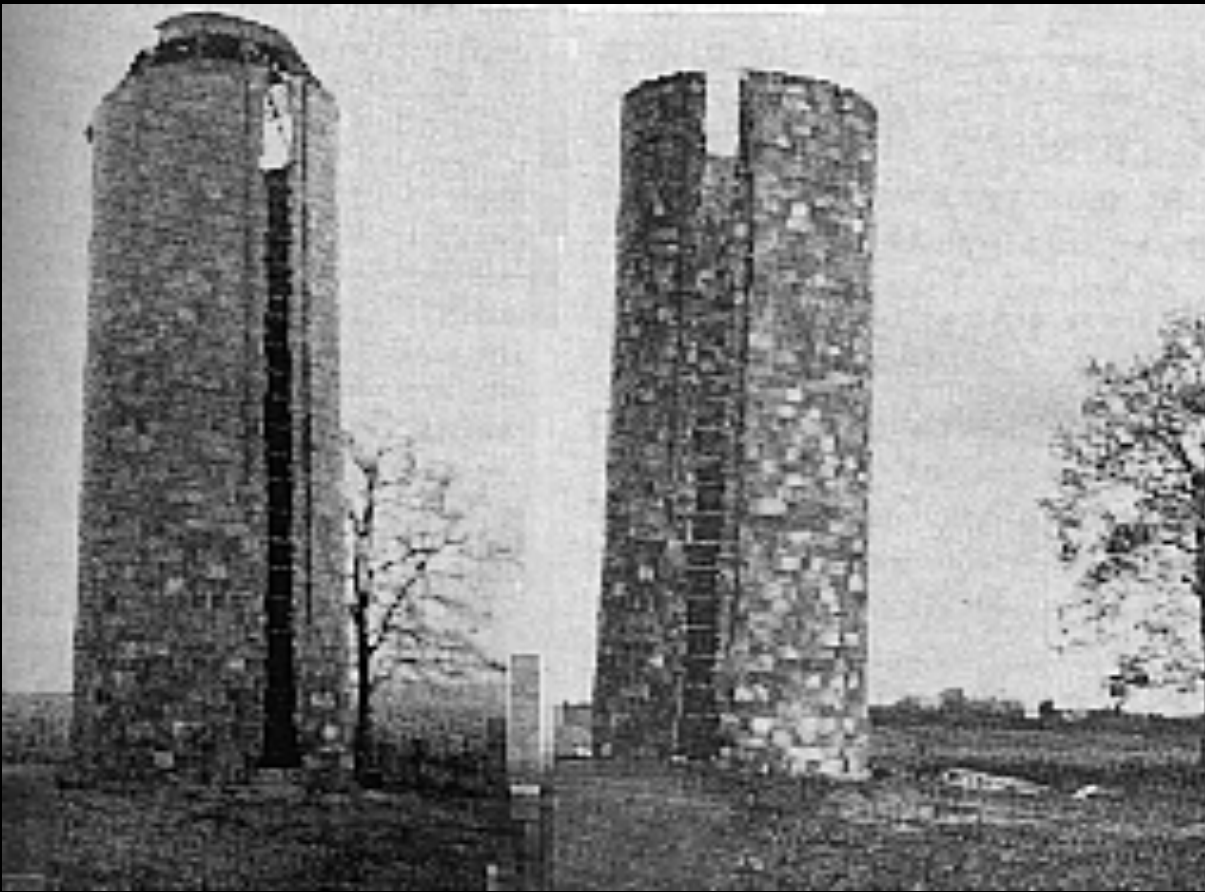
- Progressive disseminated disease

- Chronic infection

- Reinfection

Pulmonary histoplasmosis in a farm family fifteen years later

Procknow, Am Rev Respir Dis, 1966



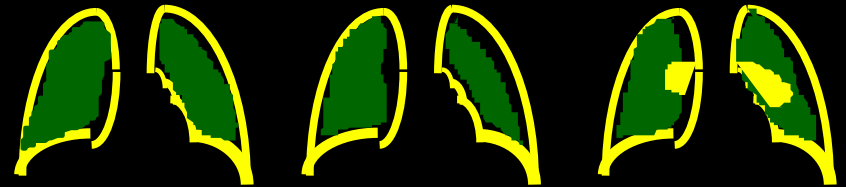
Epidemiology of Histoplasmosis

Intense Exposure - Acute Illness

Father

Son, age 21

Son, age 5



Casual Exposure - Asymptomatic

Daughter, 17

Daughter, 19

Son-in-law, 24



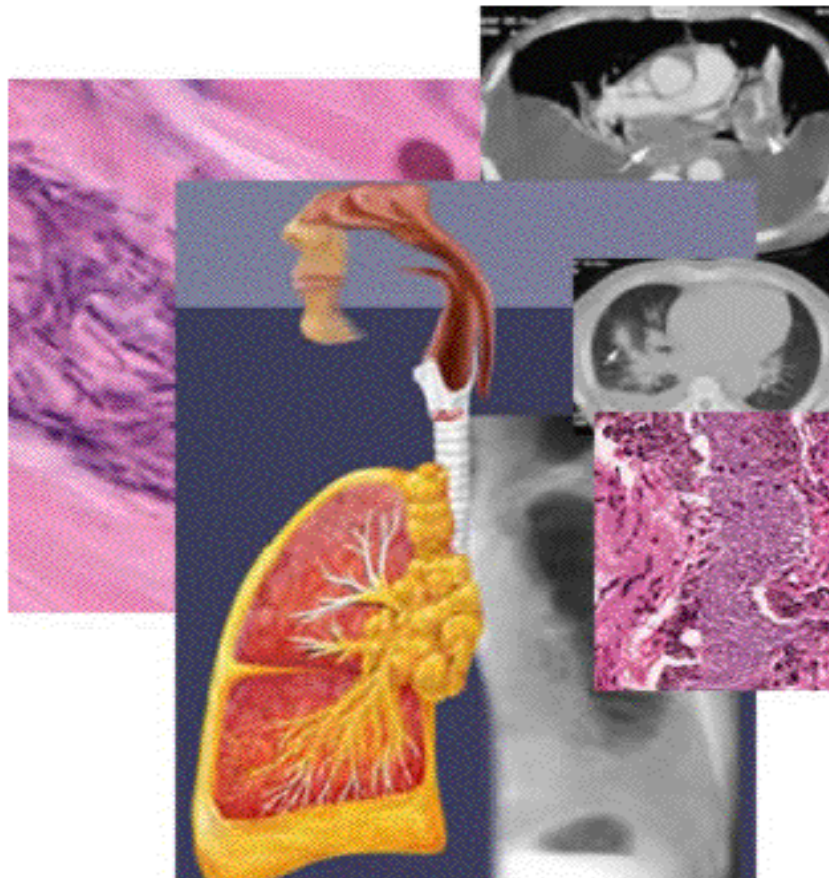
No Exposure - X-rays normal

Mother

Daughter, 24

INHALATIONAL ANTHRAX

[HOME](#) [Pathogenesis](#) [Cases](#) [References](#) [Credits](#) [Notice](#) [Summary](#)



This site provides information about the pathogenesis and imaging of inhalational anthrax.

The content represents the combined efforts of the **Armed Forces Institute of Pathology** and the **American Registry of Pathology**, Washington DC and **INOVA Fairfax Hospital**, Fairfax VA.

We invite collaboration with other institutions who have experience with anthrax.

Our goal is to provide information that improves the understanding and recognition of inhalational anthrax. We extend our deepest sympathy to the families and friends of those who have died or been injured in this attack and hope that this information contributes to the prevention of future casualties.

A complete list of those responsible for the content, design and administration of this site is available on the [credits](#) page.

Jeffrey R. Galvin, MD
Department of Radiologic Pathology
Armed Forces Institute of Pathology

