101年中區傳染病防治醫療網教育訓練課程

主辦單位：中國醫藥大學附設醫院（中區傳染病防治醫療網）

協辦單位：衛生署臺中醫院

指導單位：行政院衛生署疾病管制局第三分局

課 程 表

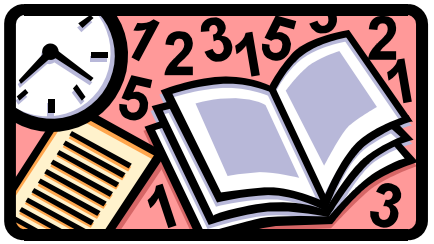
日　期	101年6月6日(星期三) 上午8:30-13:00	
地　點	衛生署台中醫院12樓大禮堂	
時　間	課 程 名 稱	講　師
08:30~09:00	報 到	
09:00~09:50	傳染病防治醫療網執行策略	衛生署疾病管制局第三分局 林代理分局長明誠
09:50~10:40	第一、五類法定傳染病概略簡介	衛生署疾病管制局 中區傳染病防治醫療網 王任賢 指揮官
10:40~10:50	休息一下	
10:50~11:40	中區傳染病防治醫療網101年工作重點	衛生署疾病管制局 中區傳染病防治醫療網 王任賢 指揮官
11:40~12:30	醫院如何撰寫傳染病緊急應變計畫	
12:30~13:00	綜合討論	
13:00	賦歸	

傳染病防治醫療網
Infection Disease Control Medical Network
IDCMN
防治策略

疾病管制局第三分局
林代理分局長明誠

大　綱

- 傳染病防治醫療網建立
- 傳染病防治醫療網體系規劃
- 傳染病防治醫療網運作
- 支援人力權利義務



傳染病防治醫療網建立

緣　起

- 92年SARS之衝擊
  - 院內感染控制
    - 醫院群聚避免再度發生感染
  - 避免造成醫院拒收病患事件
    - 不要在我家後院症候群，簡稱「鄰避」症候群 (Not-In- My-Backyard Syndrome (NIMBY)
  - 集中收治病患
    - 建立國內感染症患者專責醫療之體系

沿　革

- 92年「後SARS重建防疫體系計畫」
- 92年9月成立「感染症防治醫療網」
- 96年7月因應傳染病防治法修訂更名為「傳染病防治醫療網」

依　據

- 傳染病防治法第14條
  - 中央主管機關得建立傳染病防治醫療網
- 傳染病防治醫療網作業辦法
  - 建立傳染病防治醫療網，加強區域聯防體系

作業辦法

- 明定區域劃分原則及範圍
- 明定指揮官、副指揮官之任務及權限
- 明定啟動時機及啟動程序
- 傳染病病患收治隔離原則
- 增訂地方主管機關及應變醫院須配合之義務

目　標

- 發揮傳染病專責醫療照護之功能
- 建立感染症醫學及公共衛生結合之防疫醫療體系
- 提升國內傳染病醫療體系應變能力


馬祖
金門
基隆
桃園
台北
新竹
宜蘭
苗栗
台中
彰化
南投
花蓮
雲林
澎湖
嘉義
台南
高雄
台東
屏東
綠島
蘭嶼

指揮體系

	平時	變時
中央	疾病管制局	中央流行疫情指揮中心
區域	傳染病防治醫療網網區	傳染病防治醫療網網區
地方	縣市政府 應變/隔離醫院	地方流行疫情指揮中心

區指揮官權責

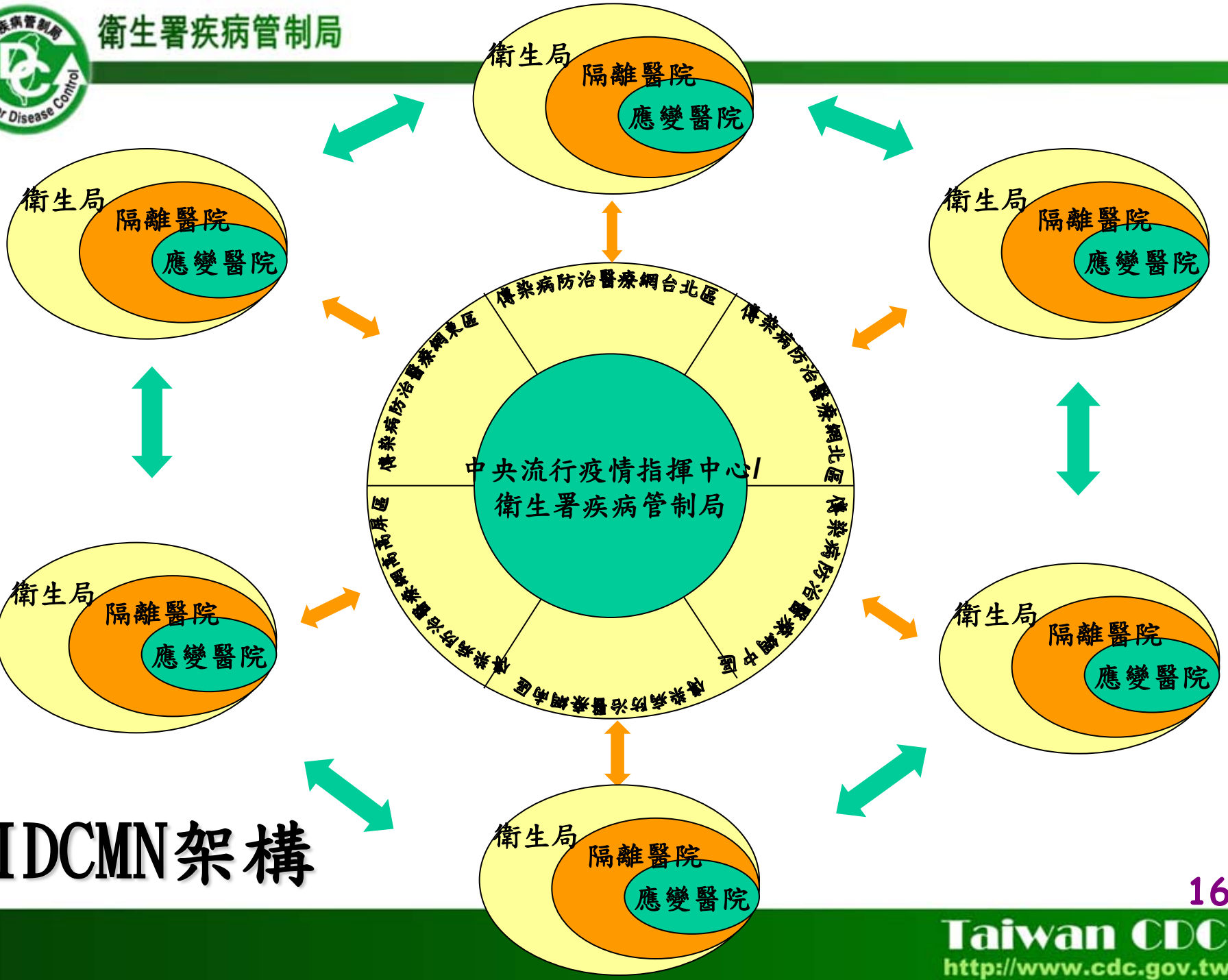
- 平時
  - 提供各醫療網區傳染病防治策略規劃/疫情研判/醫療處置等諮詢
  - 辦理相關計畫/醫院及病房指定審查/輔導考核/醫療資源調度/醫界政策溝通等事宜
- 變時
  - 統籌病例研判/疫情調查/感控措施等諮詢事宜
  - 指揮醫療資源各項調度並協調啟動醫療機構

醫療院所範圍

- 平時
  - 隔離醫院
  - 應變醫院
  - 支援合作醫院隔離醫院
- 變時
  - 指定或徵用醫療機構或公共場所設立檢疫或隔離場所

醫院收治原則及傳染病房類別

- 收治原則
  - 應變醫院：收治第一類、第五類傳染病人
  - 隔離醫院：必要時收治第二類、第三類及第四類傳染病人
  - 變時依中央流行疫情指揮中心指揮官指示辦理
- 傳染病房類別
  - 普通隔離病房
  - 負壓隔離病房


衛生局
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應變醫院
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應變醫院
傳染病防治醫療網台北區
傳染病防治醫療網北區
傳染病防治醫療網中區
傳染病防治醫療網南區
傳染病防治醫療網高屏區
傳染病防治醫療網東區
中央流行疫情指揮中心/
衛生署疾病管制局

IDCMN架構

傳染病防治醫療網運作

概念

- 傳染阻絕策略
- 病患集中收治
- 分級動員
- 保全醫療體系正常運作

工作重點

- 平時：完成應變準備計畫，加強演練及檢視，相關軟硬體設施/人員等亦完成整備
- 疫情初期：醫院啟動，以區域聯防體系運作，專責照護病患
- 疫情流行期：病患分流
- 恢復期：復原與補償

平時整備-1

- 中央
  - 政策、法規、計畫之訂定
  - 督導網區業務
- 區域（分局）
  - 配合/執行中央政策
  - 綜理/協調/督導/審查/查（考）核網區業務
  - 提報支援合作醫院

平時整備-2

- 地方
  - 縣市政府
    - 提報隔離醫院、應變醫院
    - 對於可運用人力、物力、設施及交通運輸工具等進行建檔及動員規劃並演習驗證
    - 規劃傳染病人就醫模式（含山地/離島）及醫院清空病人轉送配套措施
  - 隔離醫院
    - 充分配合傳染病防治醫療網相關政策
    - 對於可運用人力、物力、設施及交通運輸工具等進行建檔及動員規劃並演習驗證

變時應變

- 醫院啟動、清空
- 指定徵用設立檢疫隔離場所
- 人員徵調
- 病例研判、疫調、感控等

醫院啟動原則

- 依中央主管機關或中央流行疫情指揮中心指揮官指示辦理
- 醫療院所啟動以應變醫院為優先，隔離醫院次之
- 收治傳染病病人數量大於該院指定之隔離病床數
- 須採清空樓層/區塊或全院清空等策略應變

醫療處置

- 病人就地診治
- 就醫縣市之應變醫院為優先
- 轉收治於其他縣市之應變醫院
- 進駐協助診療

醫療量能

- 量能之提升
  - 維持負壓隔離病房功能完整性
  - 辦理相關醫院演習
  - 辦理教育訓練
  - 計畫評估及修訂
  - 政策/計畫宣導

人力規劃

- 維持醫院持續運作為原則
- 人員不敷調度則徵調進駐
- 照護人力配置
  - 以醫院現況為原則
  - 醫院評鑑基準
  - 勞動基準法相關規定

支援人員規劃-1

- 應變醫院之支援
  - 專業諮詢：由支援合作醫院組成諮詢團隊，類別含醫事人員、護理師、藥師、醫檢師、呼吸治療師及工程人員等
  - 臨床照護：醫療院所提撥一定比例之支援人員
    - 支援人員以達應變醫院執業人員數量30%為原則
    - 由該縣（市）地區級以上醫院派員進駐為原則，惟前開醫院之支援人員不足時，亦得徵調衛生所、基層診所人員
    - 支援人員之調度由當地主管機關為之；如支援人員仍不足，則由區指揮官（醫療網區）協調，調度轄區內其他縣市支援人員進駐；倘需跨網區支援，則由指揮官協調

支援人員規劃-2

- 檢疫或隔離場所支援人員規劃
  - 醫事人員：
    - 類別及數量視該場所規模及需求而定，由當地衛生所、基層診所優先徵調，必要時搭配歇業/退休之醫事人員
  - 其他人員：
    - 由地方主管機關平時建置之防治工作人員名冊徵調

支援人員權利義務-1

- 權利：
  - 接受教育訓練、演習
  - 受徵調：
    - 薪資：比照原日薪計算
    - 津貼：依人員別提供不同額度之補償
    - 確保提供有效的個人防護裝備
    - 優先提供疫苗注射、用藥等必要之防疫措施
    - 因直接或間接照護（顧）傳染病患致感染傳染病或死亡得予醫療費、身心障礙者補償費、喪葬費、撫卹金、非財產上損害之慰助金等補償

支援人員權利義務-2

- 義務
  - 參加教育訓練、演習
  - 依指示徵調至醫療機構、檢疫或隔離場所協助傳染病防治工作

補 助

- 應變醫院相關補助
  - 病房維護費
  - 人員訓練、演習
  - 隔離病房硬體設施

指定隔離病房補助政策調整

- 100年8月起調整補助政策，採健保總額支付概念
- 計算方式
  - 每日每間維護費給付標準-3等級給付方式
    - 第1間至第10間--180點
    - 第11間至第40間--120點
    - 第41間以上-- 60點
  - 總點數：
    - 依標準及病房數計算病房維護費點數，再乘以指定天數
    - 負壓隔離病房平均使用率≧80%者，再加計5%點數
  - 點值：點值設定為1(元)；之後將視立法院通過之預算數及所有應變醫院之加總總點數，調整點值
  - 補助金額：醫院之總點數乘以點值

徵用、徵調補償

- 指定徵用設立檢疫隔離場所及徵調相關人員作業程序與補償辦法
  - 人員/場所之補償計算方式及項目、補償期程之計算及申請程序
- 傳染病防治醫療網作業辦法第十三條
  - 隔離醫院因應疫情啟動致影響醫院營收時，補助其前一年同期全民健康保險總醫療費用差額

復原機制

- 建立復原計畫
- 適當之休息與補償
- 運用公共團體

報告完畢
敬請指教

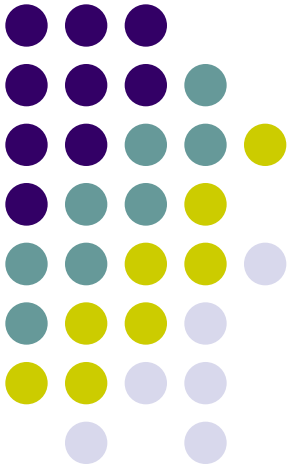
第一類法定傳染病

衛生署 疾病管制局
中區傳染病防治醫療網
王任賢 指揮官

第一類法定傳染病

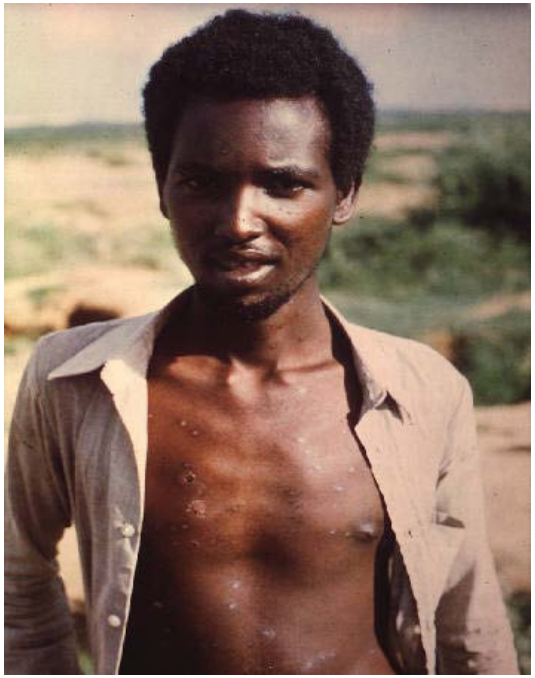
- 中華民國行政院衛生署疾病管制局在2009年6月19日修正公布
- 第一類：天花、鼠疫、嚴重急性呼吸道症候群(SARS)、霍亂、狂犬病、炭疽病、H5N1流感
- 處理原則：24小時內報告，應於指定隔離治療機構施行隔離治療

天花



Smallpox

- Most devastating infectious disease in history
  - 500 million vs 320 million
- Eradicated from planet in 1970's
- Remains bioterrorism threat

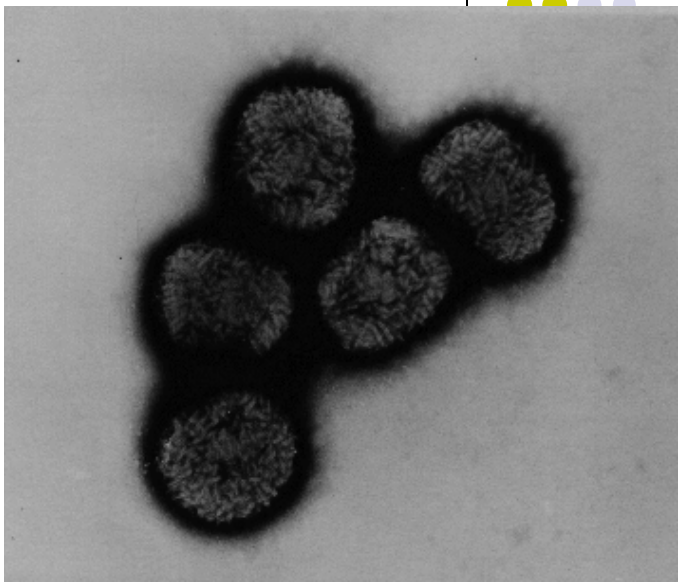


Last known person to have smallpox.

Somalia 1978

Photo courtesy of CDC PHIL

Microbiology



- Variola virus
  - 2 strains
    - Major and minor
  - Variola major
    - Classic smallpox
    - Predominant form in Asia
    - Highest mortality (>30%)
    - Form most likely to be seen

Microbiology

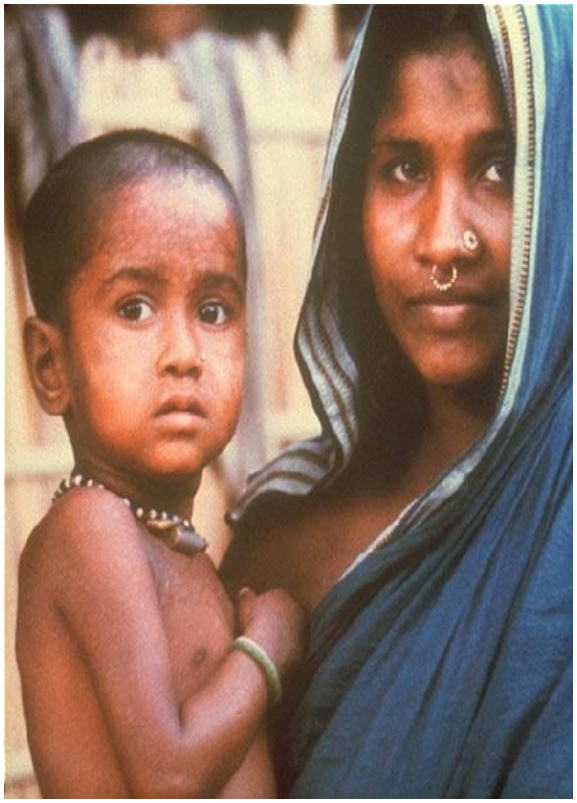
- Variola minor
  - Milder disease
    - Less morbidity/mortality (< 1%)
  - Less severe prodrome and rash
  - Predominant form in N. America

Diagnosis

- Base on signs and symptoms
- Notify Local Health Department
  - Suspicious cases

Clinical Features

- Incubation period: 12-14 days
- Three stages of disease
  - Incubation
  - Prodromal (pre-eruptive)
  - Eruptive



Clinical Features

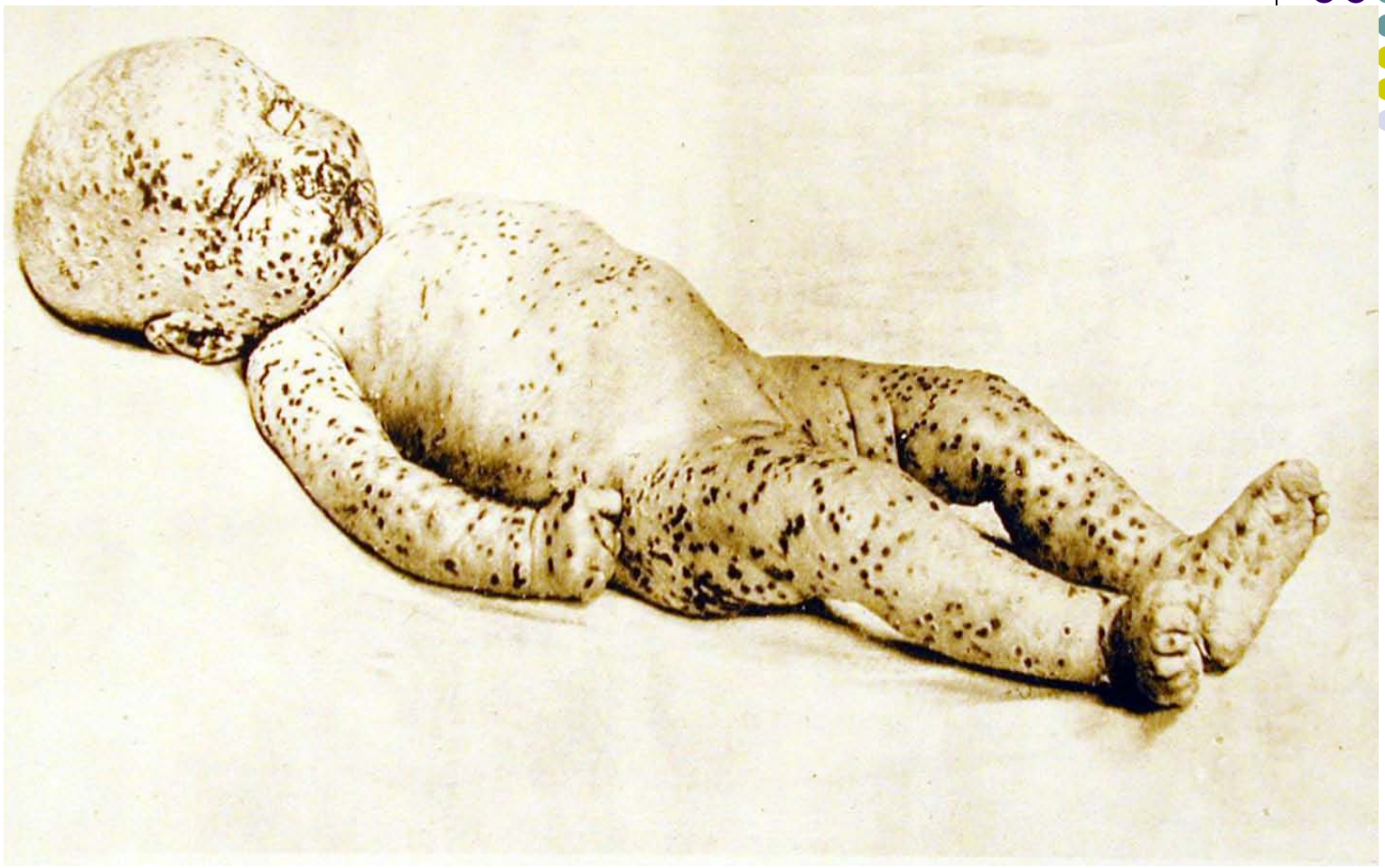
- Prodromal Stage
  - Common symptoms
    - High fever, prostration, low back myalgias, HA
  - Occasional symptoms
    - Vomiting, abdominal pain, delirium
  - Duration typically 3-5 days
    - Mucosal lesions appear at end of prodromal stage
    - Onset of infectiousness

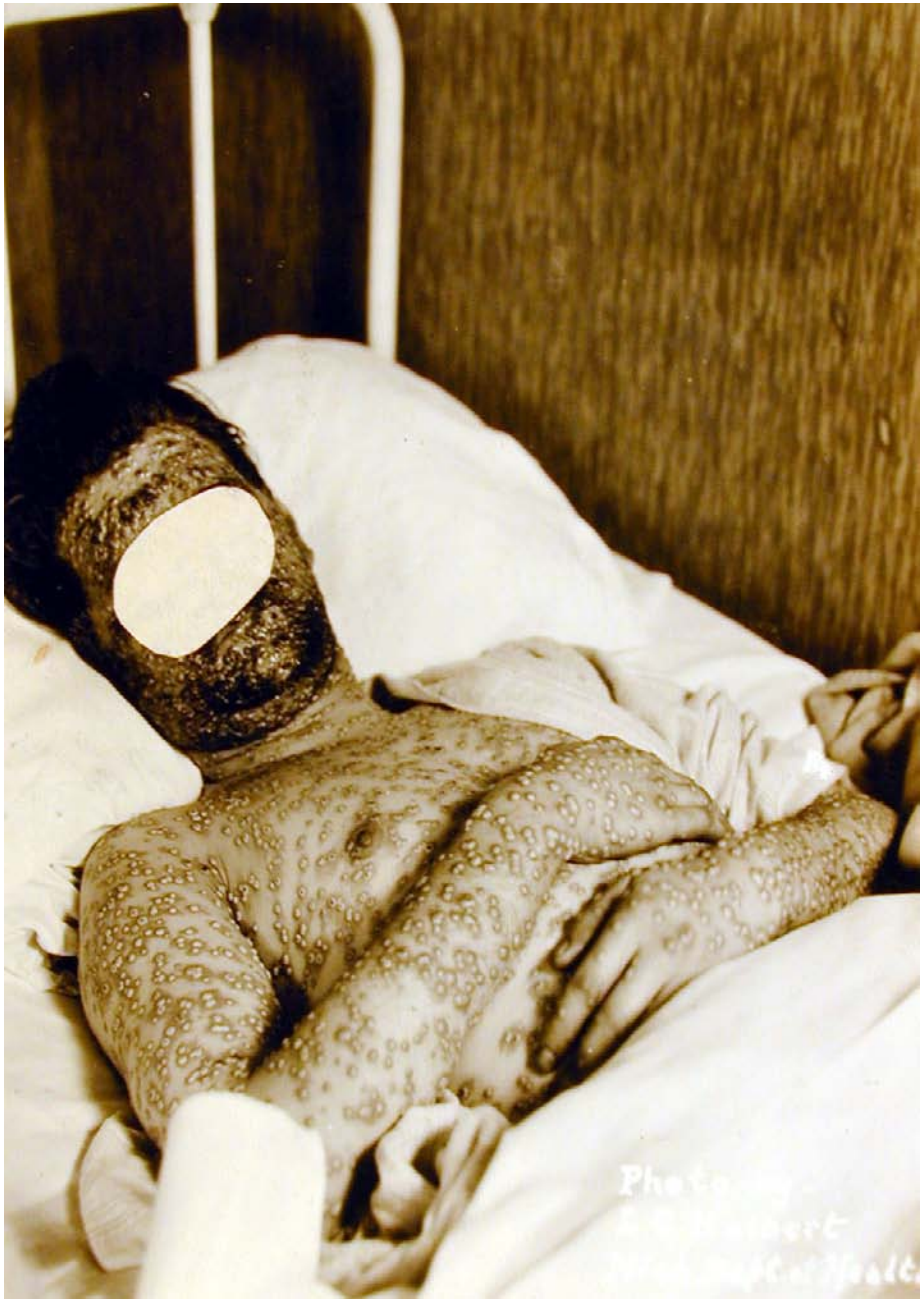
Clinical Features

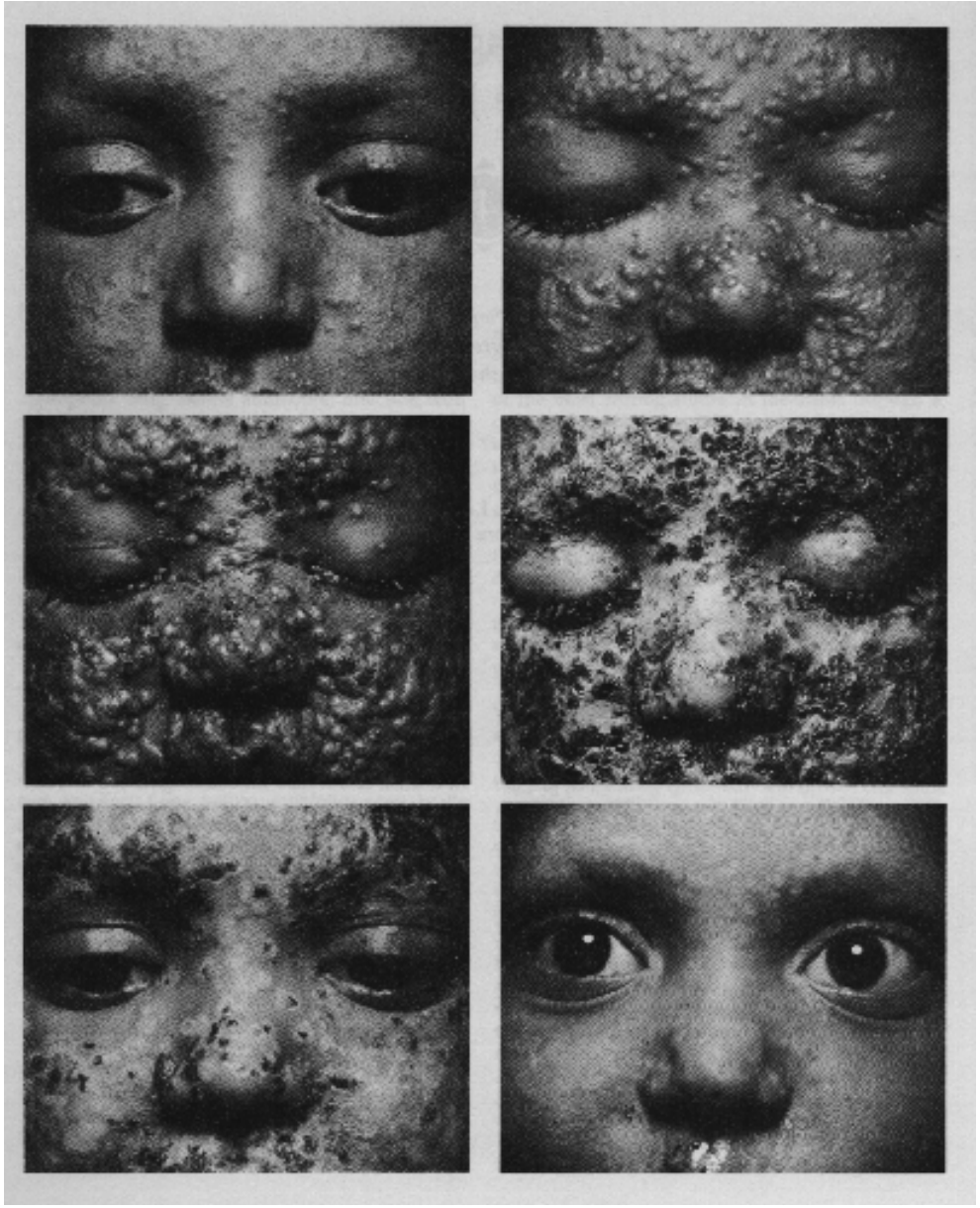
- Eruptive Stage (Rash)
  - Characteristic rash
    - **Centrifugal** (in order of appearance & severity)
    - Lesions all in same stage of maturation
    - Initially oral mucosa
    - Head, face
    - Forearms, hands, palms
    - Legs, soles, +/- trunk

Complications

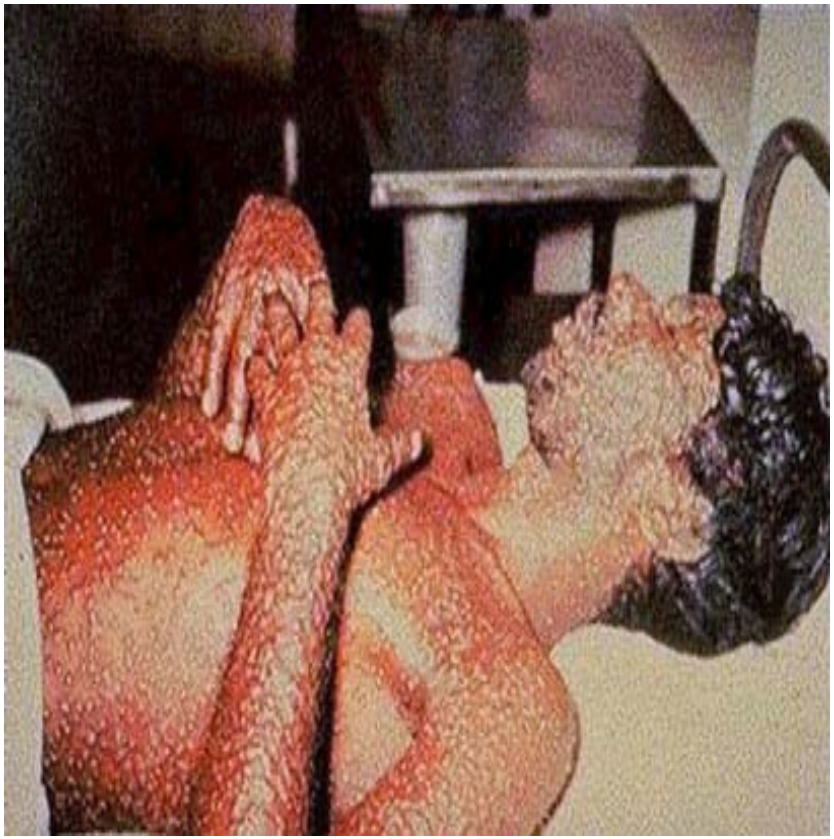
- Disfiguring pock marks
- Encephalitis
- Secondary bacterial infections
- Conjunctivitis or blindness

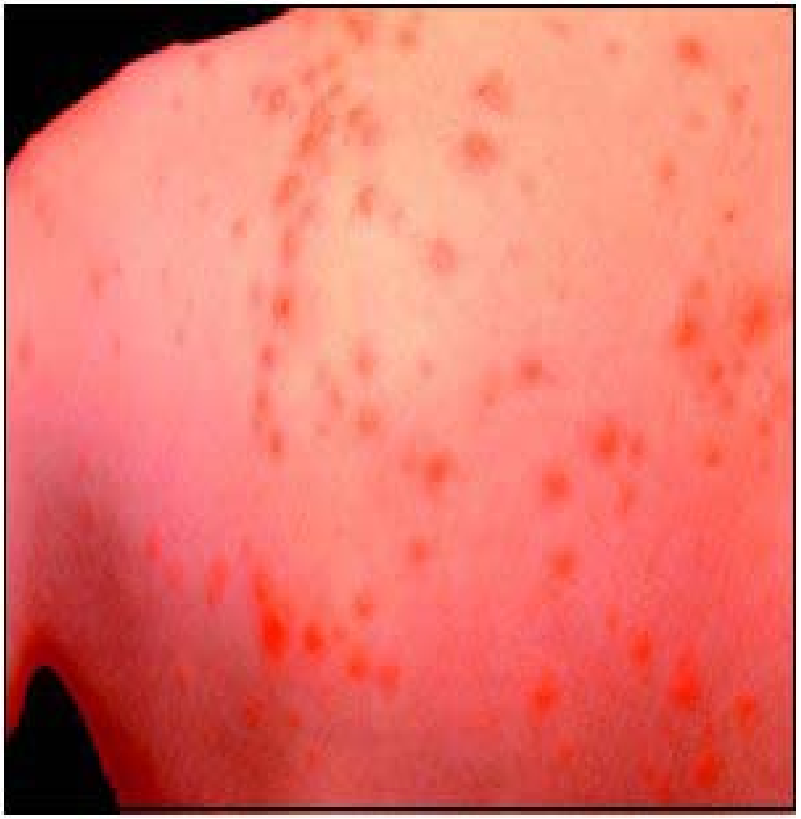






Smallpox VS Chickenpox



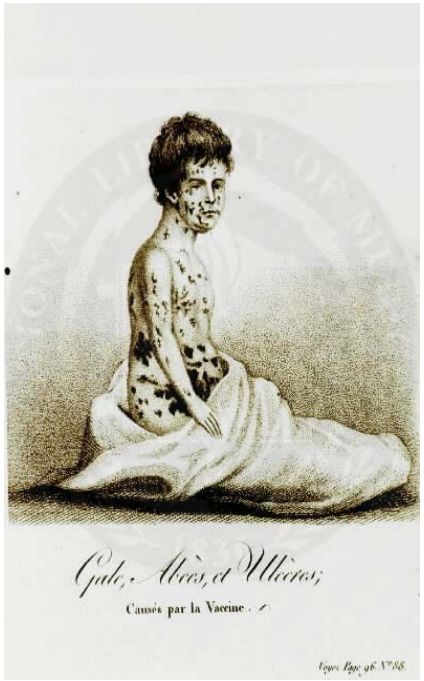


Infection Control

- Highly infectious
  - Droplet, aerosol or clothing
- Transmission slower and less likely than with measles or chickenpox
- Attack rate 25-40%
- 3-4 secondary cases/primary case
  - 10–20 not uncommon

Infection Control

- Airborne and Contact Precautions
  - Negative pressure or HEPA-filtered room
  - N-95 mask
  - Gown and gloves
  - D/C when all scabs separate
- Monitor contacts 17 days
  - Isolate febrile contacts
- Home isolation

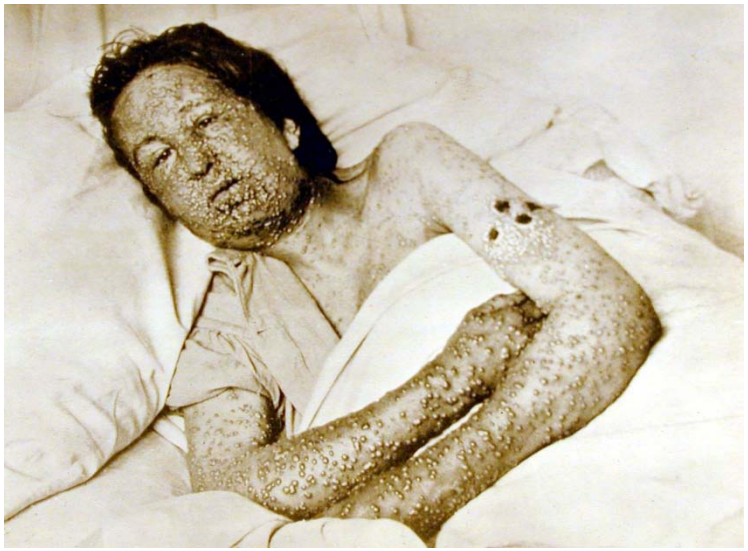


Infection Control

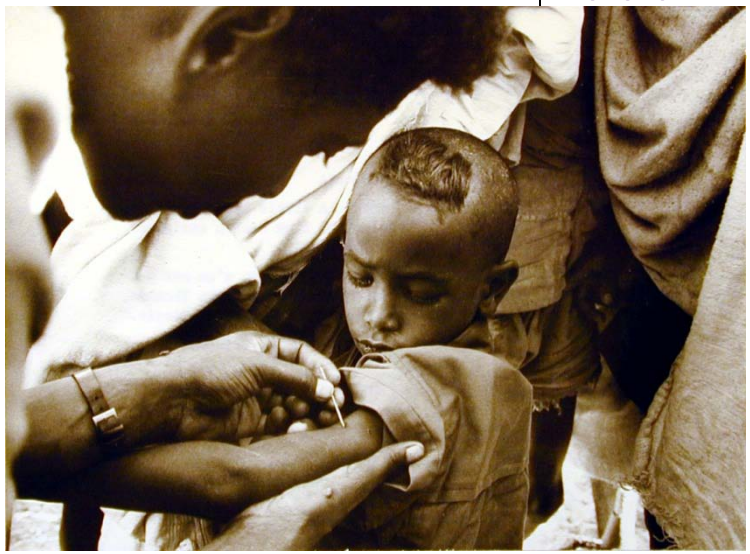
- Disposal of linens/laundry
  - Dispose in biohazard containers
  - Autoclave before laundering
  - Launder in hot water & bleach
- Cremation recommended for casualties

Treatment

- No known antiviral tx
- Offer supportive therapy
  - Electrolyte and volume repletion
  - Hemodynamic support o known antiviral tx
- AB’s for bacterial infections



Vaccination

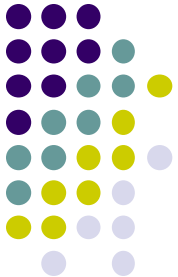


- Vaccinia virus vaccine
  - No longer produced
  - 6 -12 million doses still exist
- 1972: routine childhood vaccination stopped
  - Half of US citizens have never been vaccinated

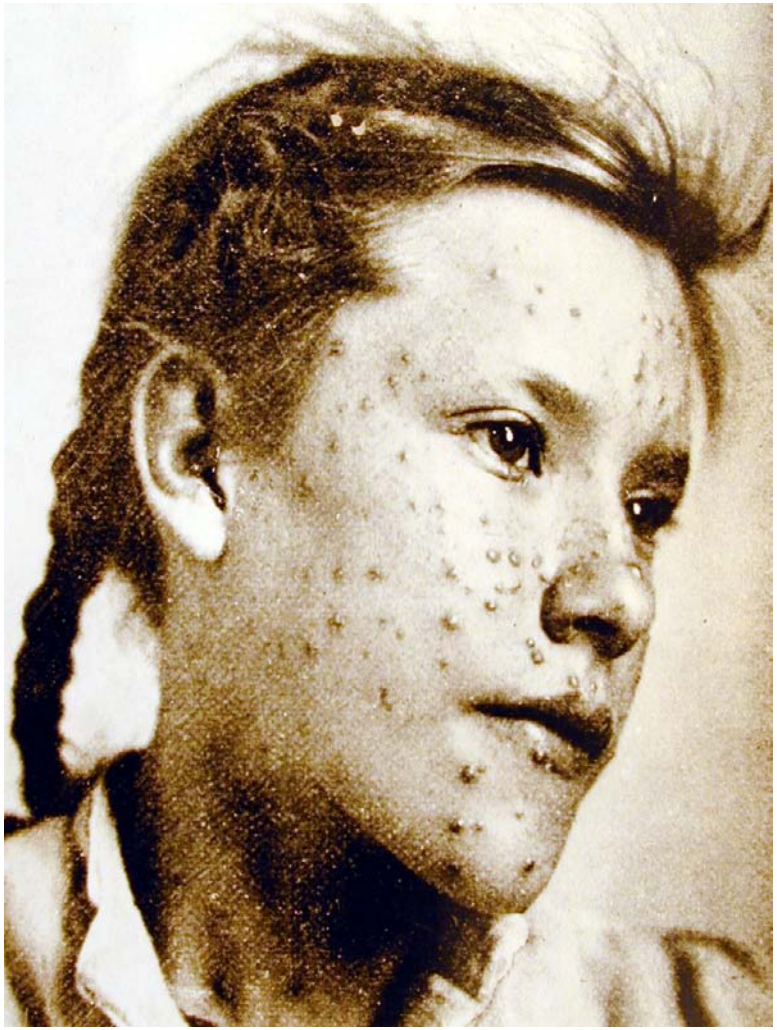
Vaccination

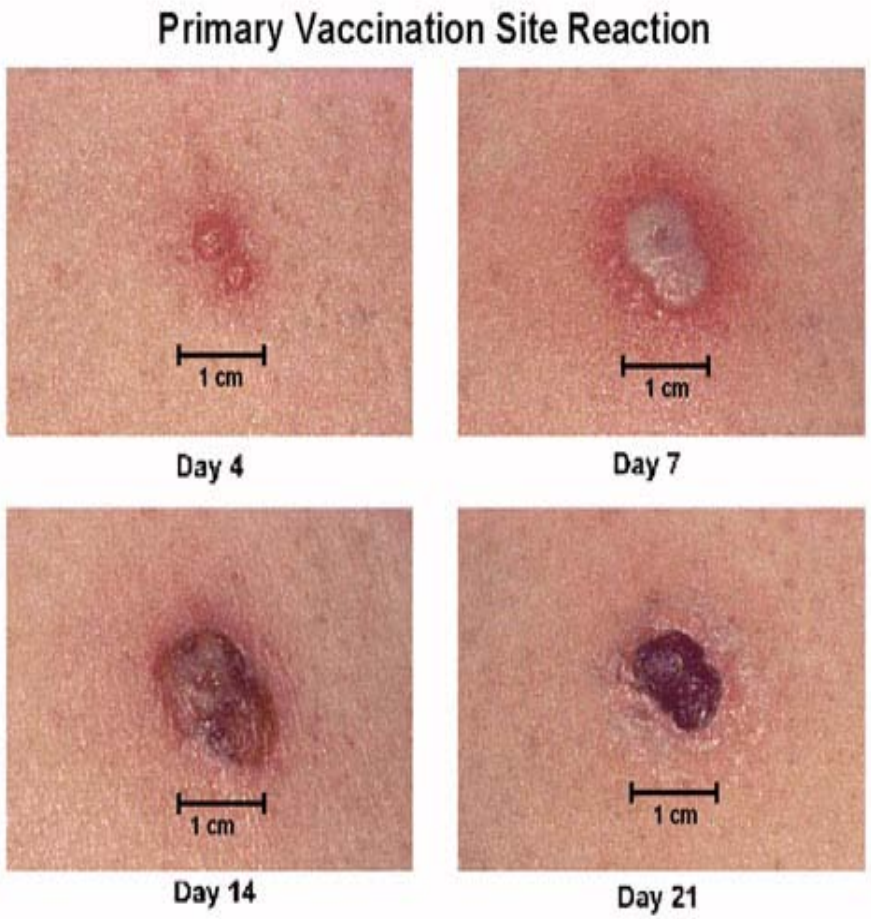
- Immunity lasts 3-5 years:
  - Partial immunity
  - Booster
- Prior infection = lifelong immunity

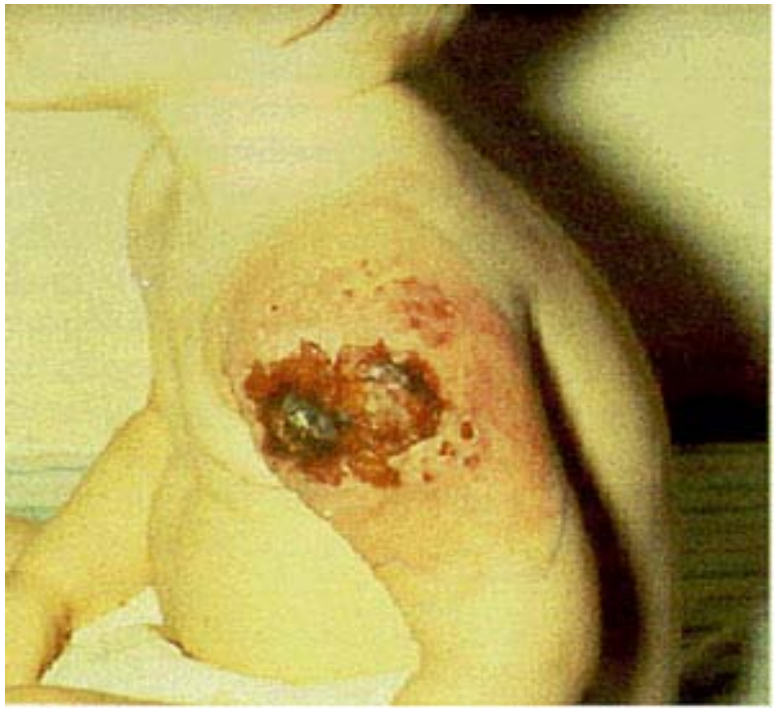
Adverse Reactions Related to Vaccination

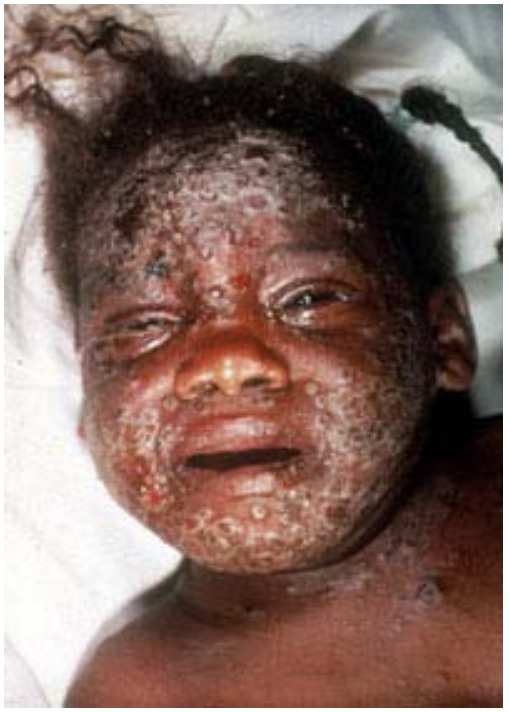


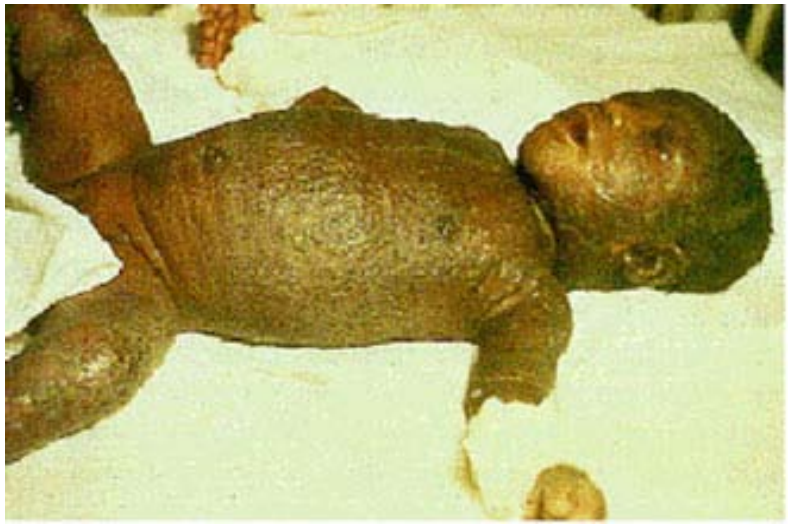
- Adverse reactions
  - Generalized vaccinia
  - Encephalitis
- Give VIG to high risk groups
  - Immunocompromised
  - Eczema or chronic skin disorder
  - Children < 1 yr old
  - Pregnant women

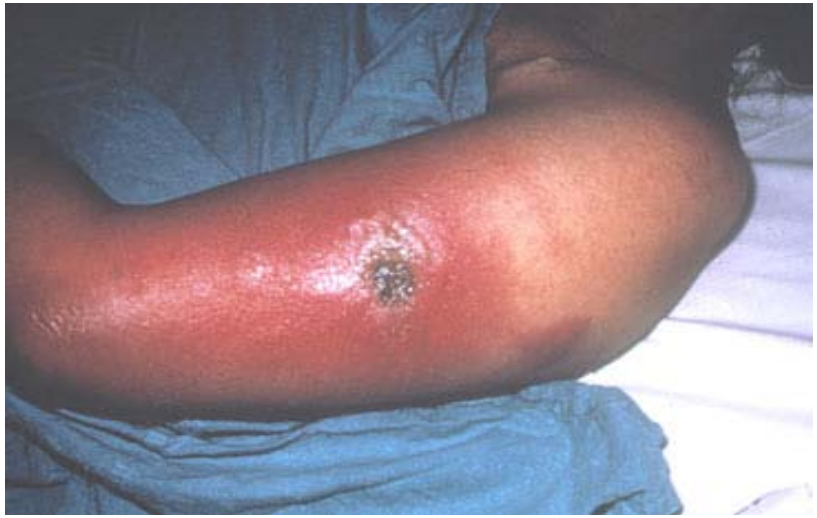



Primary Vaccination Site Reaction
1 cm
Day 4
1 cm
Day 7
1 cm
Day 14
1 cm
Day 21





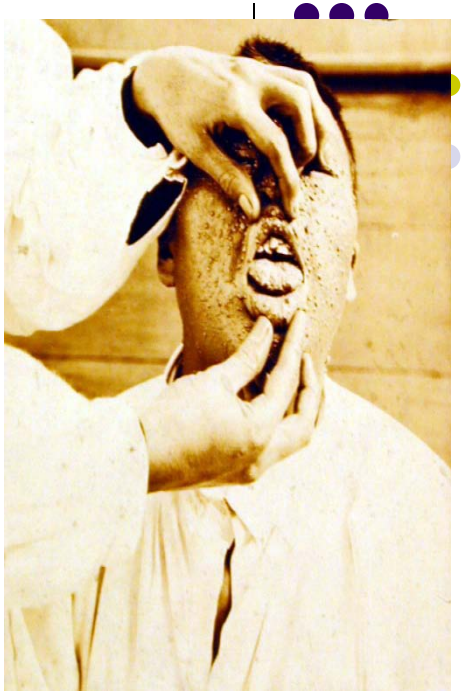




Post Exposure Prophylaxis

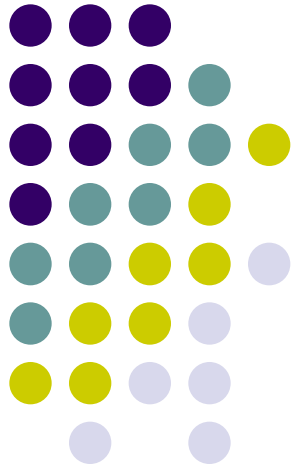
- Exposure
  - Inhalation during initial release, household or face to face contact, or direct contact with contaminated linens or lab specimens from known case
- Vaccination
  - Within 3-5 days of exposure
  - All household or close contacts, hospital employees, hospitalized patients (at the same time as the infected patient), lab employees and mortuary employees