Anthrax

6 letters contained highly refined spores

Senate: Leahy, Daschle

News anchors: Brokaw, Rather

Newspapers: New York Post, National Enquirer

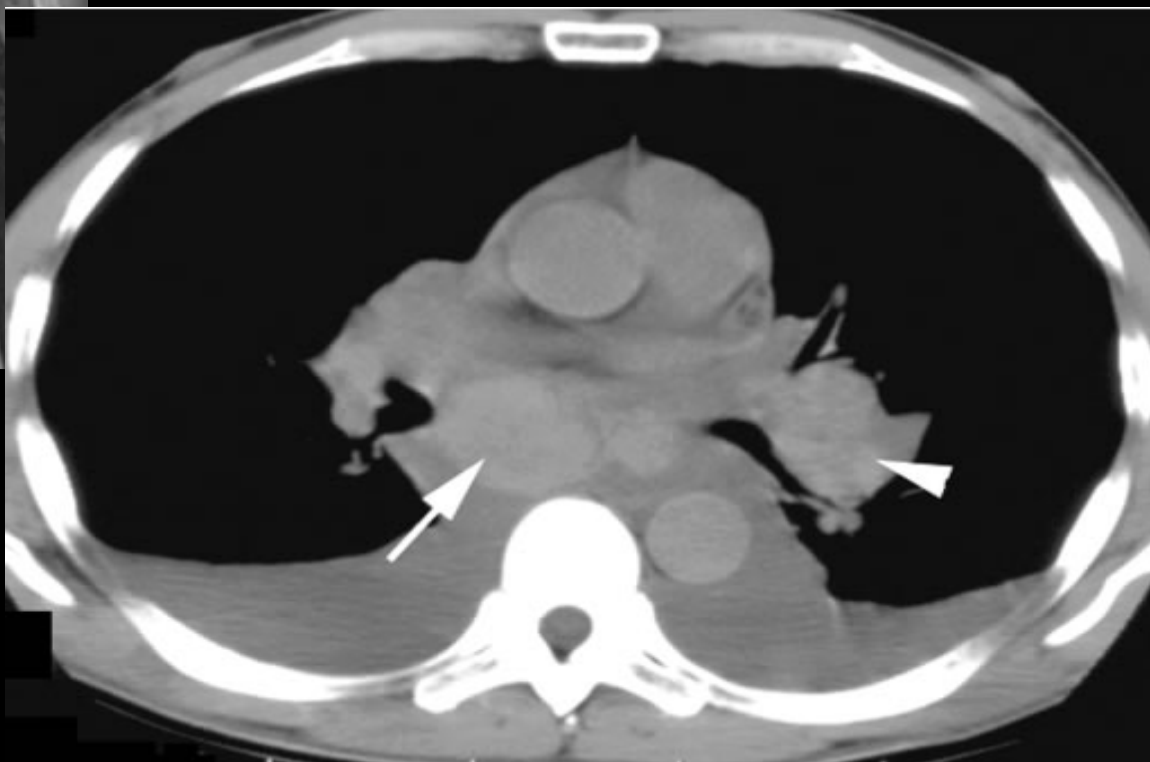
11 inhalation anthrax: 5 deaths

Photo editor (National Enquirer)

2 mailmen Virginia

61 y/o hospital stockroom Manhattan

94 y/o widow, Connecticut



SARS

Nov 2002

Guangzhou, China

Coronavirus

Civets

Fatality Rate 10%

>8000 Cases



Ananova:

China drowns 10,000 mammals to fight Sars

China has started drowning thousands of civet cats in vats of water to eliminate a possible source of the Sars virus.