Decontamination



- Virus inactivated within 2 days
- Buildings
  - Not needed
- Standard hospital disinfectants
  - Bleach also effective, but should only be used if you run out of standard disinfectants

鼠疫



Plague: History

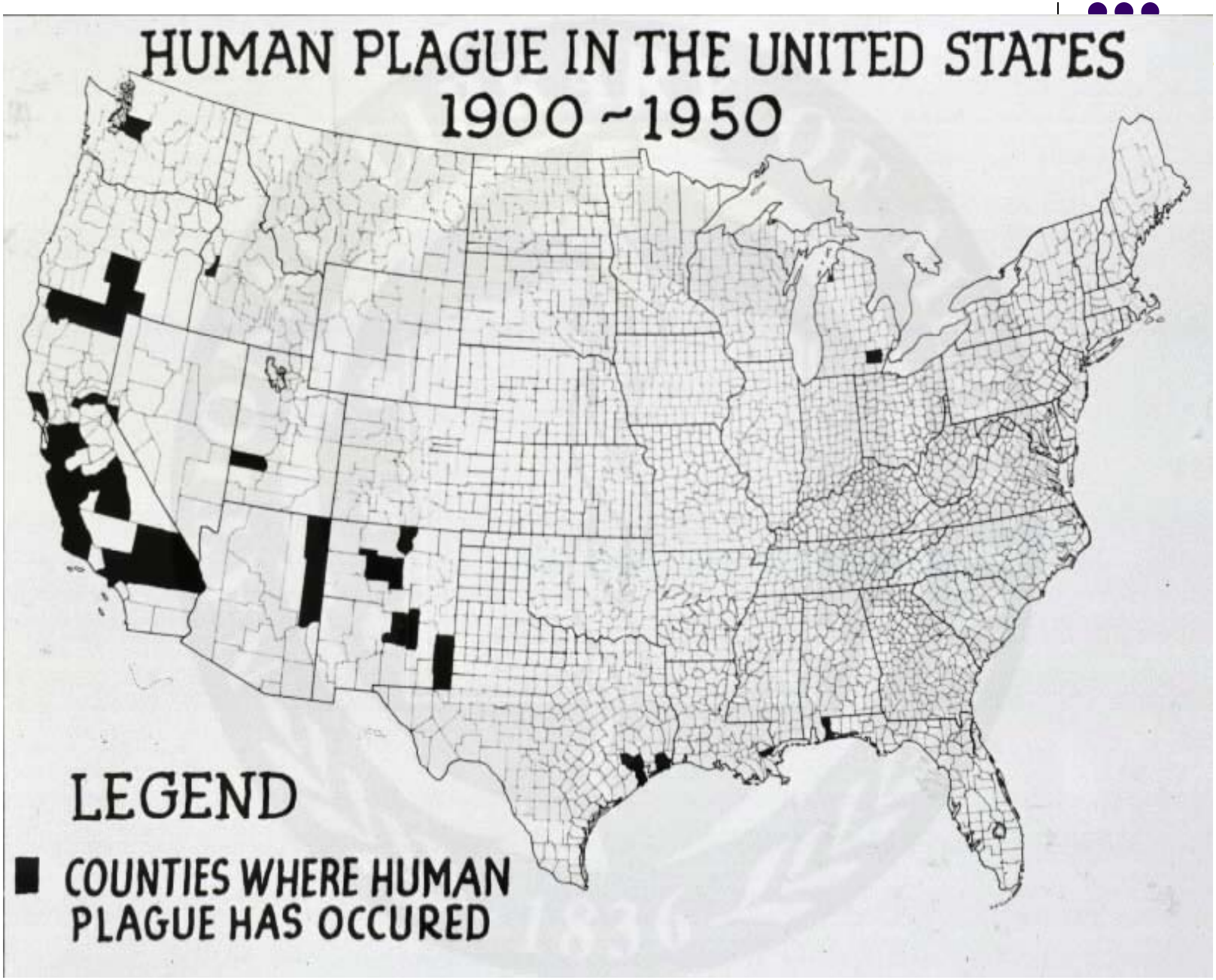
- *Yersinia pestis:* Black Death
- Importance
  - One of three WHO quarantinable diseases
  - Estimated 200 million deaths recorded
- Three prior pandemics
  - Justinian 541 AD
  - Black Death 1346
  - China 1855

Epidemiology

- Three forms of plague
  - Bubonic
    - Most common form in naturally occurring cases
    - Mortality: 13%
    - Bioterrorism: release of infected fleas
  - Septicemic
    - Systemic infection; Mortality: 22%
  - Pneumonic
    - Least common, most severe form
    - Mortality: 57%
    - Form most likely to be encountered in BT attack

When to Suspect Bioterrorism Attack Using Plague

- Report suspected intentional release:
  - Human cases occur in non-endemic areas
  - Cases occur in persons without risk factors
  - Human cases occur in the absence of rodent cases


HUMAN PLAGUE IN THE UNITED STATES
1900 ~1950
LEGEND
COUNTIES WHERE HUMAN PLAGUE HAS OCCURED

Epidemiology

- Four routes human disease
  - Flea-bite (most common)
  - Handling infected animals- skin contact, scratch, bite
  - Inhalation
    - Humans
    - Animals
  - Ingesting infected meat

Plague

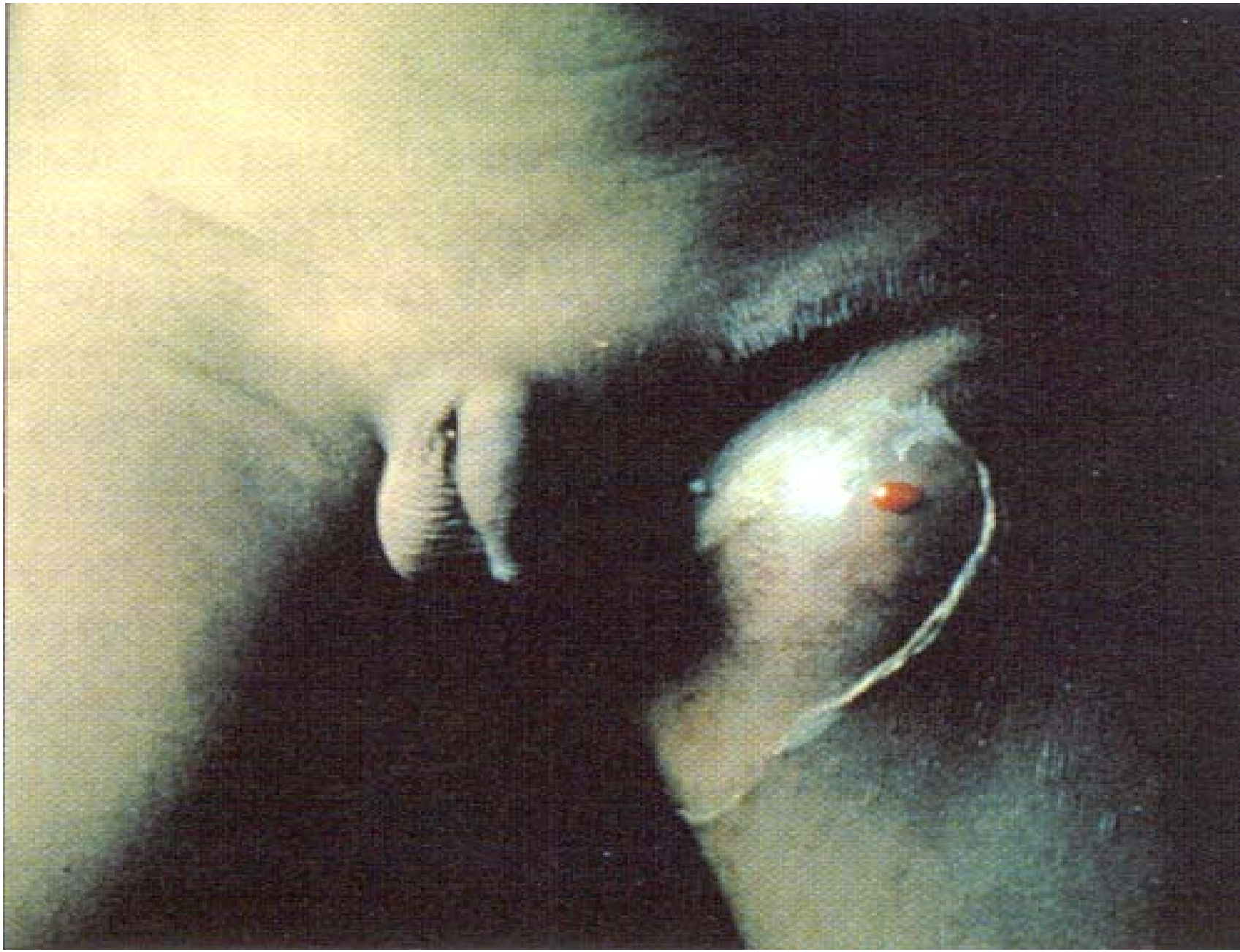
- Early diagnosis essential
  - Without treatment, death within 2-3 days
- Presumptive diagnosis
  - Symptoms; obtain culture specimens and send to reference lab
- Definitive diagnosis
  - Positive blood, sputum or bubo aspirate culture

Clinical Features

- Incubation period: 2-4 days
- Early symptoms
  - Flu-like symptoms
    - Fever
    - Chills
    - Body aches
    - Weakness
    - ↑ WBC's
    - Headache

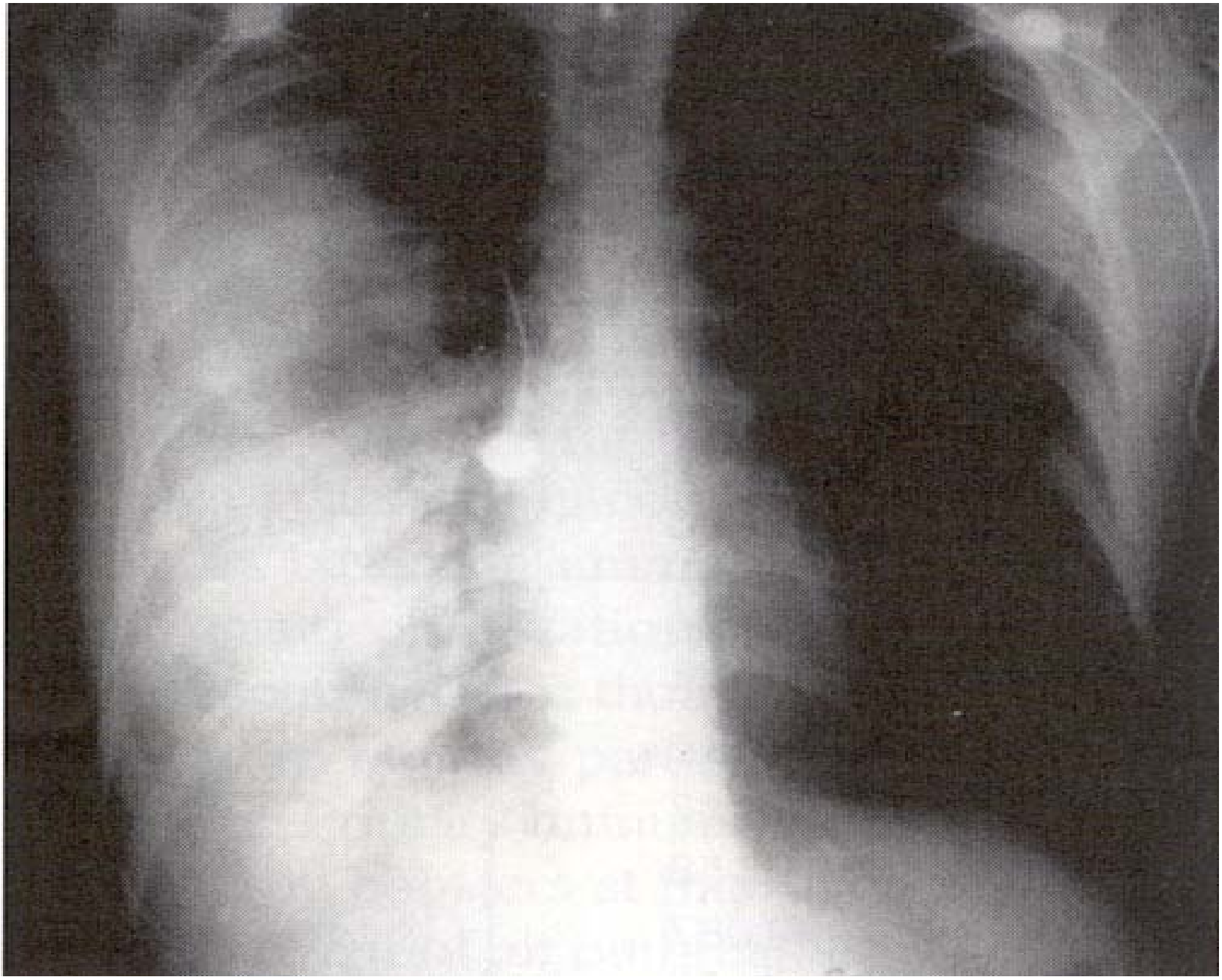
Clinical Features

- Bubonic
  - Buboes
    - Enlarged tender lymph nodes
    - Usually unilateral
    - Usually inguinal/femoral in adults
    - Cervical/submaxillary more common in age < 10



Clinical Features

- Pnuemonic
  - Primary
    - Inhalation
  - Secondary (bubonic)
    - Spread to lungs
      - Interstitial pattern initially
- Presents like typical pneumonia
  - CXR: usually patchy bilateral infiltrates, consolidation
- Hemoptysis
- Mortality nearly 100%



Infection Control

- Bubonic or Septicemic:
  - Standard precautions
  - Contact precautions
    - If bubo is draining
- Pneumonic plague:
  - Droplet isolation (D/C 48 hours)
  - Do not discontinue isolation until patient is clinically improving
    - Antibiotic resistant strain is possible

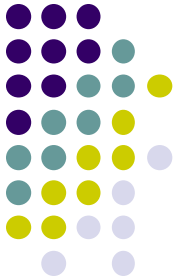
Infection Control

- All forms of plague:
  - Avoid surgery or other aerosol-generating procedures (including autopsies)
    - Wear N-95 masks and perform procedure in negative pressure room

Treatment

- Mortality for untreated cases:
  - Bubonic 50%
  - Systemic and Pneumonic: 100%
- Tx immediately
  - Streptomycin 30 mg/kg/day IM in 2 divided doses or
  - Gentamicin 2 mg/kg then 1 – 1.5 mg/kg q 8 hrs or
  - Doxycycline 200 mg IV then 100 mg IV q 12 hrs

Treatment: Special Populations



- Children
  - Same as adults but try avoid TCN if <8yo
  - No chloramphenicol for <2 yo (grey baby syndrome)
- Pregnant women
  - Try to avoid streptomycin
  - Gentamicin, Doxy, Cipro
- Breastfeeding women
  - Same recommendations as pregnant
- Immunosuppressed – no different than competent

Vaccination

- Bubonic plague vaccine no longer available
- No vaccine against pneumonic plague

Prophylaxis

- Doxycycline (drug of choice)
  - Close contacts (within 2 meters) of pneumonic plague patients
  - Monitor close contacts refusing prophylaxis
- Alternative therapy:
  - Tetracycline or Chloramphenicol
- Provide prophylaxis for 7 days

Decontamination

- Viable for only 1 hr as an aerosol
- Sunlight, heat or lack of host kills bacteria
- Environmental decontamination unnecessary
- Standard hospital-approved disinfectants

SARS與H5N1流感

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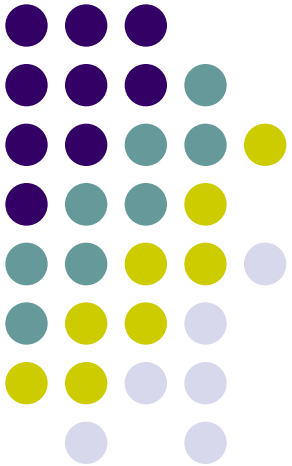

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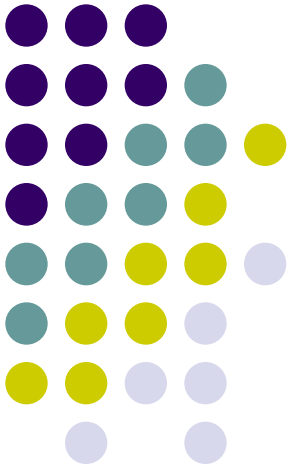


Cholera

- An acute bacterial disease (enteric),

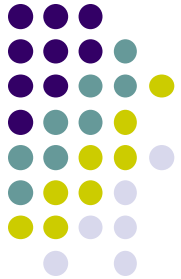
- sudden onset of profuse watery stools,

- occasional vomiting,

- rapid dehydration, acidosis ,

- circulatory collapse.

Prognosis:



* Asymptomatic infection occur much more frequently than clinical illness,

* In severe cases (untreated) , death can happen (within few hours) ,

* C.F.R ≈ 50%, but with proper Rx, C.F.R. < 1%.

Infectious Agent:

Group A – Vibrio cholerae Serogroup 01

- **El-Tor**
- **classical or true :**
  INABA, Hikojima, or OGAWA

True cholera vibrio is demonstrated by:-

- **presence of specific O antigen and**

- **no hemolysis of goat or sheep RBCs if added to suspension of these cells.**

Group B – non cholera Vibrios.

(Non pathogenic to man)

- Most vibrio strains elaborate enterotoxin resulting in similar clinical picture

- In any single epidemic one particular type tends to be dominant

(presently **El Tor biotype** is predominant except in Bangladesh, where the **classical biotype** has reappeared).

- **In 1992, a new serogroup** – a genetic derivative of the EL TOR biotype – **emerged in Bangladesh and caused an extensive epidemic.**

It has now spread over large parts of Asia and is termed **Vibrio Cholerae O139 " BENGAL".**

Occurrence

During **19th century** pandemic cholera repeatedly spread from India to most of the world.

During **Ist half of 20th century**, the disease was confined largely to Asia

(except for severe epidemic in Egypt in **1947**).

Since 1961, cholera spread from Indonesia

to Western Europe , and AFRICA.

OCCURRENCE

- **During 1977 and 1978** outbreaks were reported from **Japan*,**

- **In 1983**; **13 African countries** reported the disease,

- The **Western hemisphere** was free from cholera between 1911 – 1973

(except for 2 lab. acquired cases)

Occurrence

- **In 1991** cholera appeared in South America,
  (it had been absent for > century).

- Within a year it spread to 11 countries, and through the continent.

- **In 1992** large outbreaks began in India & Bangladesh.

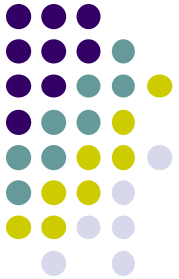
“Such outbreaks was caused by a previously unrecognized serogroup” (O139\Bengal).

- **It is a more virulent** variant of EL TOR biotype.

Reservoir

- A patient during **incubation period (faeces)**
- A patient during **illness** (faeces & vomitus)
- A patient during **convalescence** (faeces)
- Contact through faeces

Mode of Transmission



A. Primary ingestion of water (contaminated with faeces or vomitus of patients, or to lesser extent to faeces of carriers).

OR

B. Ingestion of food contaminated by dirty water, faeces, soiled hands or flies.

C. Use of soiled articles (e.g. utensils, clothes and bedlinen) “to lesser extent.”

- INCUBATION PERIOD:

  Few hours – 5 days.

  " The international I.P. is 5- days ".

- Period of Communicability:

  - For the duration of stool ve+ stage

    (usually few days after recovery)

  - Carrier state may persist for few months

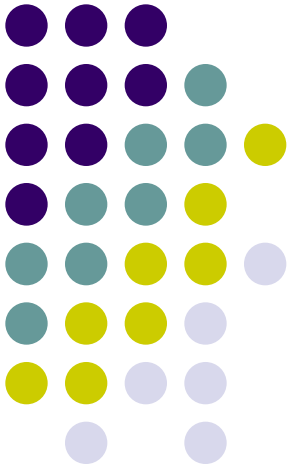
*NOTE:

Effective antibiotic eg. (tetracycline) reduce the period of communicability.

Suscept. and Resistance

- Susceptibility is general and variable
- Gastric achlorhydria increases the risk
- People with low S.E.S groups are at higher risk.

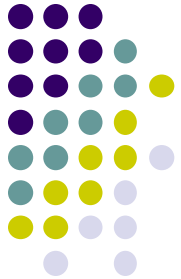
狂犬病



Rabies Virus

- Belongs to the genus *Lyssavius* (*lyssa*: rage in Greek)
- Include members of the Rabdoviridae family: Rabies, Makola, Duvenhage
- Enveloped bullet-shaped virus
- 5 structural proteins
- SS RNA, non-segmented, non-polar
- 12,000 nucletides

Rabies surveillance in animals/USA



- > 92% wild animals, 7.4% domestic species
- Raccoons: 36.3% most common
- Skunks: 30.5%
- Bats: 17.2%
- Foxes: 6.4%
- Cats: 3.8%
- Dogs: 1.2%

- ***Kerbs JW et al.2003.J Am Vet Med Assoc. 223(12):1736-48***

Rabies/Bats

- At least 39 cases in USA
- Only 9 (23%) has hx. of bite
- 20 (51%): known or likely contact with bats
- Bite is most likely mode of transmission
- Bat rabies viruses vary in their virulence properties
- Minor lesions should not be ignored

Rupprecht CE et al, The Lancet Infectious Diseases Vol 2 June 2002

Rabies/clinical manifestations

- Most cases are males ≤ 15yr
- 4 phases of illness
- First phase: asymptomatic
- Virus IP: 10-90 days (4d-19yr)

Rabies/clinical manifestations

- Second (prodromal) phase
- 2-10d
- Viral invasion of CNS (limbic system, spinal cord, brain stem)
- Respiratory symptoms
- Gastrointestinal symptoms
- Behavioral & emotional symptoms
- Local pain itching, numbness (50%)

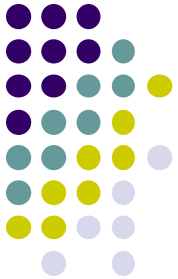
Hammond GW (Principles and Practice of Pediatric Infectious diseases)

Rabies/clinical manifestations

- Third phase: neurologic signs
- Widespread infection of the brain
- “Furious”:
  - Hyperactive form
  - Aggressiveness, biting, yelling, hallucinating
  - Triggered by sensory stimuli
  - Hydrophobia: drinking liquids
  - Aerophobia: air blown on face
  - Violent diaphragmatic contractions
  - Hyper-reflexia, cholinergic manifestations
  - lacrimation, salivation, mydriasis, pyrexia

Hammond GW (Principles and Practice of Pediatric Infectious diseases)

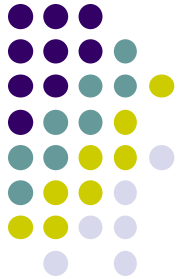
Non-Classical Rabies/clinical manifestations



- Most commonly after Bat exposure
- Bat rabies is different from dog rabies
- Third phase: neurologic signs
- “Paralytic” form: 20% of patients
- Flaccid paralysis and paresis
- Mimics GBS, transverse myelitis
- Inflammation is more extensive and severe
- Spinal cord markedly involved

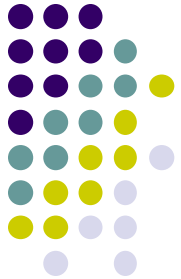
Hammond GW (Principles and Practice of Pediatric Infectious diseases)

Non-Classic Rabies/clinical manifestations



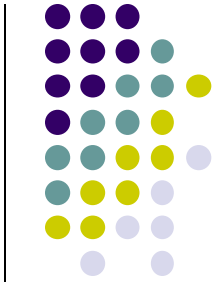
- Neuropathic pain, radicular pain, objective sensory and motor deficits
- Choreiform movements of the bitten limb during prodromal phase
- Focal brain stem signs, myoclonus
- Hemiparesis, hemisensory loss, ataxia, vertigo, Horner’s syndrome
- Seizures, ataxia

Non-Classic Dog Rabies/clinical manifestations



- Ocular myoclonus, hemichorea
- Nocturnal agitation
- Repeated spontaneous ejaculation (autonomic dysfunction)
- Paraparesis
- Facial & pulbar weakness
- Bilateral arm weakness
- Seizures, ataxia

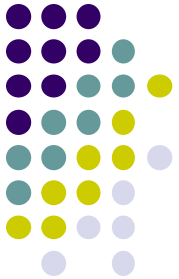
Rabies/clinical manifestations



- Fever
- Nuchal rigidity
- Paresthesia
- Fasiculations
- Convulsions
- Hypersalivation
- Hyperventilation

Hammond GW (Principles and Practice of Pediatric Infectious diseases)

Rabies/clinical manifestations



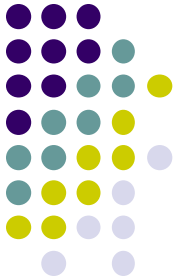
- Fourth phase: Coma
- Extensive cortical virus spread
- Death usually in 7 days
- Respiratory arrest
- Myocarditis
- Supportive care: sedation and analgesia

Hammond GW (Principles and Practice of Pediatric Infectious diseases)

Rabies/Coma

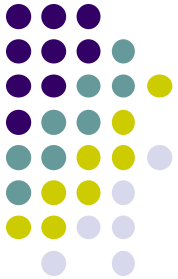
- Inspiratory spasms
- Sinus tachycardia
- Supraventricular and ventricular arrhythmias
- Reduced ejection fraction in all cases
  - Viral invasion of sinus node
  - A-V node
  - Myocarditis
- Main cause of death: Circulatory collapse
- Hematemesis: 30-60% of patients 6-12 hrs before death

Rabies/Recovery



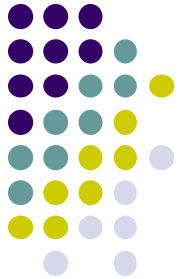
- Rare survivors
- Atypical presentations
- 1972: bat related, unsteady gait, dysarthria, hemiparesis
- 1976: dog bite, quadreparesis,myoclonus, cerebellar signs,frontal lobe signs
- 1977: Lab worker, aerosol exposure to highly concentrated fixed rabies virus
- 1992-1995: 4 Mexican children (3:dog, 1: vampire bat), received vaccine, no Ig

Rabies/clinical manifestations



- Mortality depends on
  - Severity of injury: bleeding
  - Location of the wound: face,head, neck, hand: short IP
  - Virus conc. in saliva
- Rabies mortality of untreated bite by rabid dog: 38-57%
- Rabid wolves: MR 80%
- Rabid bats: risk even with superficial wound (replication of virus in epidermis/dermis)

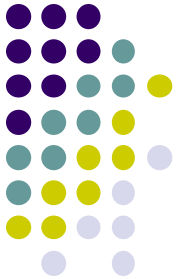
Rabies/Prevention



- Pre-exposure prophylaxis: vaccination of people in high risk groups:
- Veterinarians
- Animal handlers
- Certain lab workers
- Travel to areas where canine rabies is common

Hammond GW (Principles and Practice of Pediatric Infectious diseases)

Rabies/Prevention



- Pre-exposure prophylaxis: vaccination: intramuscular, 1ml (3 doses): at 0, 7, 21-28 days
- Antibodies usually persist for 2 yrs
- Repeat titers q6-24 months depending on level of exposure
- Acceptable titer levels are 1:5 or 0.5 IU/ml (RIFFT)

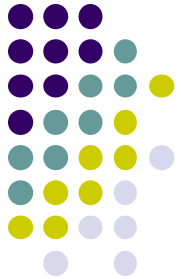
Red Book 2003

Rabies/Prevention vaccine types

- Human Diploid Cell Vaccine (HDCV)
- Rabies Vaccine adsorbed (RVA)
- Purified chicken embryo cell (PCEC)

Red Book 2003

Rabies/Post-exposure prophylaxis



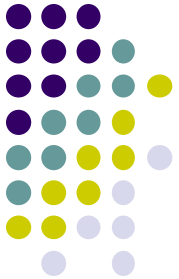
- Consult local health department
- Type of animal bite
- Unprovoked attack vs a bite during attempt to feed or handle the animal
- Immunized animals: minimal risk
- Prophylaxis to anyone bitten by
  - wild mammalian carnivores
  - bats
  - potentially infected domestic animals

Red Book 2003

Postexposure treatment recommendations of the Advisory Committee on Immunization Practices

Animal type, assessment, and disposition	Recommended treatment
Dog, cat, ferret	
Healthy and available for 10 days observation	None unless the animal develops signs of rabies; the animal should then be killed and tested
Rabid or suspected rabid	Start postexposure prophylaxis
Unknown (eg, escaped)	Consult public-health officials
Skunks, raccoons, foxes, and most other carnivores; bats	
Regard as rabid until proven negative by laboratory tests	Consider immediate vaccination
Livestock, small rodents, lagomorphs (rabbits and hares), and other mammals	
Consider individually	Consult public health officials; bites of squirrels, hamsters, guineapigs, gerbils, rats, mice, and other small rodents almost never require postexposure prophylaxis

Rabies/Post-exposure prophylaxis

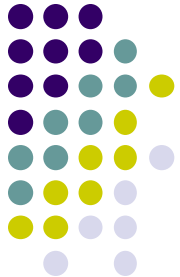


- Exposure other than bite rarely causes infection
- Prophylaxis to patients with
  - open wound
  - scratch
  - mucous membrane

  contaminated by
  - saliva or
  - potentially infectious material from rabid animal

Red Book 2003

Rabies/Post-exposure prophylaxis



- Prophylaxis to patients with bat exposure if bite or mucous membrane exposure cannot be reliably excluded
  - Bat in a room with pt asleep
  - Bat in a room with unattended child
- No prophylaxis if bat caught and promptly tested negative

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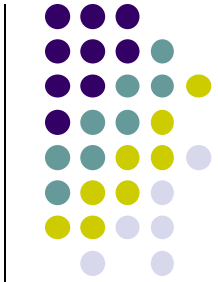
Rabies/Post-exposure prophylaxis



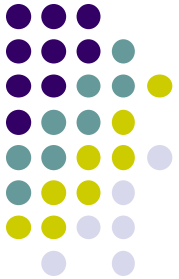
- Prophylaxis to people with sig. exposure to a rabies pt. if
  - scratch
  - bite
  - mucous membrane exposure to saliva or infectious tissue
- No prophylaxis if casual contact (touching) or exposure to non-infectious material (urine, stool)

Post-exposure wound care

- Prevent virus in wound from reaching neural tissue
- Prompt and thorough cleaning: flush wound with soap and water
- Benzalkonium chloride not superior to soap
- Update tetanus immunization
- Treat secondary bacterial infection
- Do not suture wound if possible

Red Book 2003

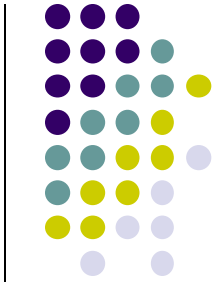
Post-exposure immunoprophylaxis



- Passive and active
- Start ASAP
- RIG and rabies vaccine
- Vaccine : one of the 3 types (5 doses), same dose for all ages
- 1.0 ml IM at 0, 3, 7, 14, 28 d
- Intradermal regimens:used in some countries, not USA
- Avoid gluteal injection: less antibody response than deltoid or AL thigh

Red Book 2003

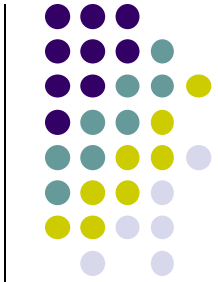
Immunoprophylaxis/RIG



- Human RIG is Given at the same time with the vaccine (ASAP)
- Dose: 20 IU/kg
- As much as possible to infiltrate the wound
- Remainder is given IM
- RIG and vaccine are Give at different sites & in different syringes
- Purified equine RIG (outside USA): dose is 40 IU/kg, may need desensitization

Red Book 2003

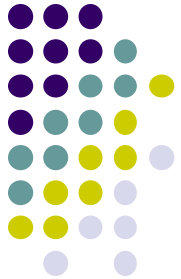
Immunoprophylaxis/RIG contraindications



- Persons who received a 3-dose pre-exposure rabies vaccine
- Those with adequate antibody response after previous immunization: give 2 doses of vaccine at 0,3 days
- Those who received post-exposure prophylaxis with rabies vaccine (>7 d)

Red Book 2003

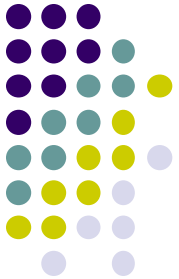
Rabies Vaccine
Adverse effects



- Less common in children than adults
- Adults: local rxn. (15-25%)
- Mild systemic rxn. (10-20%)
- Neurologic illness resembling GBS
- Acute generalized transient neurologic syndrome: not causally related
- Immune-complex reactions with booster doses of HDCV: 6%

Red Book 2003

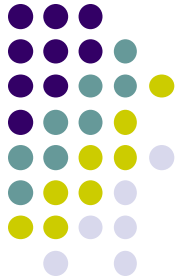
Handling of suspected rabid animal



- Management depends on the species, the circumstances of the bite and local epidemiology of rabies
- Dog, cat, ferret with suspected rabies should be captured and observed for signs of illness x 10 days
- If ill: euthanatized, head removed and shipped for examination
- Species with unknown periods of viral shedding may still be euthanatized and tested even if immunized

Red Book 2003

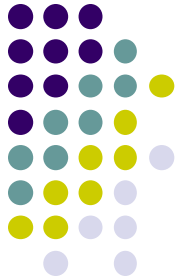
Rabies/prophylaxis



- Bats, skunks, raccoons, foxes, most other carnivores:
- Regard as rabid unless geographic area is known to be free of rabies or until animal proven negative by lab testing
- Immediate immunization and RIG

Red Book 2003

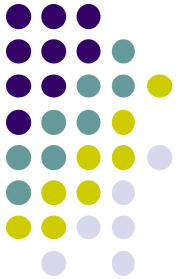
Rabies/prophylaxis



- Livestock, rodents, and lagomorphs (rabbits & hare):
- Consult local health department
- Bites of squirrels, gerbils, hamsters, guinea pigs, rats, mice, other rodents, rabbits, hare almost never require anti-rabies treatment

Red Book 2003

Handling of suspected rabid animal



- Wild animals with suspected rabies should be euthanatized at once and brain tested for rabies
- No treatment for rabies if animal brain tests negative by rapid test (fluorescent antibody testing)

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Rabies prevention

- Educating children to avoid contact with stray or wild animals
- Avoid trying to capture or provoke stray animals
- Avoid touching animal carcasses
- Secure garbage
- Chimneys, other entrances should be covered
- International travelers: avoid contact with stray dogs, consider rabies vaccine

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Post Exposure Prophylaxis/WHO

- Category I:
  - touching
  - feeding potentially rabid animal
  - licking intact skin

  no treatment
- Category II:
  - nibbling on uncovered skin
  - licks on broken skin
  - minor scratches without bleeding

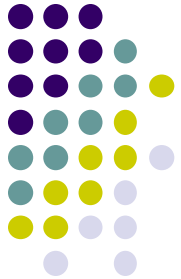
  wound disinfection, vaccine only

Post Exposure Prophylaxis/WHO

- Category III:
  - Single, multiple transdermal bites
  - Contamination of scratches or MM with saliva

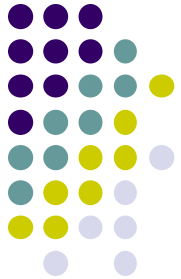
  wound cleansing, rabies IG, vaccine
- Animal observation in developing countries is not practical: frequent bites, delayed lab testing
- Delay treatment only if:
  - Species unlikely to be infected
  - Lab diagnosis in 48hr
  - Dog >1yr old with current vaccination (observe for 10d)

Prophylaxis/Nerve tissue vaccines



- Not licensed in USA, available worldwide
- Only available vaccines in some countries
- Nerve tissue from sheep, goats, suckling rodents, mouse brain
- Subcutaneously
- 7 daily doses, plus days 10,20 and 90

Rabies Vaccine
nerve tissue vaccines



- Inactivated vaccines
- Neuroparalytic reactions in 1:2000 to 1:8000
- Discontinue if a neurologic reaction occurs
- Steroids for life-threatening reactions

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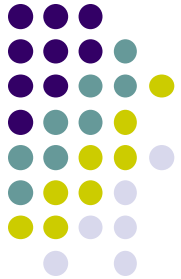
Rabies Vaccine variations



- Attempts to reduce the cost of PEP
- Reduced IM regimen (2-1-1): 2 doses on day 0, 1 dose (day 7), 1 dose (day 21)
- Intradermal regimens
- 8 site regimen: 8-0-4-0-1-1 (0.1ml doses): sites include both deltoids, lat thighs, lower quadrants of the abdomen, suprascapular areas
- 2 site regimen: 2-2-2-0-1-1 (each=20% of IM dose): deltoids

Rabies post-exposure vaccination schedules for the rabies-naive patient

	Days						
	0	3	7	14	21	28	90
Standard WHO schedule*	1 IM dose deltoid†	1 IM dose deltoid	1 IM dose deltoid	1 IM dose deltoid	..	1 IM dose deltoid	..
Reduced multi-site IM (2-1-1)	2 IM doses; right and left deltoid	..	1 IM dose deltoid	..	1 IM dose deltoid	..	..
8 site ID regimen (8-0-4-0-1-1)	8 × 0·1 mL ID	..	4 × 0·1 mL ID	..	..	0·1 mL ID	0·1 mL ID
2 site ID regimen (2-2-2-0-1-1-)	2 × 20% IM‡ ID	2 × 20% IM ID	2 × 20% IM ID	..	..	20% IM ID	20% IM ID
	Days						
		0–7			10	20	90
Suckling-mouse-brain vaccine§	1 dose each subcutaneously on abdomen				1 dose	1 dose	1 dose

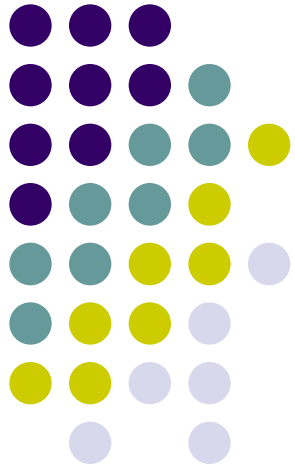
Rupprecht CE et al, The Lancet Infectious Diseases Vol 2 June 2002

Animal vaccination

- Several states initiated raccoon rabies programs
- Oral rabies vaccine delivered by baits
- Baits: polymer cubes (dog food or fish meal), wax-lard cake, attractants: fatty, cheesy, sweet odors
- Effective for coyotes and foxes
- Raccoons compete for baits
- Current oral vaccine is not effective for skunks

- *Guerra MA et.al. 2003. Emerg.Inf.Dis. 9(9): 1143-1150*

炭疽病



Anthrax

- *Bacillus anthracis*
- One of the most likely agents to be used
- Three forms:
  - Cutaneous: most common in natural cases
  - GI: Rare, but highly fatal
  - Inhalational: Most lethal form
    - Last case > 20 yrs ago (Until Sept 2001)
    - Probable form to be encountered in BT attack

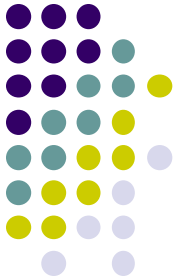
Diagnosis

- Prognosis is poor
  - Prior to Fall 2001, mortality rate: 86-100%
  - Current mortality rate: ~ 45%
- Treat pt ASAP
- Presumptive
  - Base on signs & symptoms and risk of exposure

Definitive Diagnosis

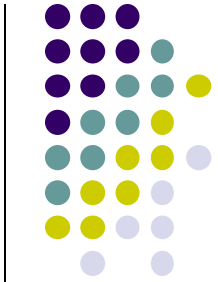
- Blood culture and Gram stain of smear at your lab
  - Gram + bacilli should be referred to the state health reference lab for confirmation
    - Must be coordinated through the local health dept
  - Alert lab of possible anthrax
    - Gram positive rods usually labeled “contaminants”
- Sputum cultures are useless (not pneumonic)
- Ulcer aspirate (cutaneous disease)

Pathogenesis: Inhalational Anthrax

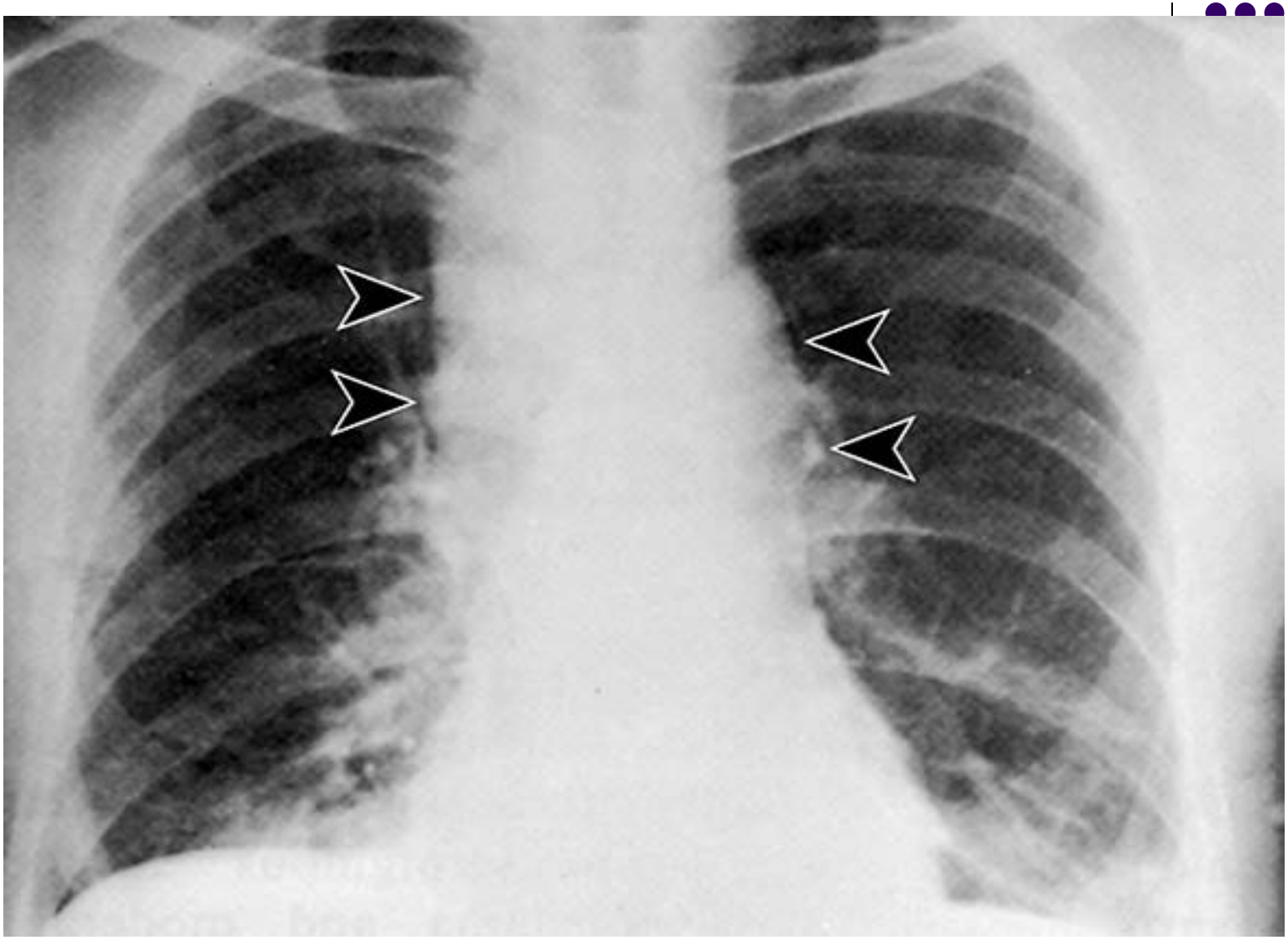


- Incompletely cleared by macrophages
- Migrate to mediastinum via lymphatics
- Germinate into vegetative bacilli
  - Causes hemorrhagic necrotizing mediastinitis
  - Active toxin production
    - Followed by high-grade bacteremia
  - Sepsis, multiorgan failure, spread to meninges

Clinical Features: Inhalational Anthrax

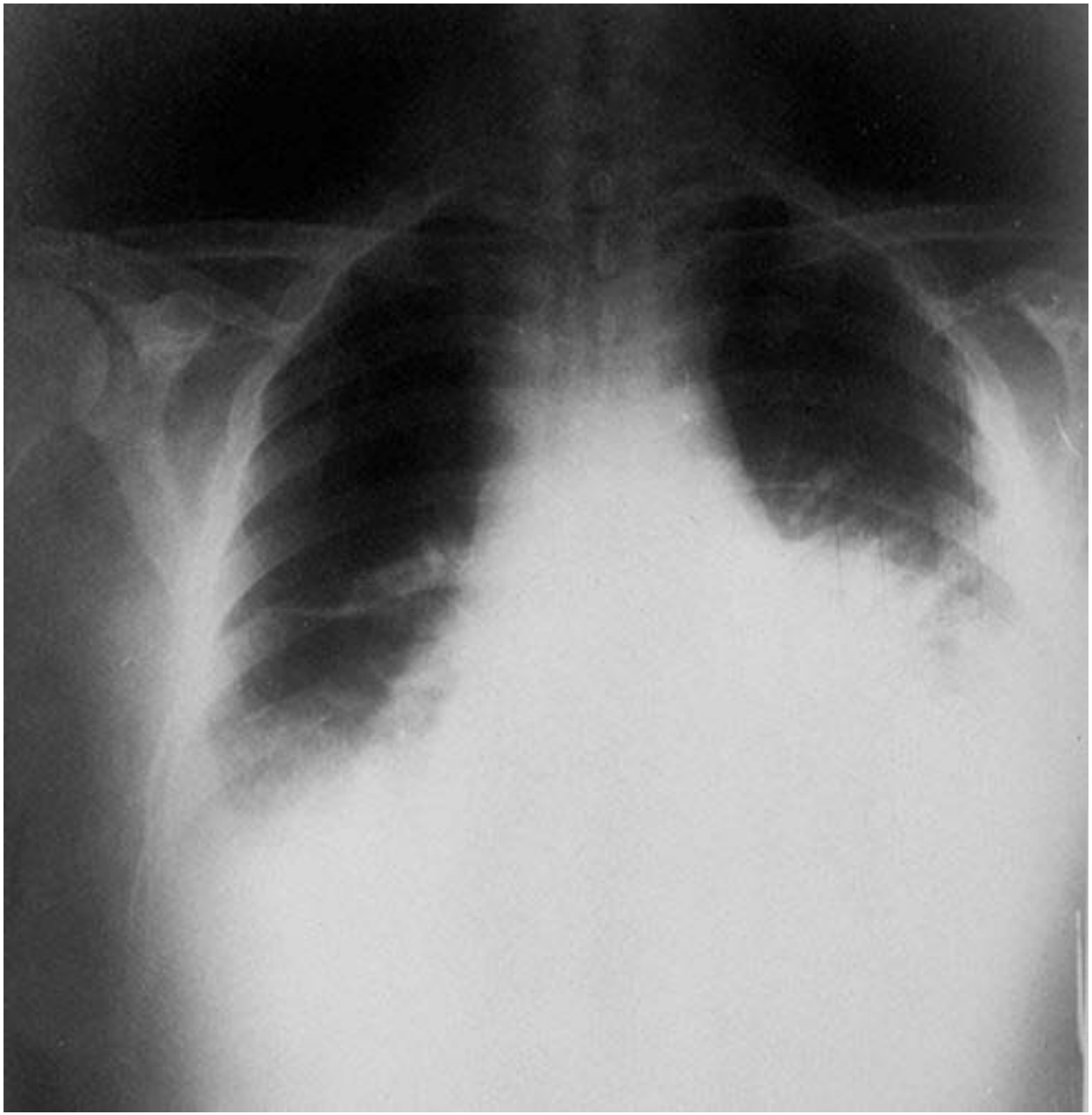


- Incubation period: 1-10 days
- 2 stage illness:
  - Prodromal phase:
    - Flu-like symptoms
    - Brief improvement (not seen in recent cases)
  - Fulminate stage:
    - High-grade bacteremia
    - Widened mediastinum without infiltrates



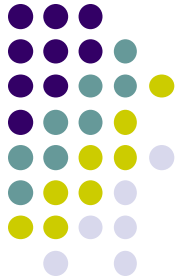
Chest radiograph of a 51-year-old laborer with occupational exposure to airborne anthrax spores taken on day 2 of illness. Lobulated mediastinal widening (arrowheads) is present, consistent with lymphadenopathy, with a small parenchymal infiltrate at the left lung base.