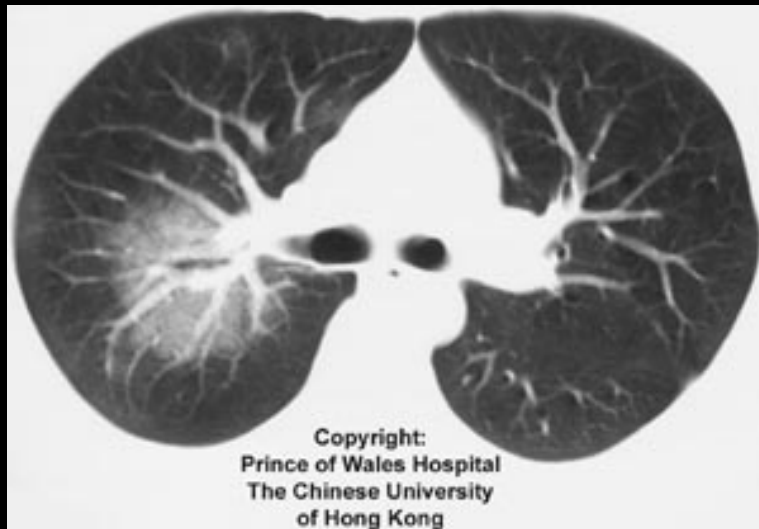
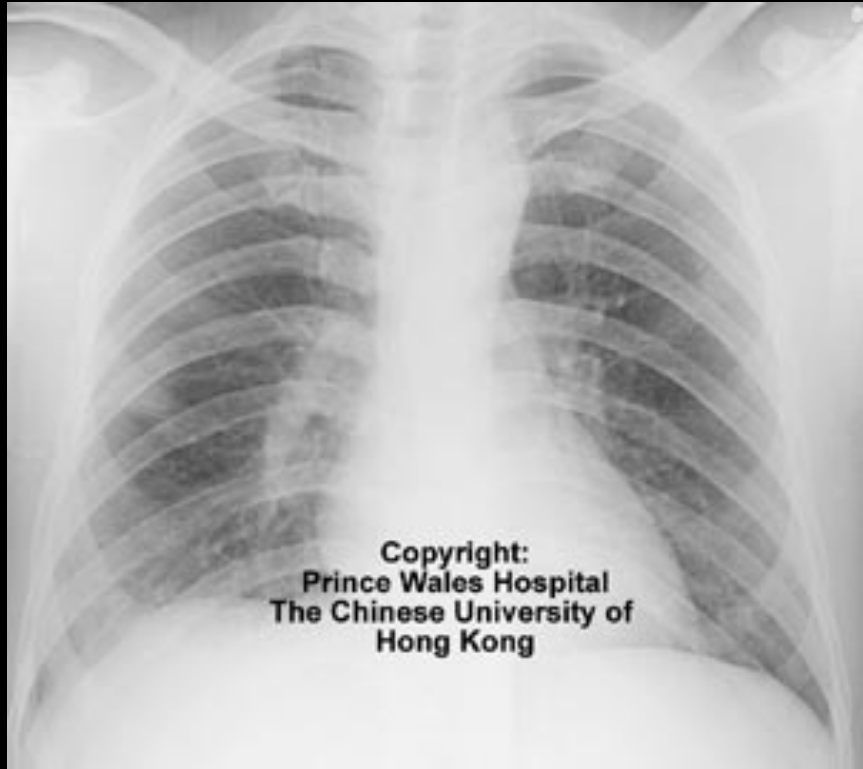