Photo: JAMA Consensus Article

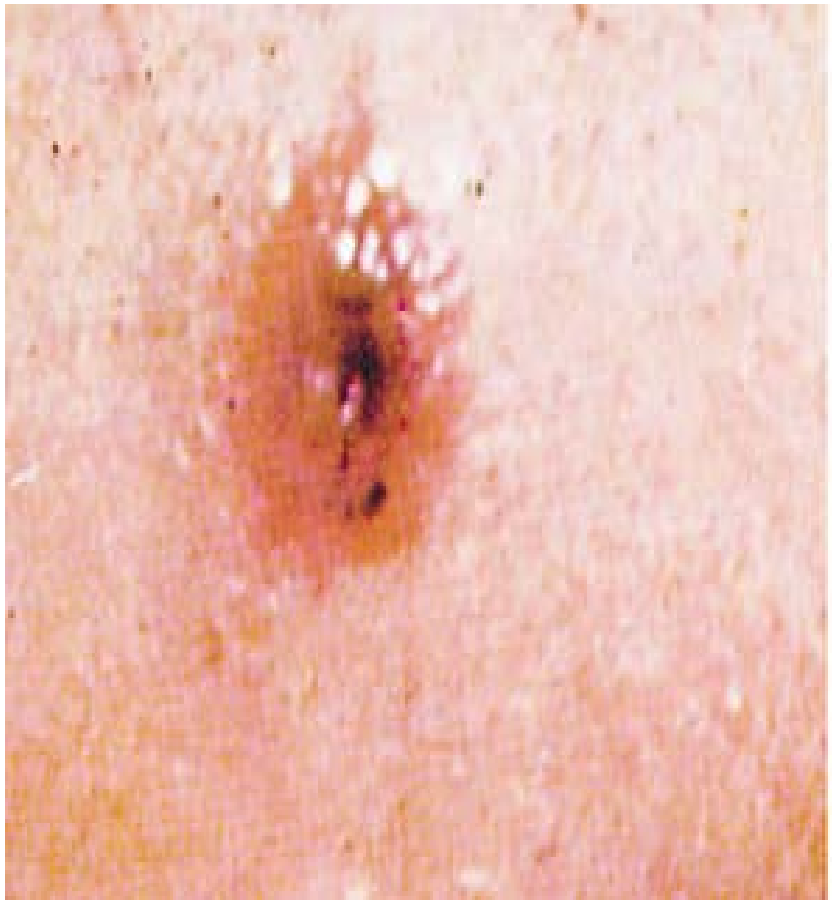


Mediastinal widening on Chest X-Ray in an inhalational anthrax patient

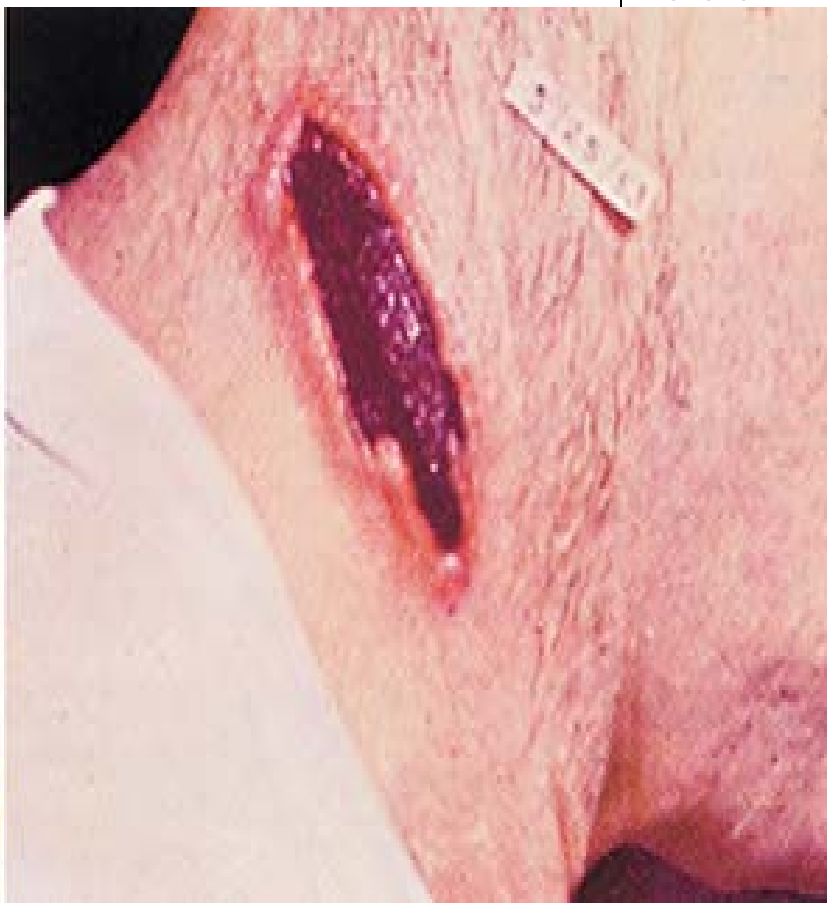
Clinical Features: Cutaneous Anthrax



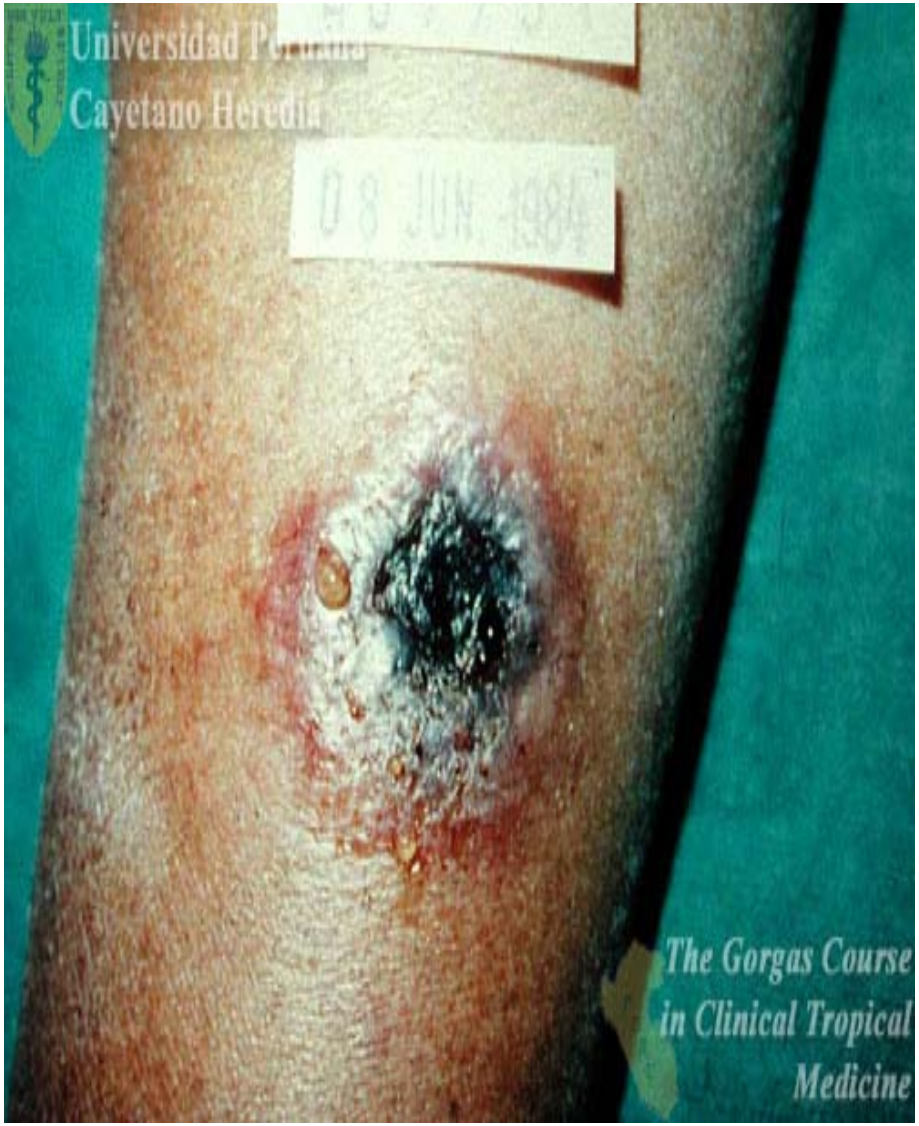
- Black eschar
  - Begins as pruritic macule or papule
  - Painless ulcer by 2nd day
    - Contains *B. anthracis*
  - Usually progresses to eschar within 5-6 days
- Systemic disease may develop
  - Lymphangitis and lymphadenopathy
  - If untreated, can progress to sepsis, death



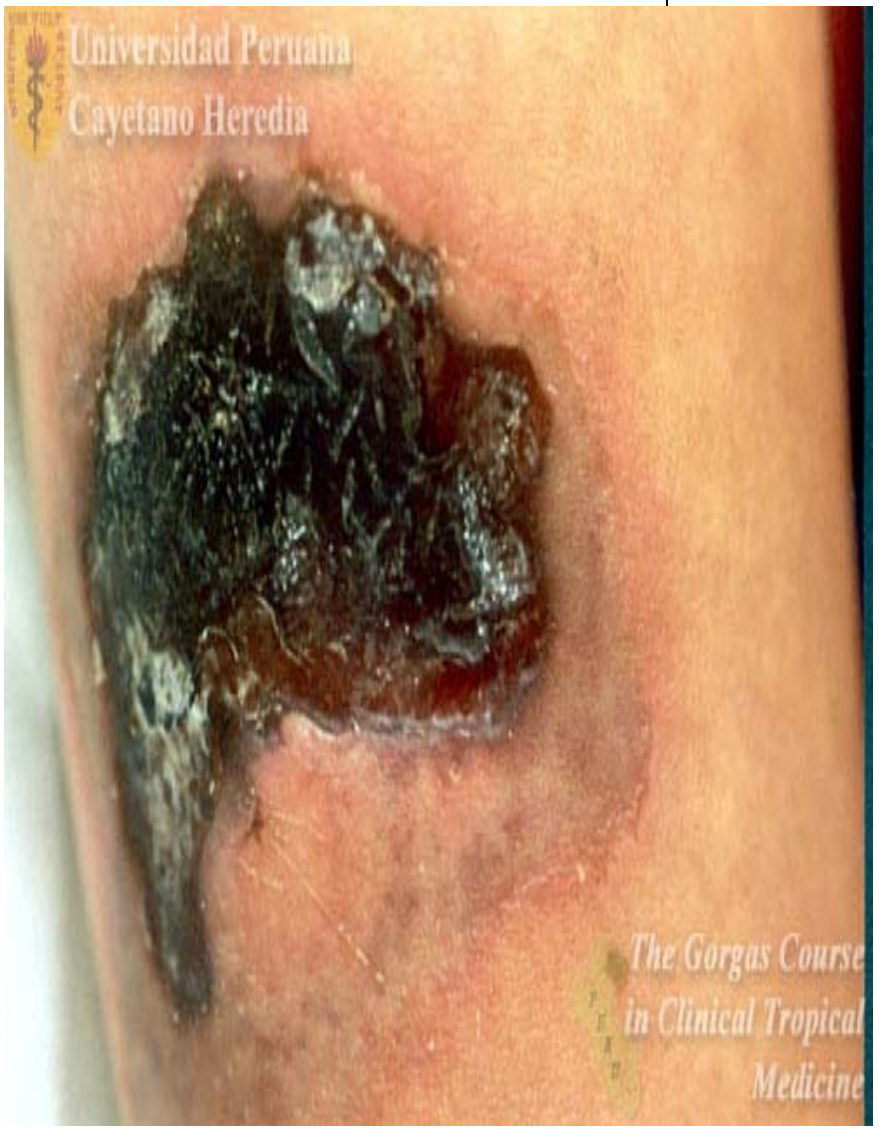
Forearm lesion on day 7 of illness shows vesiculation and ulceration of the initial macular or papular anthrax skin lesion.



Eschar of the neck on day 15 of illness is typical of the last stage of the lesion before it resolves over 1 to 2 weeks



Painless lesion of cutaneous anthrax

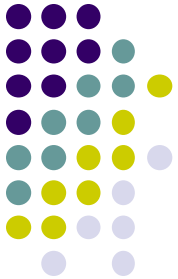


Painful lesion from spider bite

Infection Control

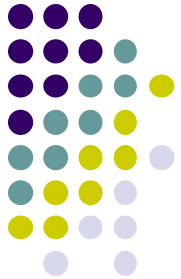
- Not transmitted person to person
- Standard Precautions

Inhalational Anthrax: Treatment Recommendations



- Initial multi-drug therapy for adults:
  - Ciprofloxacin 400mg IV every 12 hours or
  - Doxycycline 100mg IV every 12 hours
  - **AND** one or two of the following: Rifampin, Vancomycin, Imipenem, Chloramphenicol, Penicillin, Ampicillin, Clindamycin, Clarithromycin

Inhalational Anthrax Treatment



- Initial multi-drug therapy for children:
  - Ciprofloxacin 20-30 mg/kg/d IV divided q12 ° or
  - Doxycycline
    - ≤ 45kg: 2.2 mg/kg IV q12°
    - > 45kg: adult dose
  - **AND** one or two of the following: Rifampin, Vancomycin, Imipenem, Chloramphenicol, Penicillin, Ampicillin, Clindamycin, Clarithromycin

Treatment

- Switch to PO therapy when clinically appropriate
  - Ciprofloxacin 500mg twice daily or
  - Doxycycline 100mg twice daily
- All treatment (IV and PO combined) is 60 days
- Cutaneous treatment same as inhalational, except use single drug
  - Treat for 60 days

Postexposure Prophylaxis

- Antibiotic therapy
  - Treat ASAP; prompt therapy can improve survival
  - Contacts do not need it

Postexposure Prophylaxis

- Same regimen as active treatment
  - Substituting oral equivalent for IV
  - Ciprofloxacin 500 mg po bid
  - Doxycycline 100 mg po bid
- Continue for 8 weeks
- Vaccine
  - May be available through CDC

Decontamination

- Patient decontamination usually not an issue
  - By the time the pt has developed symptoms or the release is identified, most pts will have showered and changed their clothes

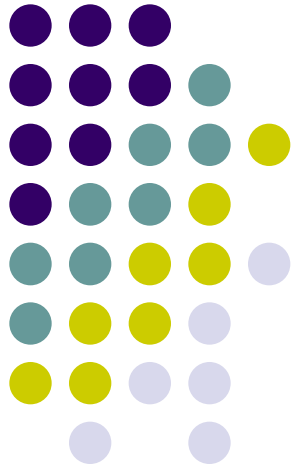
Decontamination

- Announced attack or release identified within 24 – 48 hrs
  - Exposed individuals
    - Shower with soap and water
      - Bleach not needed
    - Store clothing in sealed bag
      - Potential evidence

Decontamination

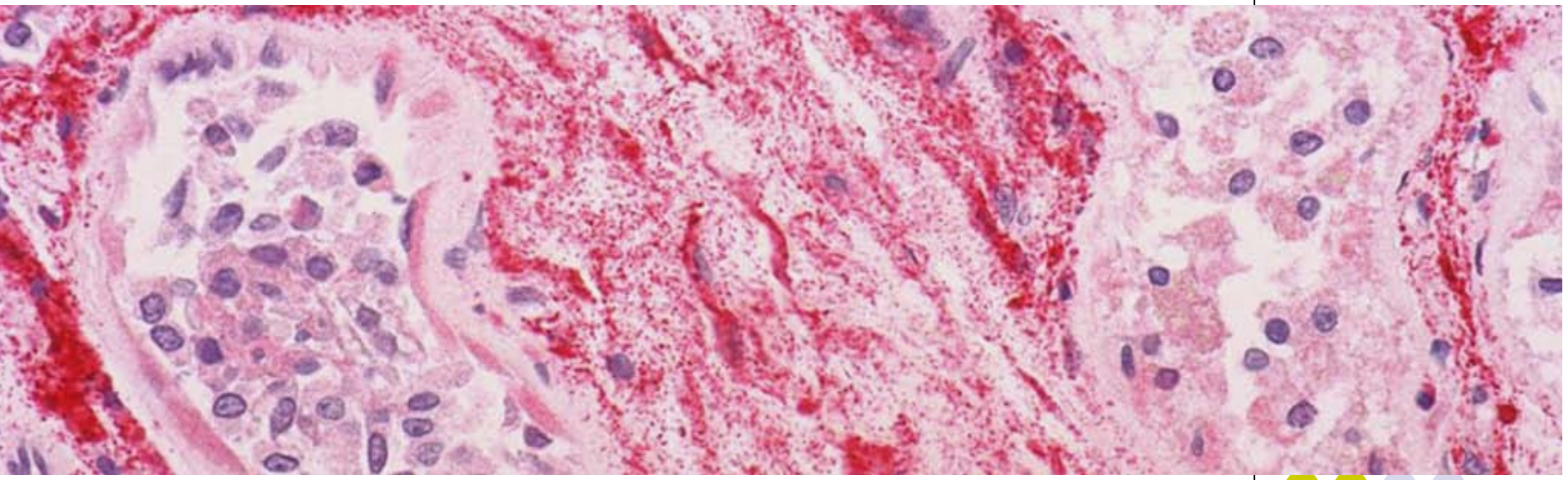
- Spores are hardy in the environment
  - Survive for years in soil
    - No secondary cases
- Sterilize instruments with a sporicidal agent

第五類法定傳染病



第五類法定傳染病

- 中華民國行政院衛生署疾病管制局在2009年6月19日修正公布
- 第五類：裂谷熱(里夫谷熱)、馬堡病毒出血熱、黃熱病、伊波拉病毒出血熱、拉薩熱
- 處理原則：依中央主管機關公告之期限及規定方式為之



病毒性出血熱(VHF)

- Acute infection:

  fever, myalgia, malaise; progression to prostration

- Small vessel involvement:

  increased permeability, cellular damage

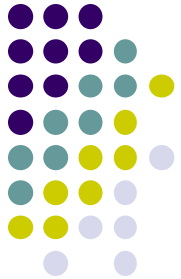
- Multisystem compromise (varies with pathogen)
- Hemorrhage may be small in volume

  (indicates small vessel involvement, thrombocytopenia)

- Poor prognosis associated with:

  shock, encephalopathy, extensive hemorrhage

Viral Hemorrhagic Fever: viruses

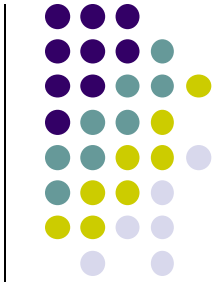


- Filoviruses
  - Ebola Hemorrhagic fever (EHF)
  - Marburg virus
- Arenaviruses
  - Lassa fever
  - “New World Arenaviruses”
- Bunyaviruses
  - Rift Valley fever (RVF)
  - Crimean Congo Hemorrhagic fever (CCHF)

VHF: Viruses

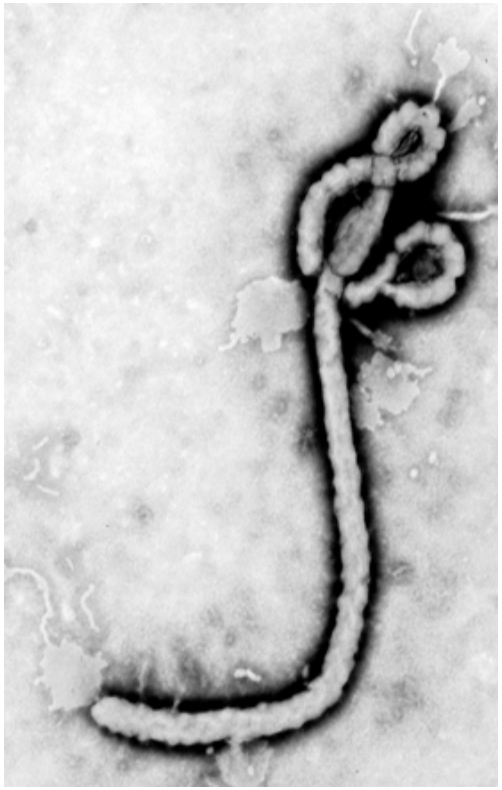
- Encapsulated, single stranded RNA viruses
- Similar syndromes; different pathogenesis & treatment
- Persistent in nature: rodents, bats, mosquitoes
- Geographically restricted by host
- Potential infectious hazards from laboratory aerosols

Filoviruses



- Ebola
  - Zaire
  - Sudan
- Marburg

Ebola virus



- 1-2 week incubation
- Abrupt onset fever, headache, myalgia
- GI symptoms, chest pain, delerium
- 53-88% case-fatality
- ~ 45% hemorrhage
- Person-to-person transmission
- African rainforest
- Unknown reservoir

伊波拉病毒

於1976年首次在鄰近赤道的蘇丹西部省份與離其約800公里遠之薩伊同時出現，有600多個個案發生於鄉村之醫院與村落內。死亡率各為55%及70%。第二次爆發流行是在1979年發生於蘇丹的同一地區。1994年在象牙海岸的居民與黑猩猩發現另一型別之病毒株。1994之後在加彭、烏干達、剛果等地，陸續有大小不等的疫情爆發。其中以1995年在剛果之Kitwit的流行規模較大。在撒哈拉沙漠附近的居民，以螢光法檢查抗體，發現有陽性反應。但是是否與高致病力之伊波拉病毒有所關連，則並非十分清楚。此外，2004年在俄羅斯及美國曾分別發生實驗室感染事件。2005年4月剛果再度發生疫情。

與伊波拉病毒有關之線病毒 (Ebola-Reston)

美國於1989年與1990年，義大利於1992年從菲律賓進口Cynomolgus猴子，皆發現與伊波拉病毒有關之線病毒。許多受感染之猴子皆死亡，5位動物工作者幾乎每天皆須與這些猴子接觸，其中有4位出現特異性之抗體，但並無發燒或其他病徵出現。

Fig

Ebola Outbreaks

1979, 2004

1994

1976, 1979, 2004

1994, 1996, 1996

Congo

2003

2000

1976, 1995

1996*

1995 Zaire

- 315 cases
- 81% case-fatality
- Point source outbreak
- Unrecognized 3 months
- 25% health care workers
- 2 “super-spreaders”

Ebola Case Fatalities 60-80%

Risk Factors

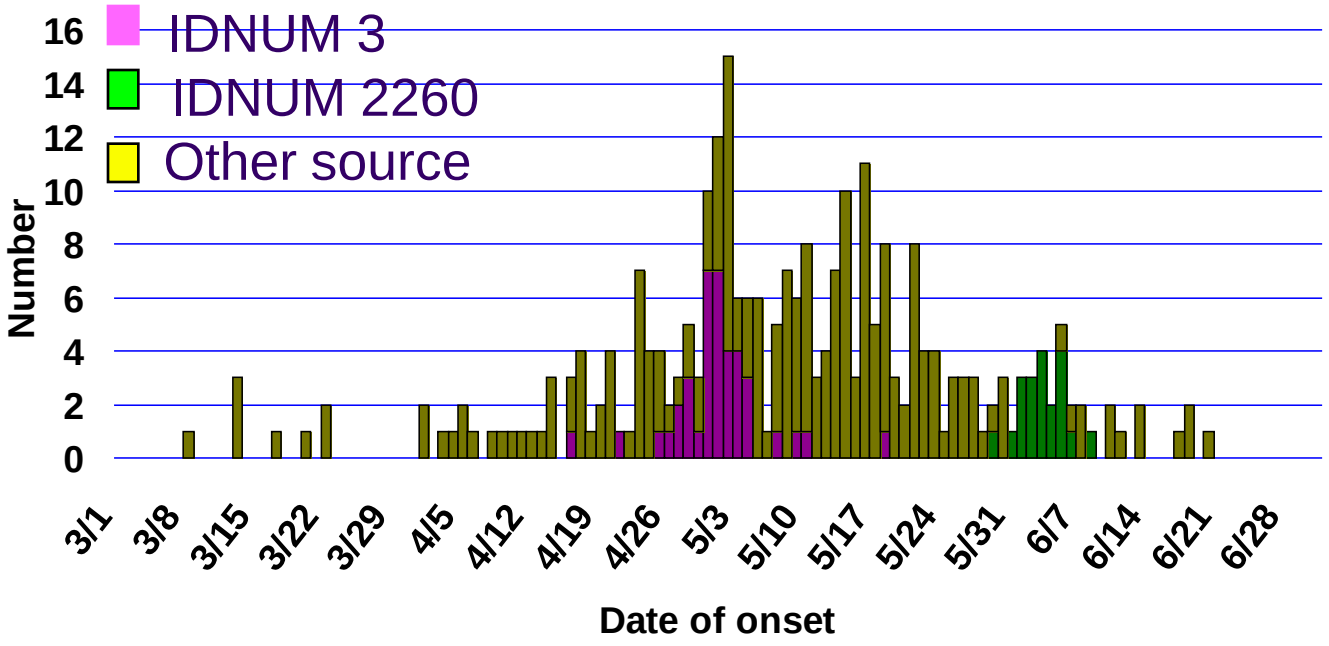
2º attack rate of 16%

- Direct physical contact

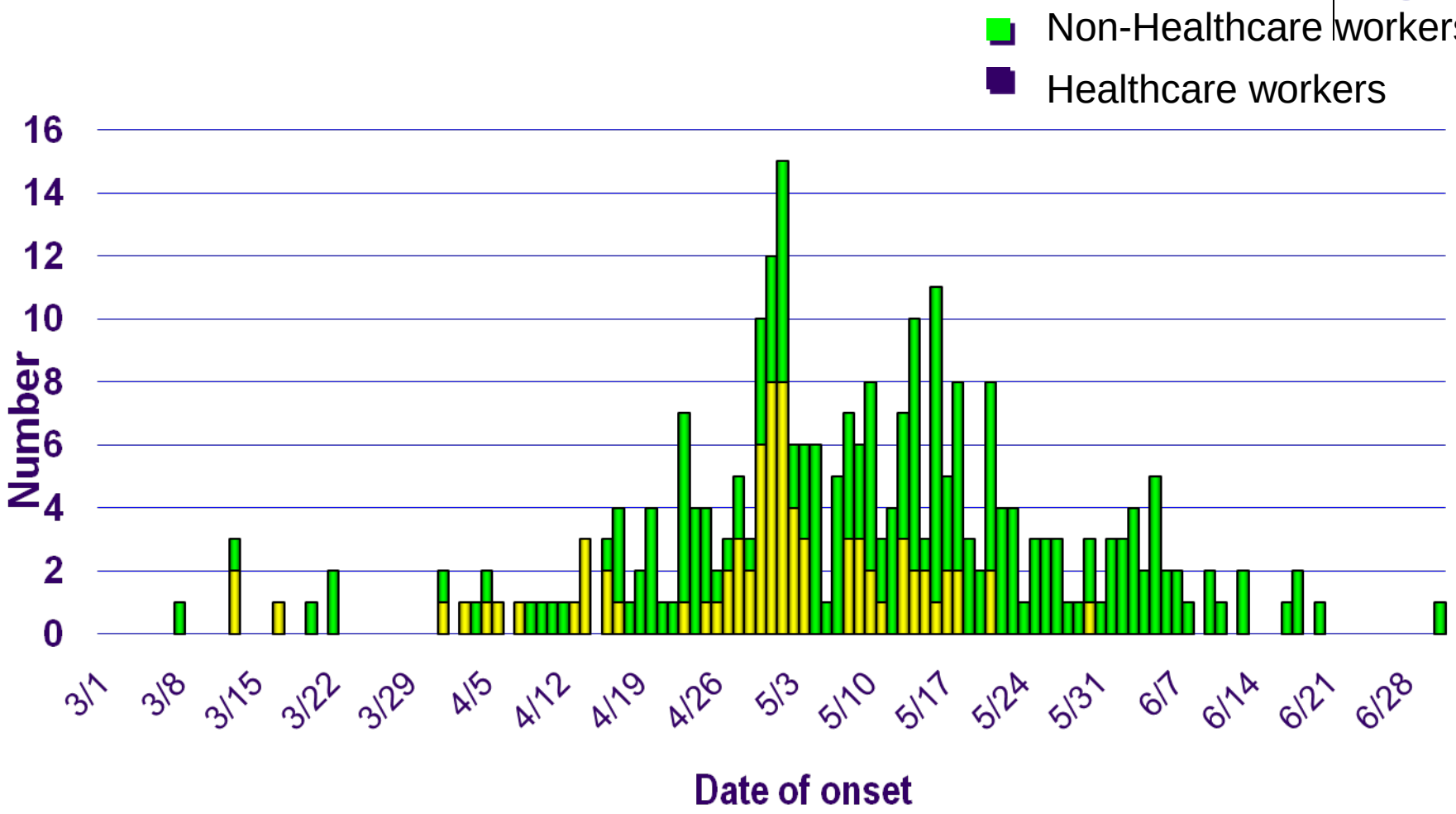
  OR = undefined, p<0.01
- Body fluids

  OR = 3.8, 95%CI (1.9-6.8)
- No contact = no disease

Suspected EHF cases, DRC, March-June 1995: by Source of Infection



EHF Cases by Date of Onset and Occupation, Bandundu Region, DRC

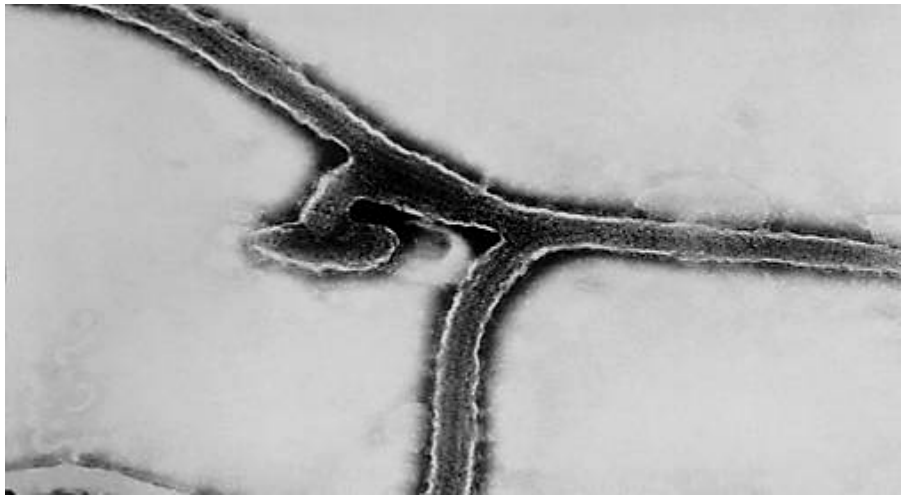


馬堡病毒

於1967年，德國馬堡地區共有31人暴露於來自烏干達非洲綠猴而受到感染，其中有7人死亡；1975年南非出現3件死亡病例，其中指標病例是肇始於辛巴威地區；1980年肯亞出現2件確認感染病例，1例死亡；1982年辛巴威有1例；1987年肯亞出現1例死亡病例；1998-2000年於剛果民主共和國有至少有12例確定病例(145例疑似病例)；2005年(至7月止)安哥拉計有374例。

Marburg

- 1967
- Marburg, Frankfurt, & Belgrade
- 25 primary
- 6 secondary
- 7 deaths
- African green monkeys from Uganda



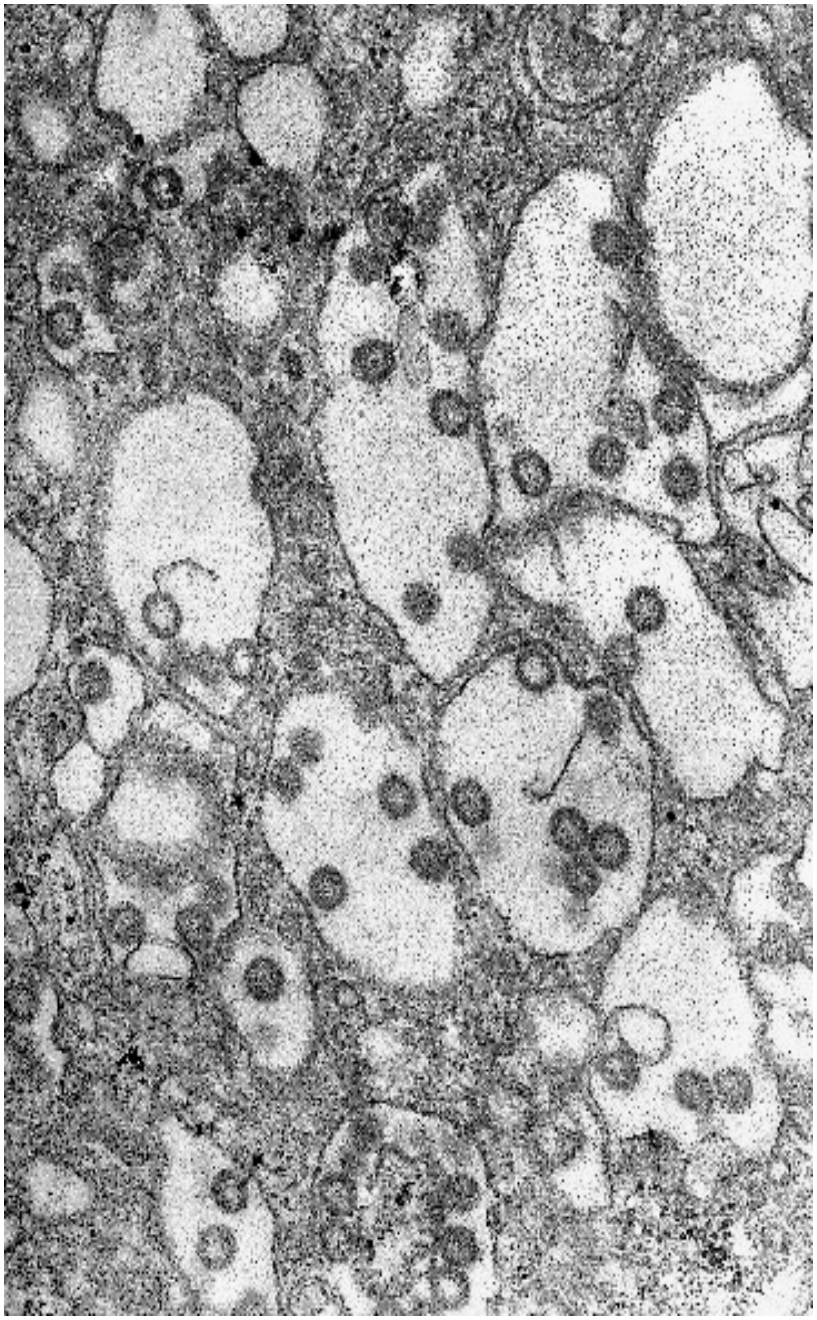
- 1975
- Australian traveller
- Zimbabwe
- 1 primary
- 2 secondary
- 1 death

Marburg

- 1980
- Engineer
- N.W. Kenya
- 1 primary
- 1 secondary
- 1 death

- 1987
- Danish traveller
- W. Kenya
- 1 primary
- 1 death

- 1998-200
- Gold mine
- N.E. DRC
- 76 cases
- 52 deaths
- >150 cases through follow-up

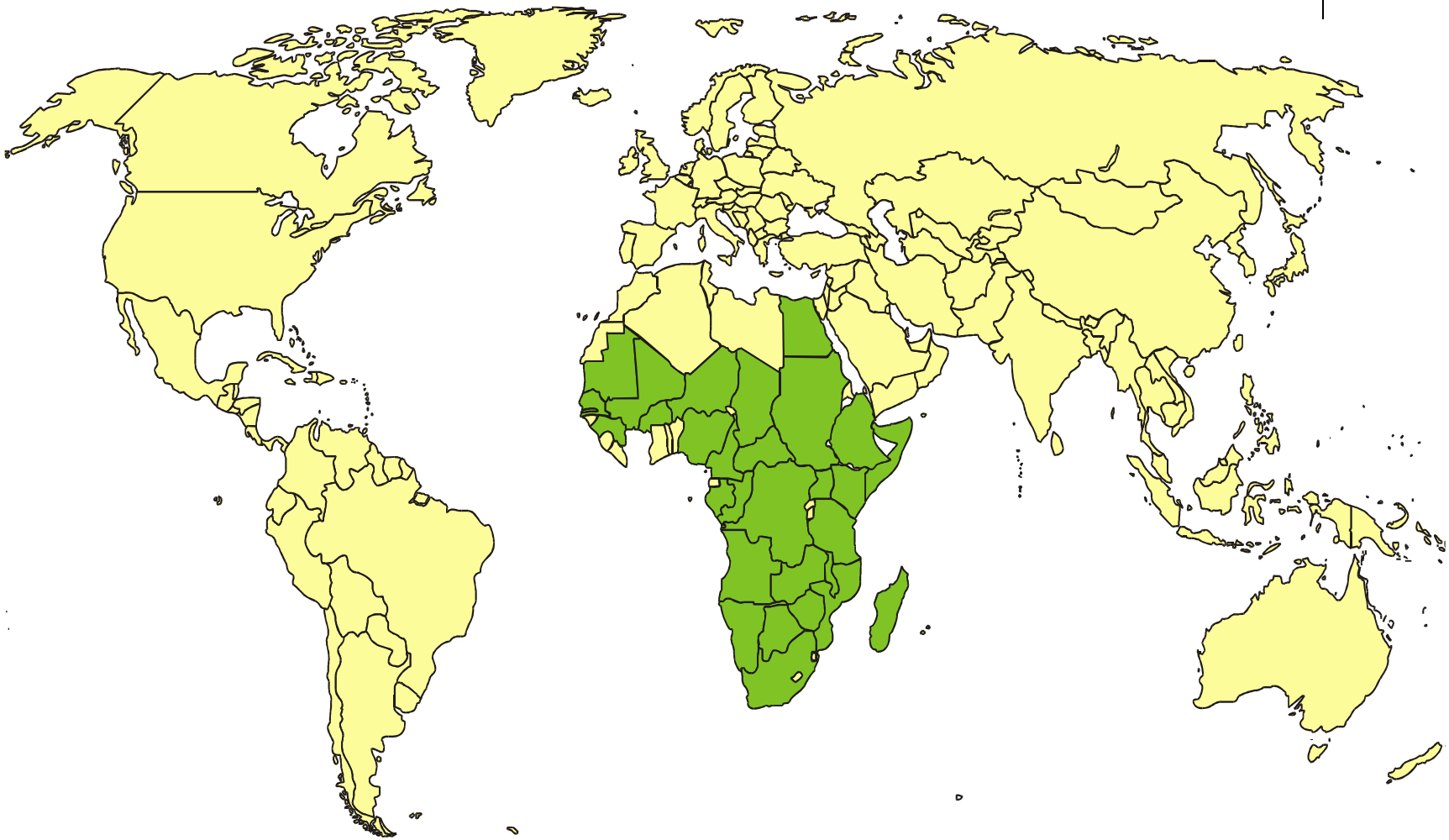


Bunyaviruses

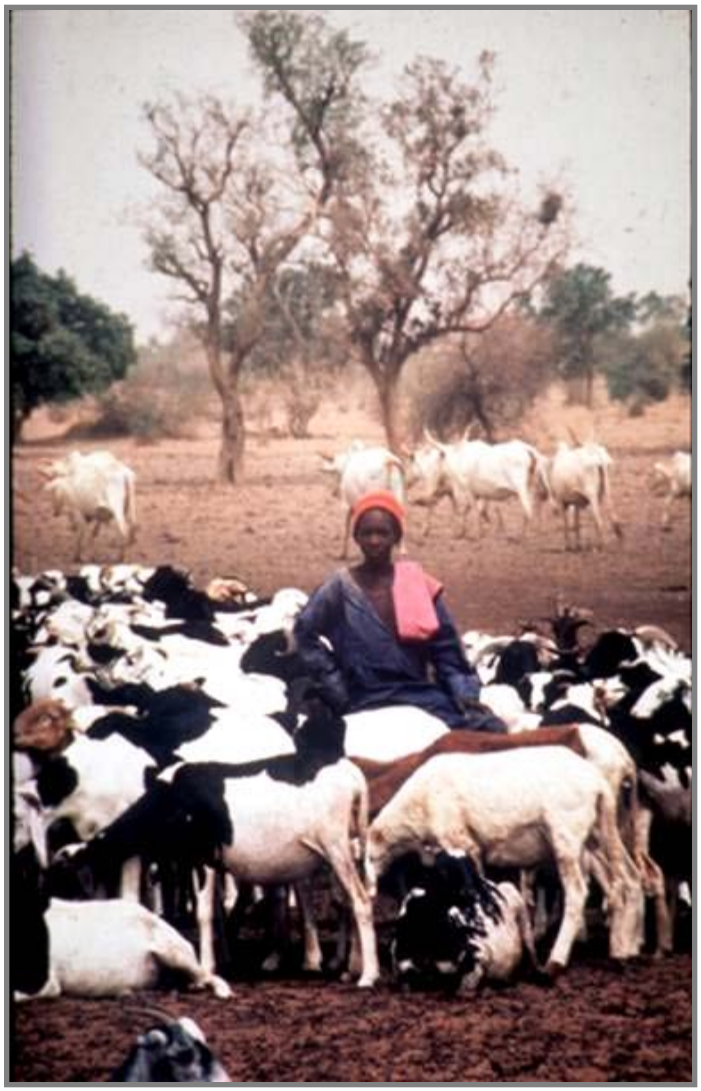
- Rift Valley fever
- Crimean Congo hemorrhagic fever

Distribution of Rift Valley Fever (RVF) Virus

(Countries with outbreak of RVF, periodic isolations of virus, or serologic evidence of RVF 1910-1999)

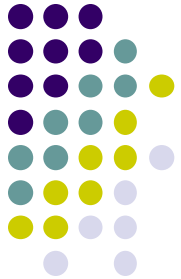


Rift Valley Fever



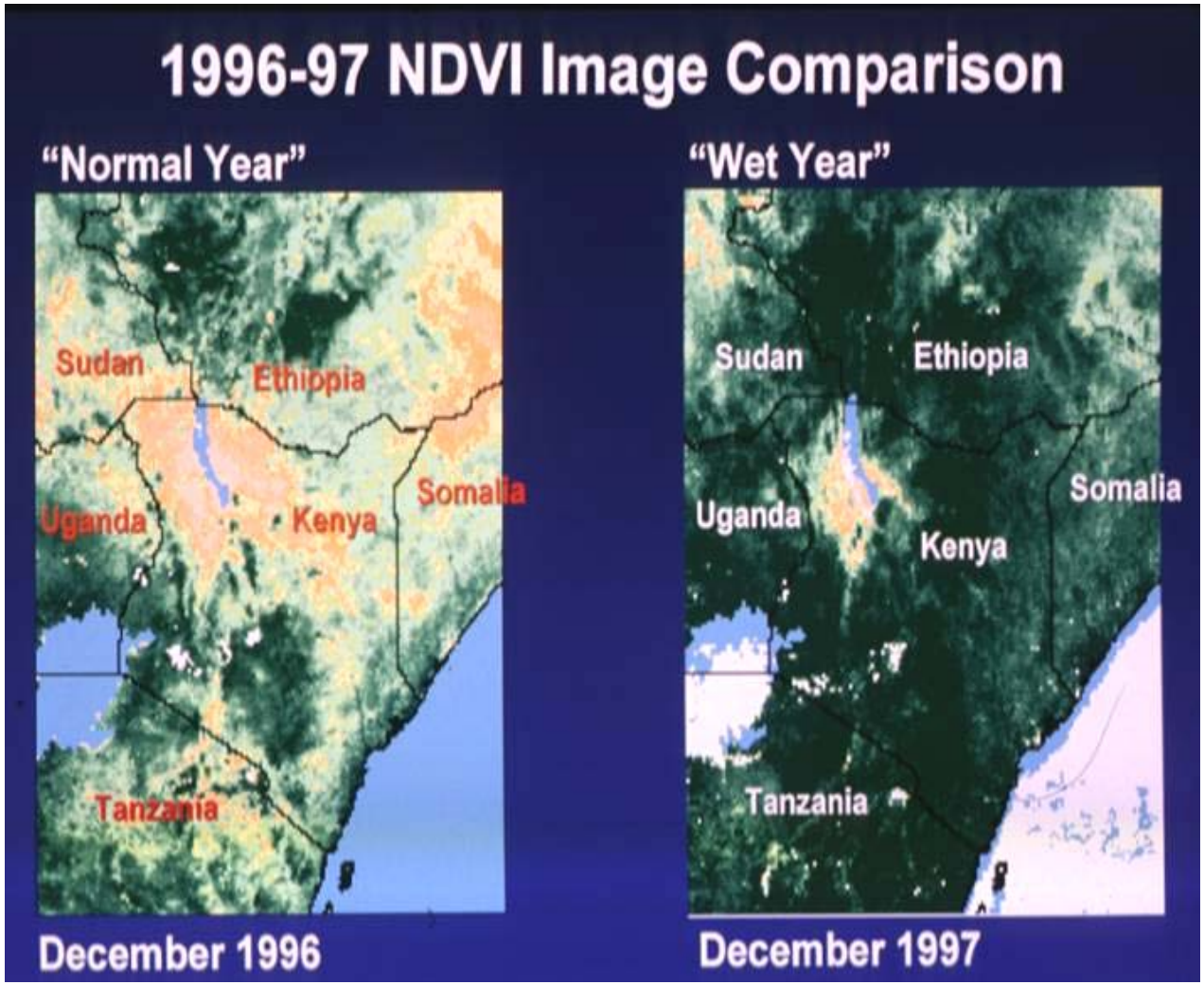
- Disease of sheep and cattle
- Humans: Asymptomatic-to-mild
- Rare VHF, encephalitis, retinitis

Rift Valley Fever



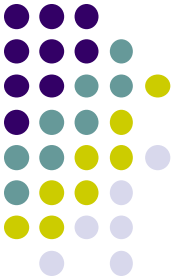
- Mosquito-borne (*Aedes* spp.)
  - vertical transmission in mosquitos
- Transmission:
  - Animal contact (birthing or blood)
  - Laboratory aerosol
- Mortality 1% overall
- Therapy: Ribavirin?
- Live-attenuated vaccine (MP-12) undergoing trials

1997-1998 East Africa Outbreak

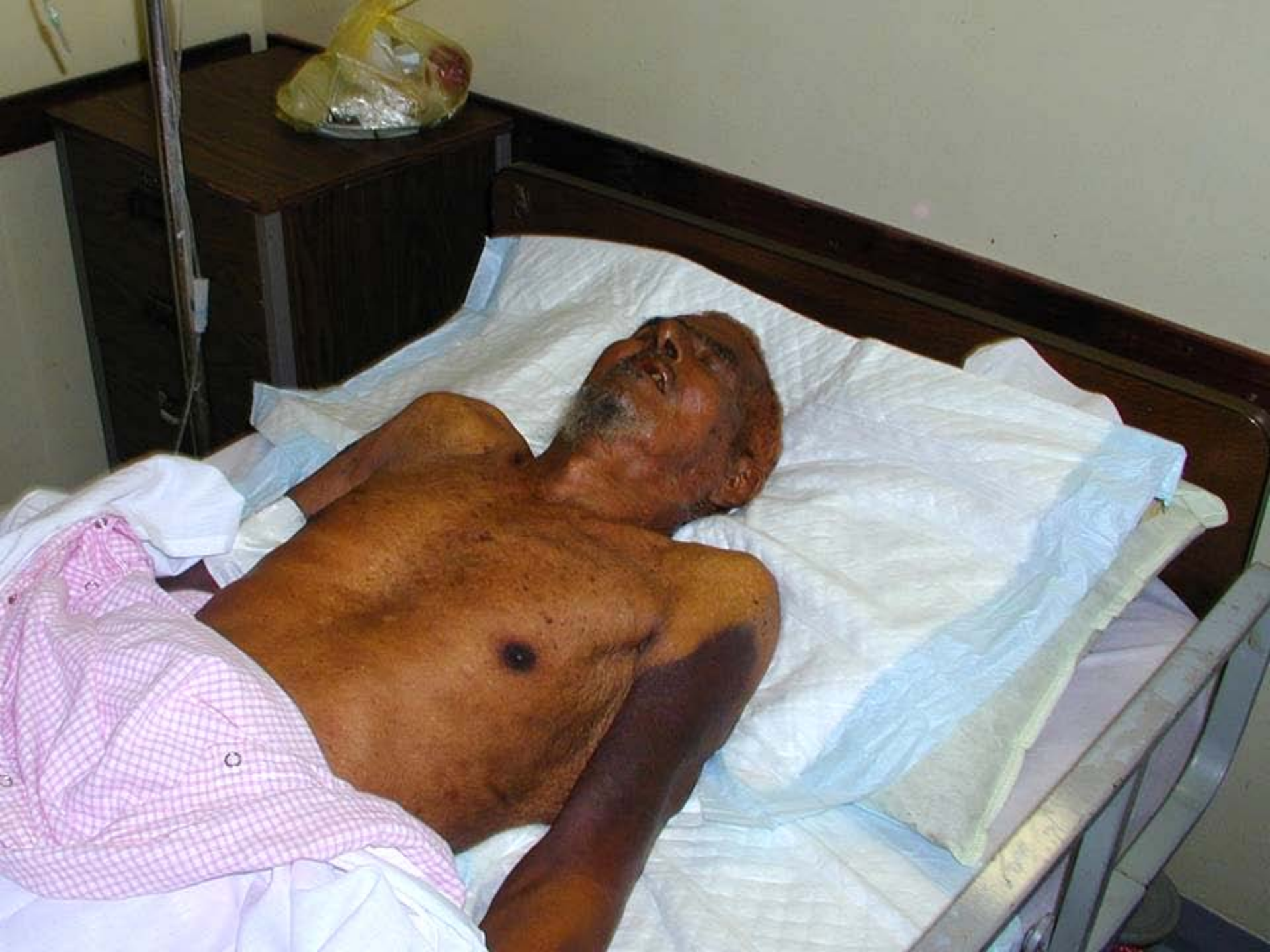


- 478 deaths
- 115 VHF deaths
- 9% IgM+
- ~89,000 cases
- 70% animal loss

Rift Valley Fever: Clinical features



- 3-7 day incubation, 3-5 day duration
- Asymptomatic or mild illness
- Fever, myalgia, weakness, weightloss
- Photophobia, conjunctivitis
- Encephalitis
- <5% hemorrhagic fever
- 1-10% vision loss (retinal hemorrhage, vasculitis)

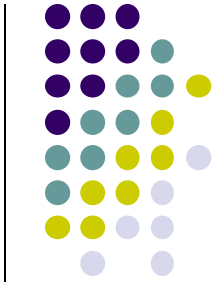


RVF: Encephalitis

	%*
Meningeal signs	67
Confusion	81
Stupor or coma	78
Hypersalivation and teeth grinding	11
Hallucinations	43
Hemiparesis	5
Focal Signs	27
CSF pleocytosis	86
CSF protein > 40 mg%	57
Fatal outcome	11
Residua	7

* Percent of total from a series of 37 reported cases

Arenaviruses



- Old world
  - Lassa
- New world
  - Junin
  - Machupo
  - Guanarito
  - Sabia

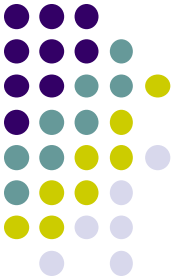
Lassa Fever

- West Africa
- Rodent-borne (*Mastomys natalensis*)
- Person-to-person transmission
  - Direct contact
  - Sex
  - Breast feeding
- Mortality 1-3% overall, 20% among hospital patients
- Therapy: Ribavirin

Lassa: Clinical features

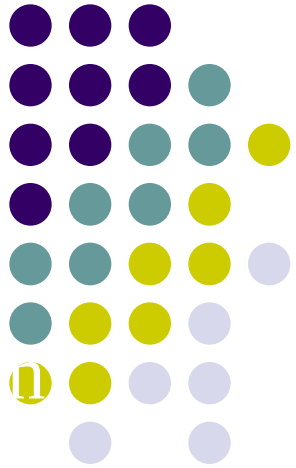
- 80% asymptomatic
- Fever
- Retro-sternal pain
- Exudative pharyngitis
- Myalgia, headache
- Abdominal pain, vomiting
- Facial edema and conjunctivitis
- Mucosal bleeding
- Proteniuria

Lassa: Clinical features

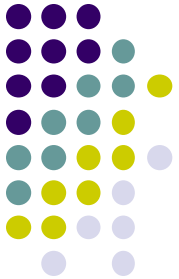


- Hearing loss, 25%, may be persistent
- Spontaneous abortion

Lassa Fever

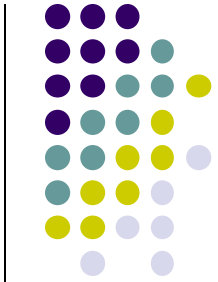


General Facts



- Viral hemorrhagic fever caused by the *Arenavirus* Lassa
- Transmitted from rodents to humans
- Discovered in Nigeria, 1969
- Endemic in portions of West Africa
- Seasonal clustering: Late rainy and early dry season
- Affects all age groups and both sexes