SARS Imaging

Nonspecific findings

CXR's abnormal in those
requiring hospitalization

CT more sensitive



Radiographic Manifestation of Agricultural Disorders of the Lung

Normal Chest Radiograph

Chronic Bronchitis

Asthma

Organic Dust Toxicity Syndrome

Farmers Lung

Alveolar Pattern Acute Interstitial

Farmers Lung

Silo Fillers Disease

Dung Lung

Chemical Poisoning

Chronic Interstitial Pattern

Upper Lobes

Farmers Lung

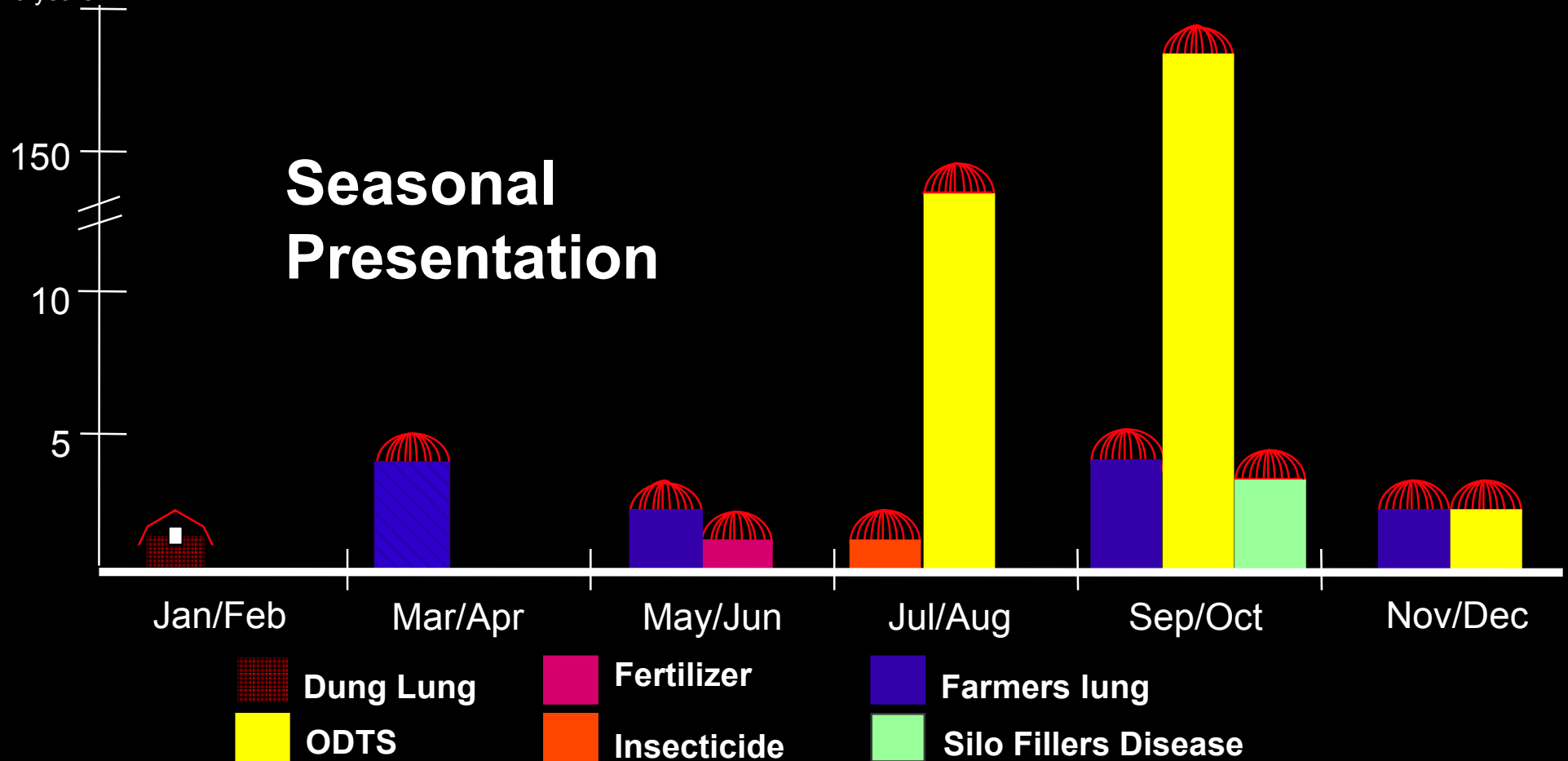
Lower Lobes

Silo Fillers Disease

Paraquat Poisoning

Farmers
10 years

Seasonal Presentation



Rural vs Big City

Hypersensitivity
pneumonitis

NO₂

Poisonings

ODTS

Hydrogen sulfide

Fungi

Farmers lung

Silo fillers disease

Insecticides

Moldy hay

Toxic manure

chickens

Humidifier lung

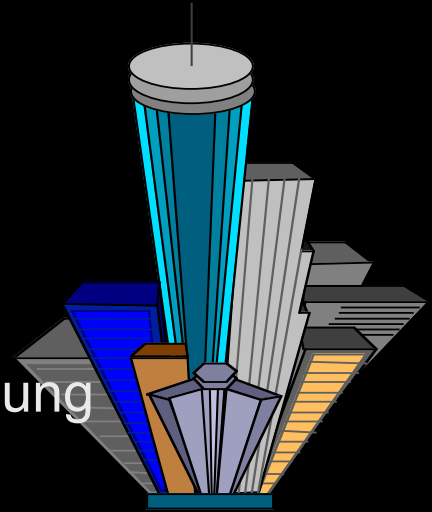
Ice hockey

Insecticides

Air conditioners

Chemical industry

pigeons



GURNEY'S

SEED & NURSERY CO.



Gurney Radiographics 1991

W. B. GURNEY

Cancer Among Farmers

Excess Risk

Non-Hodgkin's Lymphoma
Leukemia
Hodgkin's Lymphoma
Skin
Multiple myeloma
Lip
Stomach

Decreased Risk

Lung
Colon
Esophagus
Bladder

Non-Hodgkin's Lymphoma

- Fertilizer: Nitrates
- Herbicide: 2,4-D
- Insecticide: Diazinon

Weisenburger Am J Ind Med 1990

Zahm Epidemiology 1990

Lung Field