Arenaviridae



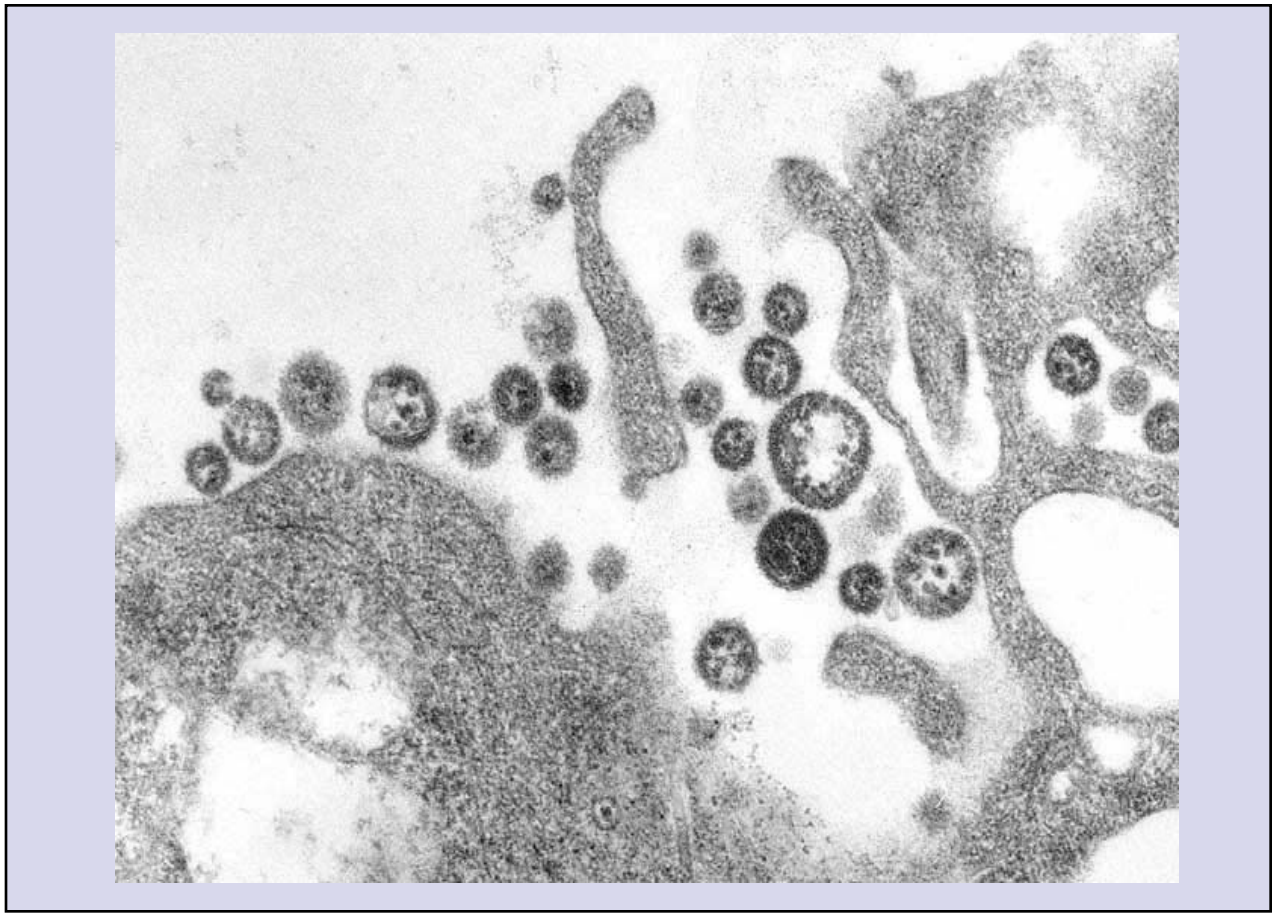
- Name derived from “arenosus” (Latin “sandy”) describing appearance of virions on examination by electron microscopy
- Enveloped virus, round or pleomorphic, 50-300 nm in diameter
- Single-stranded genome divided into 2 RNA segments: small (~3.4 kb) and large (~7.1 kb)
- 2 genes on each segment, arranged in unique “ambisense” orientation, encoding 5 proteins
- Inactivated by:
  - heating to 56^{o}C
  - pH<5.5 or >8.5
  - UV/gamma irradiation
  - detergents

Arenaviridae

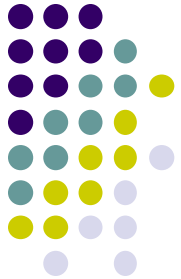
- Arenaviruses associated with human disease

Virus	Origin of Name	Year	Distribution
Lassa	Town, Nigeria	1969	West Africa
Junin	Town, Argentina	1957	South America
Machupo	River, Bolivia	1962	South America
Guanarito Area,	Venezuela	1989	South America
Sabia	Town, Brazil	1990	South America
LCMV	Clinical disease	1933	Worldwide

Lassa Virus

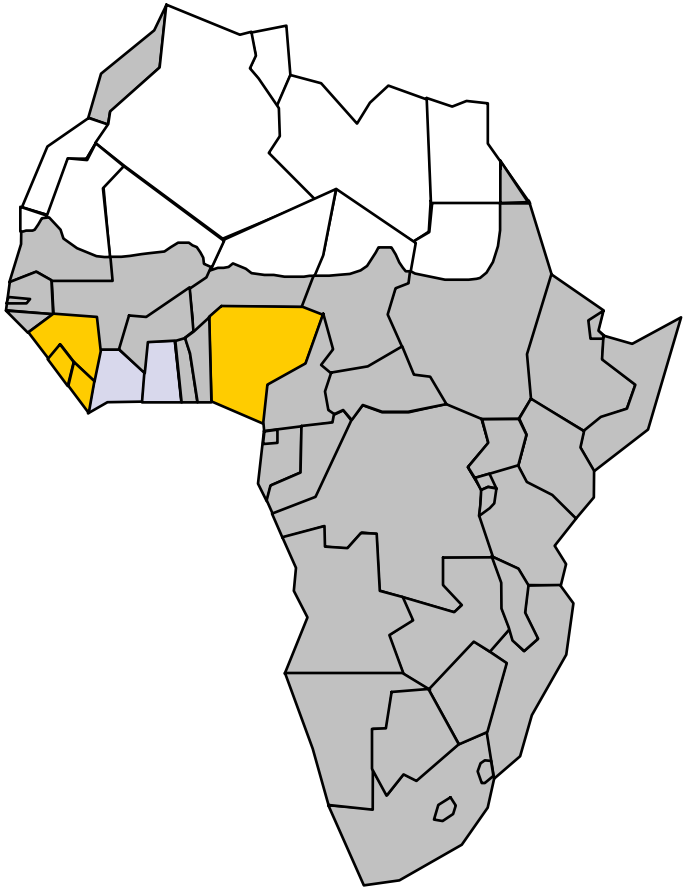


Epidemiology



- Endemic in areas of West Africa, including Nigeria, Liberia, Sierra Leone, and Guinea
- Estimated 300,000-500,000 infections/year, with 5000 deaths
- Rodent-to-human transmission (the “multimammate rat”, *Mastomys* species-complex)
- Secondary human-to-human transmission with the potential for nosocomial outbreaks with high case-fatality

Known Distribution of *Mastomys*



MASTOMYS **DISTRIBUTION**

LASSA 1969

Rodent Reservoir

- *Mastomys* species complex
- Taxonomy still unclear
  - *M. huberti*: more common in peridomestic habitat
  - *M. erytholeucus*: more common in brush habitat
  - Others

Transmission

- Rodent-to-human:
  - Inhalation of aerosolized virus
  - Ingestion of food or materials contaminated by infected rodent excreta
  - Catching and preparing *Mastomys* as a food source

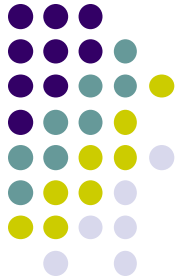
Transmission

- Human-to-human:
  - Direct contact with blood, tissues, secretions or excretions of infected humans
  - Needle stick or cut
  - Inhalation of aerosolized virus

Pathogenesis

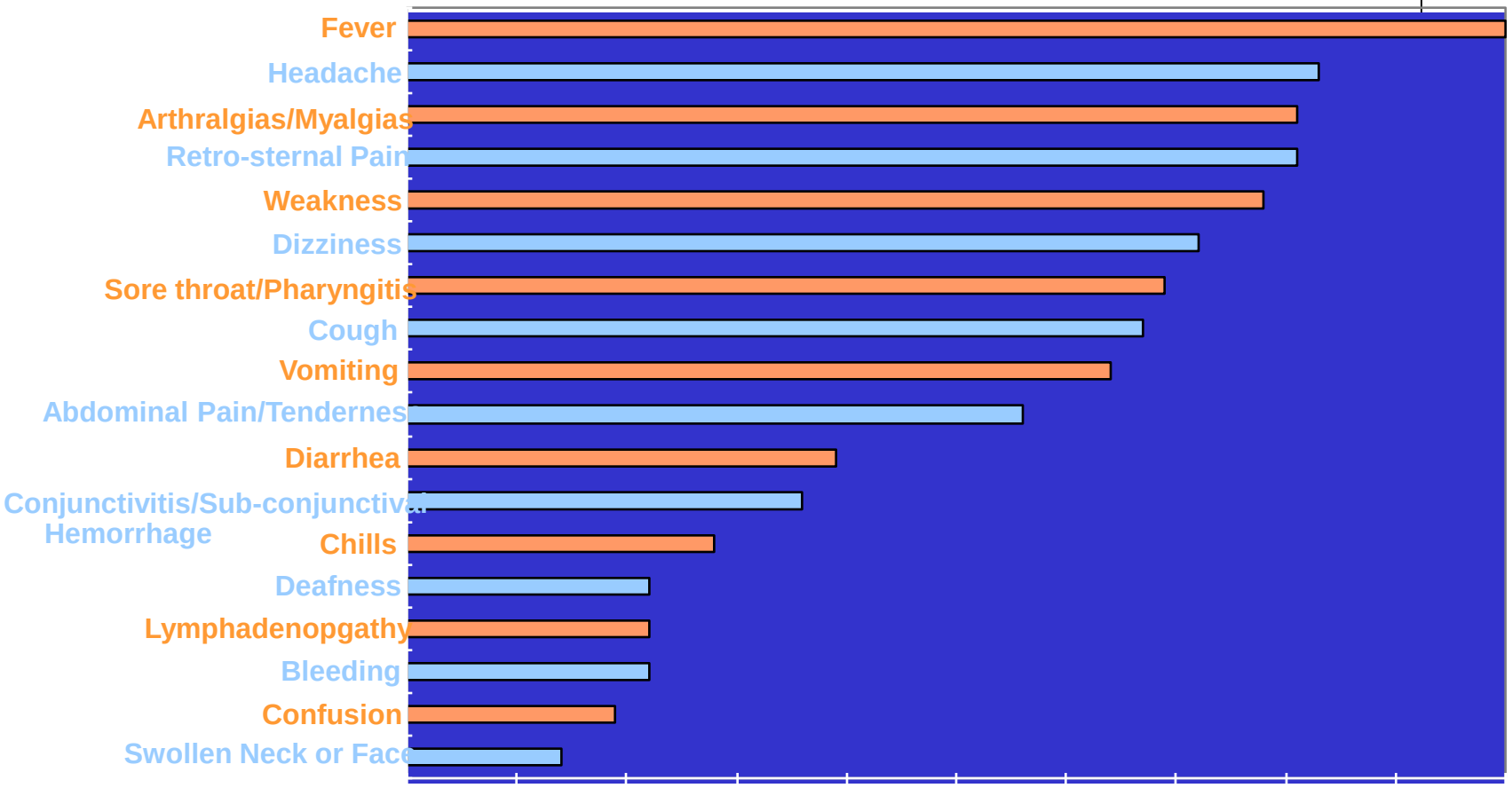
- Endothelial cell damage/capillary leak
- Platelet dysfunction
- Suppressed cardiac function
- Cytokines and other soluble mediators of shock and inflammation

Clinical Aspects

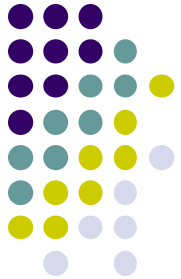


- Incubation period of 5-21 days
- Gradual onset of fever, headache, malaise and other non-specific signs and symptoms
- Pharyngitis, myalgias, retro-sternal pain, cough and gastrointestinal symptoms typically seen
- A minority present with classic symptoms of bleeding, neck/facial swelling and shock
- Case fatality of hospitalized cases: 15-20%
- Particularly severe in pregnant women and their offspring
- Deafness a common sequela

Clinical Signs and Symptoms

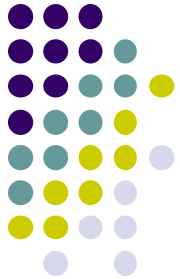


Lassa Fever in Pregnancy



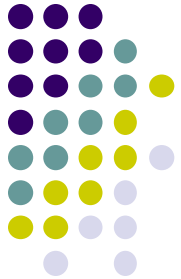
- Increased maternal mortality in third trimester (>30%)
- Increased fetal and neonatal mortality (>85%)
- Increased level of viremia in pregnant women
- Placental infection
- Evacuation of uterus improves mother’s chance of survival

Sensorineural Hearing Deficit in Lassa Fever



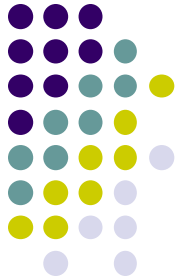
- Typically appears during early convalescence
- Not related to severity of acute illness
- Occurs in one-third of cases
- May be bilateral or unilateral
- May persist for life in up to one-third of those affected

Lassa Fever in Children and Infants



- Significant cause of pediatric hospitalizations in some areas of West Africa
- Signs and symptoms most often similar to adults
- “Swollen Baby Syndrome”
  - Edema/Anasarca
  - Abdominal distension
  - Bleeding
  - Poor prognosis

Differential Diagnosis of Lassa Fever



- Malaria
- Typhoid fever
- Streptococcal pharyngitis
- Leptospirosis
- Bacterial sepsis
- Bacterial meningitis
- Arboviral infection
- Anicteric hepatitis
- Enterovirus infection
- Bacterial or viral conjuctivitis

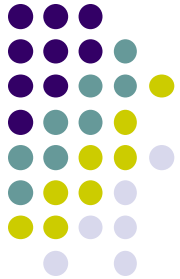
Diagnostics

- Clinical diagnosis often difficult
- ELISA (Enzyme-linked immunosorbent assays) for antigen, IgM, and IgG
- As research tools:
  - Virus isolation
  - Immunohistochemistry (for post-mortem diagnosis)
  - RT-PCR (Reverse transcription-polymerase chain reaction)

Treatment

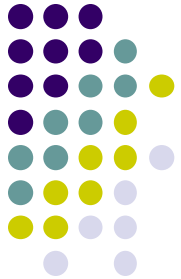
- Supportive measures
- Ribavirin
  - Most effective when started within the first 6 days of illness
  - Major toxicity: mild hemolysis and suppression of erythropoesis. Both reversible
  - Presently contraindicated in pregnancy, although may be warranted if mother's life at risk
  - Does not appear to reduce incidence or severity of deafness

Associated with Poor Prognosis in Lassa Fever



- High viremia
- Serum AST level >150 IU/L
- Bleeding
- Encephalitis
- Edema
- Third trimester of pregnancy

Prevention and Control



- Village-based programs for rodent control and avoidance
- Hospital training programs to avoid nosocomial spread: barrier nursing manual
- Diagnostic technology transfer
- Specific antiviral chemotherapy (ribavirin)

Rodent Control

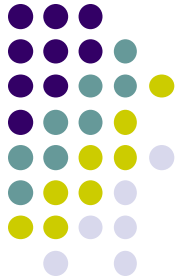
- Proper storage of food in rodent-proof containers
- Cleaning around homes
- Trapping and killing rodents with proper and safe disposal of carcasses
- Avoid rodents as a food source

Ongoing Lassa Fever Research in Guinea, West Africa

- Natural history of disease
  - Where it came from
  - How clinical course progresses
  - Whom it affects
- Diagnosis: Clinical/Laboratory
- Immunopathogenesis
- Treatment
- Rodent population dynamics
- Prevention and control

Collaboration between CDC/SPB and the Guinean Institute for Research and Applied Biology

VHF: Supportive therapy



- Rule out or treat febrile illnesses:

  malaria, rickettsia, leptospirosis, typhoid, dysentery
- Early hospitalization
- Distant medical evacuation associated with high mortality
- Cautious sedation and analgesia
- Careful hydration
- Pressors, cardiotonic drugs
- Support of coagulation system

Ribavirin

- Guanosine nucleoside analog:

  blocks viral replication by inhibiting IMP dehydrogenase
- Licensed for treatment of RSV and HCV
- Potential adverse effects:
  - Dose dependent reversible anemia
  - Pancreatitis
  - Teratogen in rodents

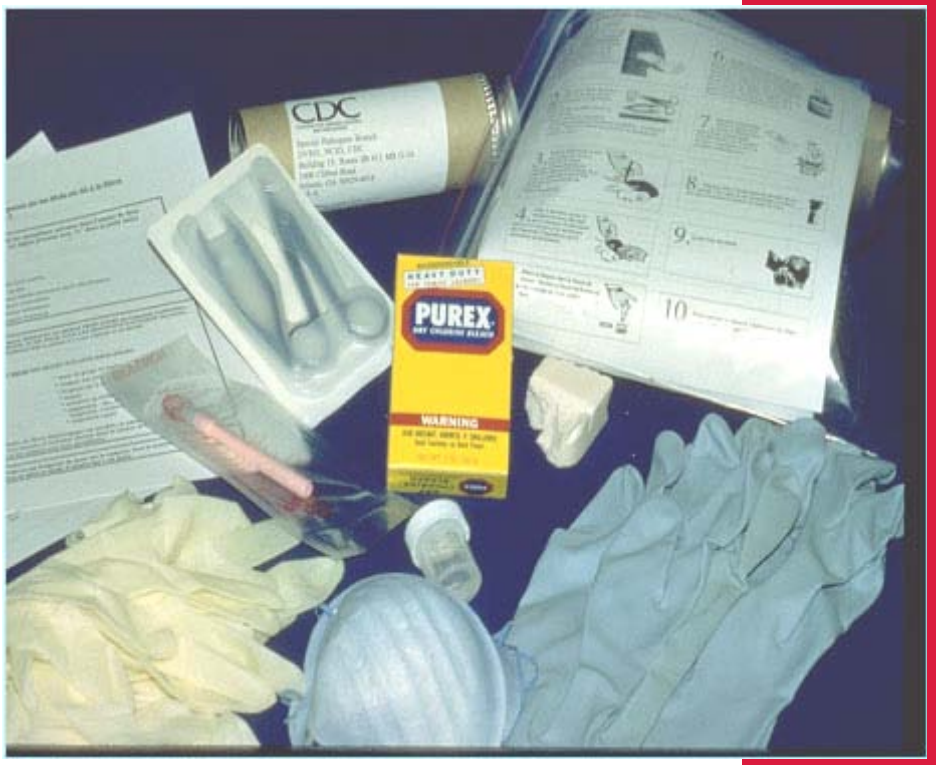
Ribavirin: indications

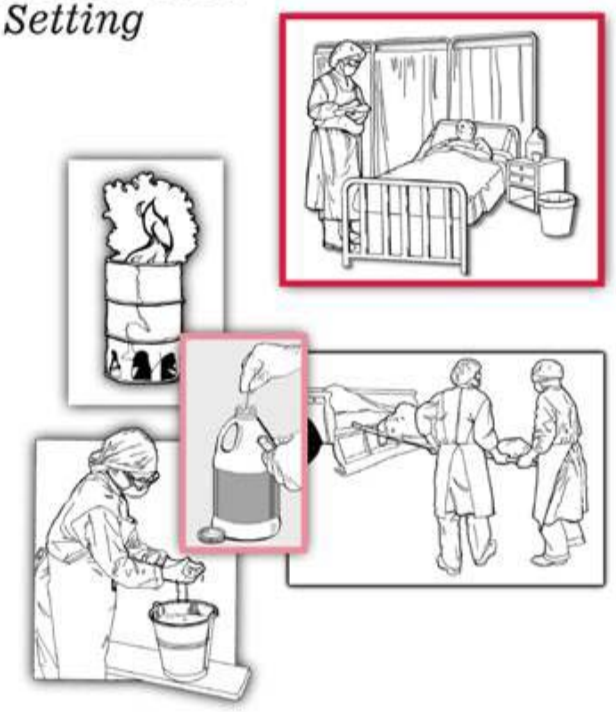
• Filoviruses	No
• Rift Valley	No…
• CCHF	Yes
• Lassa	Yes
• Argentine HF	Yes
• Other New world Arena	Maybe

Ribavirin: toxicities

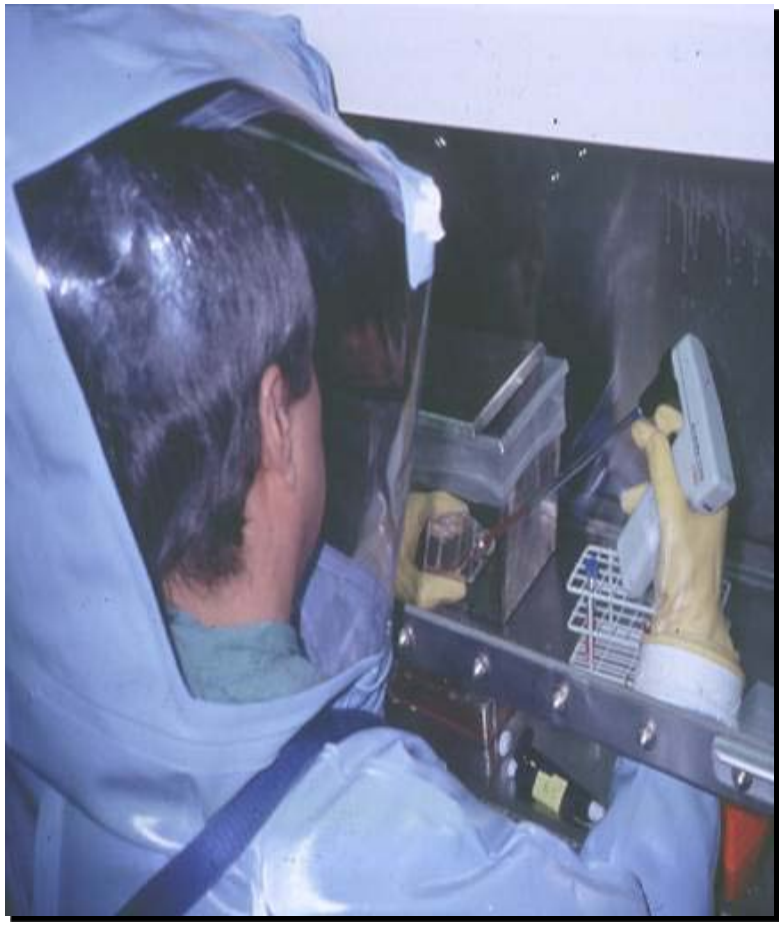
- Teratogenic
- Extravascular hemolysis
- Bone marrow suppression
- Rigors with abrupt iv administration
- Reversible hyperbilirubinemia, hyperuricemia with oral administration
- Pruritus, nausea, depression, cough

Infection Control





Laboratory safety: BSL-4

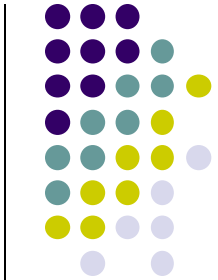


In contrast to patient-care,

high-level protection required for:

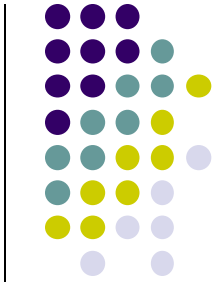
- Laboratory manipulation
- Mechanical generation of aerosols
- Concentrated infectious material
- Viral culture

VHF: Human-to-Human transmission



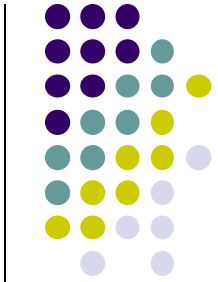
- None: Yellow fever, Dengue, Rift Valley fever, Kyasanur, Omsk (arboviruses), hantaviruses
- Low: Lassa and South American Arenaviruses
- High: Ebola, Marburg, Crimean-Congo HF

History of Infection Control Precautions



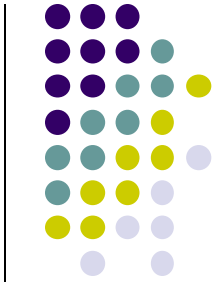
- 1877 Separate facilities for infectious diseases
- 1910 Antisepsis and disinfection
- 1950-60 Closure of Infectious disease and TB hospitals
- 1970 CDC:“Isolation Techniques for use in Hospitals”

History of Infection Control Precautions



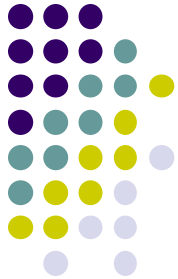
- 1983 CDC Guideline: Isolation Precautions in Hospitals
- 1985 Universal precautions
- 1987 Body substance isolation

History of Infection Control Precautions



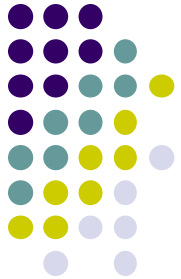
- 1996 CDC/HICPAC revised guidelines:
  - Standard Precautions

Standard Precautions



- Constant use of gloves and handwashing (plus face-shields, masks or gowns if splashes are anticipated) for any contact with blood, moist body substances, mucous membranes or non-intact skin.

Standard Precautions

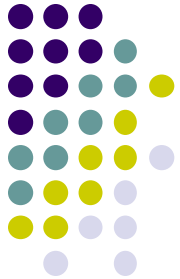


- Constant use of gloves and handwashing

  (plus face-shields, masks or gowns if splashes are anticipated) for any contact with blood, moist body substances, mucous membranes or non-intact skin.

- Additional, Transmission-based Precautions

Standard Precautions



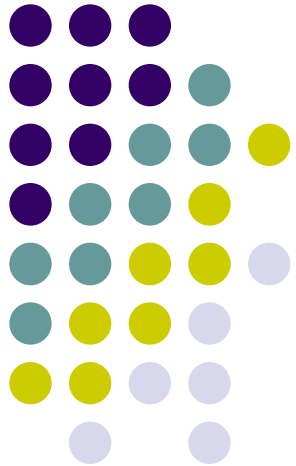
Transmission-based Precautions

- Airborne (TB, Chicken pox, Measles, Smallpox)
- Droplet (Diphtheria, Pertussis, Meningococcus, Influenza, Mumps....)
- Contact (Enteric infections, Respiratory infections, Skin infections, Conjunctivitis….)

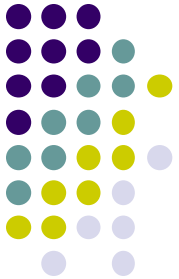
VHF: Contact management

- Casual contacts: e.g., shared airplane or hotel,
  No surveillance indicated
- Close contacts: Direct contact with patient and/or body fluids during symptomatic illness.
  Fever watch during incubation period
- High risk contacts: Needle stick, mucosal exposure to body fluids, sexual contact.
  Fever watch, consider inpatient observation.

Yellow Fever



What is Yellow Fever?



- Small but serious virus that is transmitted through the bite of the female Aedes aegypti mosquito
- Also transmitted directly into the blood through needles
- Virus prevalent in South Africa and sub-Saharan Africa.
- Being in both urban and jungle areas

Aedes Aegypti Mosquito

The Virus

- YF virus is a single-stranded RNA virus that is in the *Flavivirus* genus.
- It replicates in regional lymph nodes and spreads via the bloodstream.

Three Stages of YF

- Early stage: Headache, muscle and joint aches, fever, chills, loss of appetite, vomiting, and jaundice are common.
- Period of remission: After 3 - 4 days, fever and other symptoms go away.
- Period of intoxication: Multi-organ dysfunction occurs.

Symptoms

- Jaundice
- Headache
- Fever/chills
- Vomiting (blood)
- Muscle aches
- Hemorrhaging
- Seizures
- Arrhythmia
- Delirium
- Decreased urination
- Red eyes
- Coma

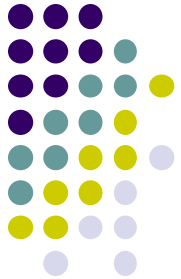
Who’s Infected?

- Persons 9 months and older who are travelling to countries highly populated with the virus carrying mosquito
- Monkeys living in the jungle where the mosquito is found.

Detection

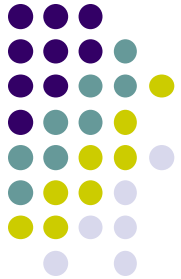
- Symptoms of YF are also identical to that of malaria, typhoid, and dengue
- Blood tests must be done in order to properly diagnose YF.

History of Yellow Fever



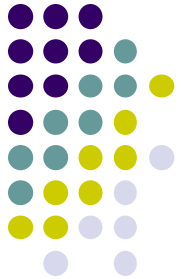
- Dr. Benjamin Rush first identified yellow fever in 1793.
- First reported in the U.S. in Philadelphia, PA in August of 1793.
- Rush had his own method of healing those infected which included purging the bowels and removing high proportions of blood from the body
- Wasn’t recognized that yellow fever was transmitted by mosquitoes until 1881.

History of Yellow Fever (cont'd)



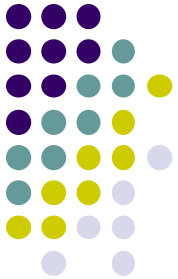
- At one point it was said that Africans were immune to the virus
- The number of casualties reached 3,881
- As a result of the Yellow Fever epidemic many more hospitals, isolation hospitals, and orphanages were built
- In 1951 Max Theiler was awarded the Nobel Peace Prize in Physiology and Medicine for the YF-VAx

The Cure…?



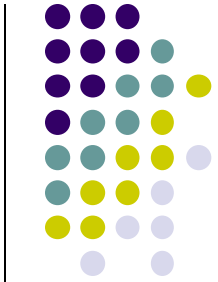
- The Yellow Fever virus has no known cure.
- The treatment focuses on relieving pain
- the patient will feel.

Treatment for Mild Cases



- Drink plenty of water
- Bed rest
- Take acetaminophen (not aspirin) for the pain and discomfort

Treatment for Severe Cases

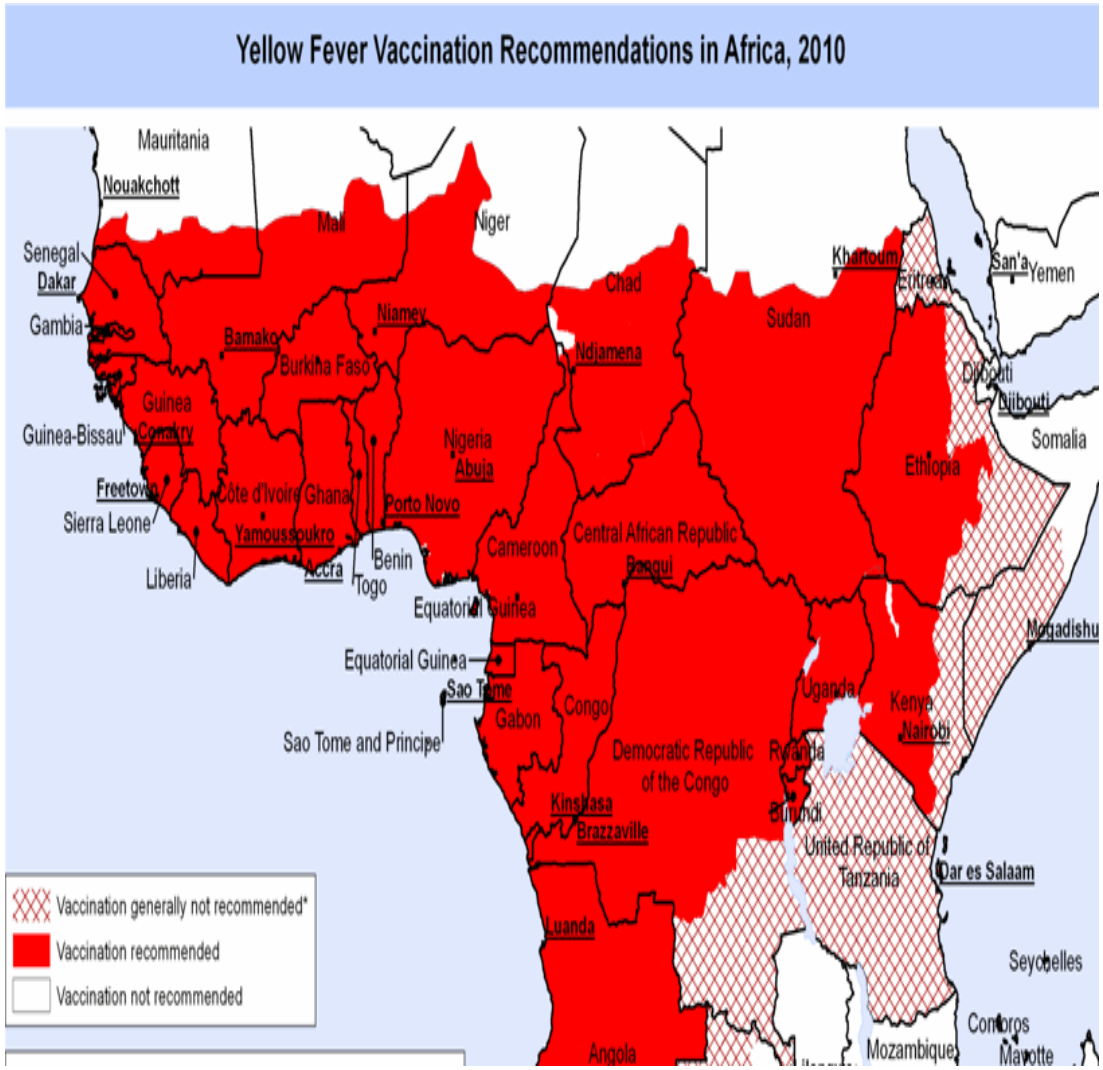


- Hospitalization required
- Blood replacement
- Medication to prevent and control seizures, nausea
- Prevention of secondary infections

Vaccination

- The vaccine has been used since 1930 and has been given to over 300 million people
- The vaccine given now is called YF-Vax and is a live preparation 17D strand of the virus grown in leucosis-free chick embryos
- If allergic to eggs, vaccine is not recommended
- One dose will last up to 10 years
- Those with cancer, kidney failure, HIV/AIDS, and weak immune system are suggested against using the vaccine

Infected Areas



Infected Areas

2012年傳染病防治醫療網工作計畫重點

王任賢 指揮官

依據

- 傳染病防治法第14、53條
- 傳染病防治醫療網作業辦法
- 指定徵用設立檢疫隔離場所及徵調相關人員作業程序與補償辦法

目的

- 強化支援人力之動員機制、應變醫院之應變整備度及負壓隔離病房收治力，提升傳染病防治醫療網應變之量能
- 強化應變醫院與支援合作醫院之合作機制，建全傳染病防治醫療網架構及功能

工作重點與時程

持續進行「傳染病防治醫療網作業辦法」修法作業

- 研擬「傳染病防治醫療網作業辦法」修訂草案，提經本局100/4/28法制工作小組會議討論，內容包含：
  - 區指揮官/副指揮官之權責
  - 支援合作醫院指定入法並比照應變醫院取得相關補助之法源依據
  - 隔離醫院啟動致影響醫院營運之差額補助計算方式
- 鑑於本修法作業事涉醫療網整體架構及其功能，攸關醫療網功能健全，因此仍應參依上開會議決議及醫療網實際運作需求，持續辦理修法作業

工作時程

- 12月31日前完成修法作業草案修訂及第二次提報法制工作小組討論

提升應變醫院應變力-1

- 完成應變計畫修訂
  - 參依2011年委託台灣急診醫學會辦理之應變計畫審查結果修訂，送請衛生局進行審查、醫療網區（分局）核定，再送總局備查
- 工作時程
  - 應變醫院3/10完成檢視及修訂送衛生局
  - 衛生局於3/25完成審查送網區
  - 分局於4/15完成核定後送總局
  - 總局5/3完成應變計畫備查

提升應變醫院應變力-2

- 提升負壓隔離病房自我維護能力：
  - 持續辦理應變醫院自我查核及委由專業機關（團體）、學術單位辦理年度檢查工作
  - 綜整歷年查核計畫結果，作為未來是否將應變醫院自我查核能力及負壓隔離病房之維護納入醫療院所常規業務之參採
- 工作時程
  - 5/31應變醫院完成自我檢測
  - 6/30委由專業機關或學術單位完成年度檢查
  - 7/15將前兩項結果送衛生局審查
  - 7/31衛生局完成初審
  - 8/15分局完成複審
  - 12/31總局完成負壓隔離病房抽查

提升應變醫院應變力-3

- 辦理應變醫院負壓隔離病房指定及補助病房維護費用並定期檢視更新傳染病隔離/應變/支援醫院指定名單
- 工作時程
  - 100/12提報指定負壓隔離病房資料
  - 6/10前檢具使用成果及經費執行率送本局審核
  - 12/10前檢具成果及收支明細核銷
  - 總局2月初完成應變醫院指定負壓隔離病房及維護費核撥/使用/核銷原則
  - 2/28完成備查更新傳染病隔離/應變/支援醫院指定名單
  - 101/3完成第一期撥款事宜、101/8完成第二期撥款事宜 101/12/31完成核銷事宜

提升應變醫院應變力-4

- 補助硬體設備提升硬體設備量能
  - 依100年勞研所查核結果，視設備設置之必要性及需求性補助應變醫院進行相關改善，以提升硬體設備量能
- 工作時程
  - 4/15前總局依100年查核結果規畫補助項目及對象
  - 4/30前各應變醫院依總局規畫補助項目及對象提報補助計畫
  - 6/30前核定硬體補助計畫及撥款
  - 12/1前各應變醫院檢具收支明細表、財產增加單、工程相關原始資料等送總局辦理核銷
  - 12/31完成硬體補助計畫核銷事宜

提升應變醫院應變力-5

- 補助辦理訓練及演習
  - 教育訓練以「第一及第五類傳染病防治」、「負壓隔離病房及負壓隔離艙之維護/使用」、「呼吸防護具介紹及密合度介紹/測試」、「傳染病緊急應變計畫」為主軸
    - 進行分眾（如醫護人員/工務或機電外包人員/勞務及行政人員/醫療輔助人員等）訓練，並由各應變醫院結合支援合作醫院依在地化需求，研提訓練計畫，
  - 醫療網演習以傳染病緊急應變計畫為主軸，依轄區特性及由支援合作醫院協助至少辦理1場次演習
- 工作時程
  - 3/10提報訓練/演習計畫送衛生局
  - 3/20各縣市衛生局初審送醫療網區
  - 3//31分局完成複審、評定優劣次序送總局
  - 4/30總局核定應補助金額、5/31前完成撥款、 12/31完成核銷
  - 102/1/31分局完成成果彙整

強化應變醫院與支援合作醫院之合作夥伴關係

- 依照傳染病防治法第53條規定，人力支援與設備徵用，為中央流行疫情指揮中心成立期間，各級政府機關得依指揮官之指示，指定或徵用公、私立醫療機構或公共場所，設立檢疫或隔離場所，並得徵調相關人員協助防治工作
- 合作計畫內容應回歸為雙方訓練/演習規劃、合作交流模式等內容
- 由本局邀請各網區、應變醫院及支援合作醫院，召開工作計畫說明會，說明合作計畫規範內容，提升執行效能
- 工作時程
  - 4/1總局召開工作計畫說明會
  - 4/30各衛生局前召開計畫協商會議
  - 5/11各衛生局督導應變醫院與支援合作醫院擬定合作計畫送網區
  - 6/15分局完成審核後送總局
  - 6/30總局完成備查

強化支援合作醫院體系-1

- 組成醫療專業諮詢團隊
  - 支援合作醫院組成醫療專業諮詢團隊，提供應變醫院急/重症病患診療、會診及相關諮詢等事宜
  - 規劃協助醫療、照護等臨床實務人員名冊，必要時依中央主管機關指示進駐應變醫院配合網區相關規劃，協助/參加應變醫院辦理傳染病防治相關教育訓練、研習、演練等
- 工作時程
  - 3/30支援合作醫院提報醫療專業諮詢團隊及支援醫療人員名冊送醫療網區、總局
  - 4/30備查支援合作醫院之醫療專業諮詢團隊及支援醫療人員名冊，轉知應變醫院、衛生局

強化支援合作醫院體系-2

- 指揮官所在行政支援合作醫院辦理6場次教育訓練
- 工作時程
  - 3/30行政支援合作醫院提報年度計畫
  - 4/15分局完成審查
  - 4/30總局完成備查及撥款
  - 11/15行政支援合作醫院提報成果送網區彙整、另檢具相關資料送總局核銷
  - 12/31完成核銷事宜

強化支援合作醫院體系-3

- 辦理支援人員教育訓練
  - 各網區就支援合作醫院規劃之進駐應變醫院支援人員，以醫療網之運作、該等人員之權利義務為主軸辦理教育訓練至少1場次
  - 訓練對象應以進駐人員進駐先後次序為考量，人數須達各網區支援人力60%
  - 訓練期間應進行前後測以評估訓練成效
- 工作時程
  - 10/31完成支援合作醫院支援人員教育訓練

完善支援人力儲備及管理平台

- 衛生局應依應變醫院所提應變計畫及考量轄區特性依需支援人力類別、人數等，提報或更新支援人力名冊，且需建立支援人力調度原則，以因應變時之需
- 增訂現行中央傳染病追蹤管理系統功能及介面（包括增加逾期未維護稽核清單查詢及強化批次傳送等功能）
- 總局每半年辦理「中央傳染病追蹤管理系統」教育訓練，以強化使用人員操作能力，提升資訊正確性
- 工作時程
  - 總局於4/10及10/10辦理「中央傳染病追蹤管理系統」教育訓練各一場
  - 各衛生局4/30及10/31前完成提報並上傳轄區支援人力名冊
  - 6/30規劃中央傳染並追蹤管理系統功能增訂、12/31完成功能增訂

維運醫療網區會議提升網區工作效能

- 各網區每年至少召開2次網區諮詢會議，並將支援合作醫院納入
- 工作時程
  - 12/31前分局召開至少兩次醫療網區會議

規劃委託外部專家進行傳染病防治醫療網整體量能之模擬分析

- 國內學者曾就禽流感爆發疫情下醫院抗疫能力進行模擬分析，作為醫院整備參採，惟相關研究多侷限於單一醫療院所醫療整備
- 為完備醫療網之整備，本局將規劃與外部專家合作，進行傳染病防治醫療網應變量能模擬分析
- 工作時程
  - 12/31前完成提供科技計畫相關資料及納入102年科技計畫

Thank you for your attention

醫院如何撰寫傳染病緊急應變計畫？

衛生署 疾病管制局

中區傳染病防治醫療網

王任賢 指揮官

傳染病聚集事件不同於其他災難聚集事件

- 災難聚集事件
  - 同一時間出現大量同質病患
  - 無第二波病患出現
  - 介入措施無法改變已發生的聚集事件
- 傳染病聚集事件
  - 病患出現在不同時間點及不同地點
  - 病患會一波接一波的出現
  - 介入措施能改變聚集事件的走向

傳染病應變計畫不同於災難應變計畫

- 災難應變計畫
  - 不須審度該不該啟動，因為災難已經發生了
  - 不需要預測災難的強度，因為沒有第二波
  - 支援的人力與物力均要求全力以赴以及一步到位，因為明天沒事了
- 傳染病應變計畫
  - 必須審度疾病發生之原因及疾病未來之走勢，以決定該不該啟動
  - 必須預測傳染病的強度，以決定反映之強度
  - 支援的人力與物力要求逐步到位，並應顧及常規之醫療

傳染病發生的原因

- 呼吸道傳染病
  - 無法預知發生的原因
    - Vaccine preventable diseases
    - Vaccine unpreventable diseases
- 接觸傳染病
  - Protocol violation
- 蟲媒傳染病
  - 不可能在醫院內散播

醫院傳染病緊急應變計畫之標的

呼吸道傳染病中之

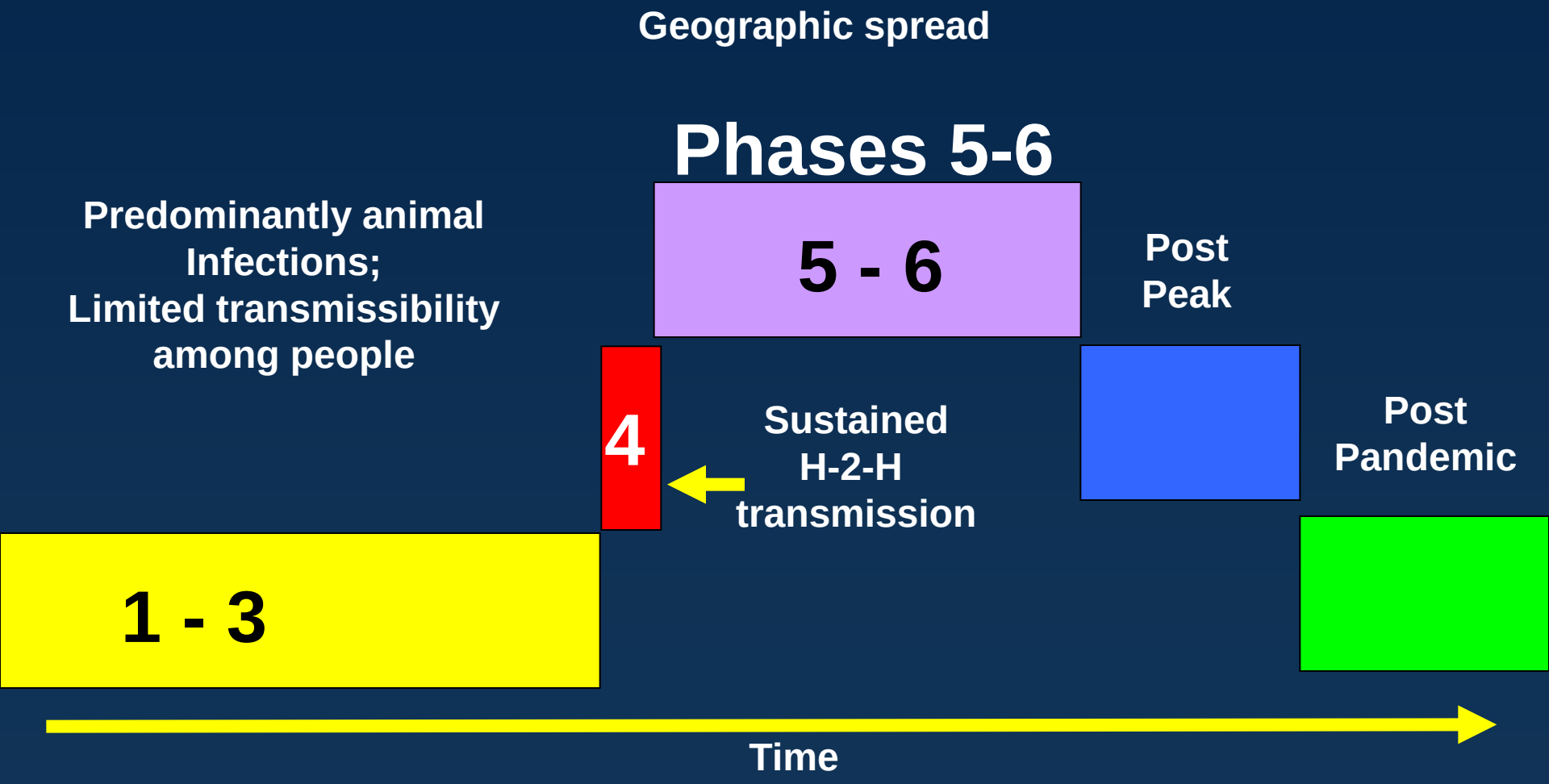
Vaccine unpreventable diseases

在醫院產生或即將產生聚集事件

WHO疫情分級

大流行警示狀況	人類風險狀況	疫情分級
大流行間期 (Inter-pandemic) 出現動物新病毒 但無人類個案	人類低風險期	Phase 1
	人類高風險期	Phase 2
大流行警示期 (Pandemic alert) 新病毒引發人類個案	尚未出現人傳人或 已出現有限性人傳人的新病毒	Phase 3
	證據顯示新病毒可人傳人機會增加	Phase 4
	證據顯示新病毒已可以有效人傳人	Phase 5
大流行期 (Pandemic)	已證實出現有效性人傳人	Phase 6

Pandemic phases and transmission patterns



醫院傳染病緊急應變計畫之啟動時機

- WHO界定已進入第四期的呼吸道傳染病且國內已宣佈進入WHO之第三期時
- WHO界定已進入第四期的呼吸道傳染病且院內已出現第一起案例或第一起聚集 (二個相關聯的病例)

醫院傳染病緊急應變計畫之內容

- 壹、指揮體系之建立
- 貳、人力與物力徵調計畫
- 參、介入計劃
- 肆、監測計畫
- 伍、訓練計畫
- 陸、支持計劃

壹、指揮體系的建立

- 防疫作戰強調的是執行面的到位，指揮體系的功能就是在督導各項計畫縱向能確實到位，橫向能互相支援
- 指揮中心對於執行的五大計劃均必須設立相對應的組以實施督考

醫院傳染病緊急應變計畫之構成要件

- 人力與物力徵調計畫
  - 必須隨著疫情發展而執行增減
- 介入計劃
  - 必須多管齊下並能有效到位，隨著疫情發展而調整步伐
- 監測計畫
  - 有效而及時的疾病監測有助於微調徵調與介入計劃
- 訓練計畫
  - 及時的訓練可有效整合徵調與介入計劃
- 支持計劃
  - 確保徵調與介入計劃能有效執行

督導考核

- 指揮中心的責任在於督導考核整個計畫之執行，每項計畫之督導考核必須由專人負責，而且是real time監測，real time執行人力物力之增減及介入措施之強弱或更替

醫院符合傳染病啟動標準時

除專業人力與物力之徵調應視疫情而調整步伐外，其他介入措施及後勤作業均必須立即啟動，但亦必須視疫情而調整

貳、人力與物力徵調計畫:I

- 專業人員是否足以應付目前的疫情？
  - 是：不需要執行人力與物力徵調計畫
  - 否：開始波段性人力與物力徵調
- 專業人員的定義由醫院自行認定
  - 感染科?
  - 感染科+胸腔科?
  - 內科?
  - 內科+家醫科?
- 足夠的定義由醫院自行認定
  - 專業人員著防護執行24小時醫療照顧，每人能照顧之能量應只有常規醫療的1/3至1/4

人力與物力徵調計畫: II

- 專業人員足以應付目前疫情時該有的其他因應
  - 訂定常規醫療之優先順序，次要醫療以nonhospital medicine為主 (開源)
  - 目標疾病在疫情初期並不需要訂定優先順序，但在後期必須訂定，輕病者應執行nonhospital medicine (節流)

人力與物力徵調計畫: III

- 波段性人力徵調
  - 人力徵調順序：
    - 專業到半專業，不專業者不徵調
    - 院內到院外，若配套措施做得好，可以不必院外支援
  - 院內人力徵調必須配合nonhospital medicine的執行

人力與物力徵調計畫: IV

- 波段性物力徵調
  - 立即提升防疫物資的存量至能涵蓋整個疫情期之水平
  - 訂立各項防疫物資使用之適應症
  - 積極尋求次要防疫物資之替代品，例如外科口罩可用紙口罩或布口罩代替、隔離衣可以布工作服代替、眼罩可以自製面罩代替、負壓隔離病房可以簡易隔離病房代替

參、介入計畫

呼吸道衛生及咳嗽禮節全面向上提升

呼吸道衛生及咳嗽禮節之平時作為：I

- 民眾通視教育：所有具呼吸道症狀的人
  - 咳嗽時用衛生紙遮住口鼻，然後將紙丟進垃圾桶。
  - 如果可以，咳嗽時應戴口罩
  - 如果有接觸到呼吸道分泌物，之後要洗手
  - 盡可能保持與別人距離1公尺以上

呼吸道衛生及咳嗽禮節之平時作為：II

- 醫療機構要推行呼吸道衛生及咳嗽禮節：
  - 教育所有HCW、病人、家屬及訪客，避免散布呼吸道飛沫以預防流感或其他呼吸道病毒的重要性。
  - 張貼告示要求病人及家屬主動通報呼吸道症狀，並遵守呼吸道衛生及咳嗽禮節.
  - 張貼告示要求有呼吸道症狀的人不要到機構探病
  - 在院內公共區及門診區提供口罩給有呼吸道症狀者
  - 在院內公共區及門診區提供衛生紙及揮發性洗手劑

呼吸道衛生及咳嗽禮節之提升作為：I

- 民眾通視教育:
  - 所有具呼吸道症狀或發燒的人，以門禁管理禁止進入醫療院所探病
  - 來醫院探病的人，每次每床以一人為限，需配戴探病證，並應全程配戴外科口罩
  - 咳嗽時用衛生紙遮住口鼻，然後將紙丟進垃圾桶。
  - 如果可以，咳嗽時應戴口罩
  - 如果有接觸到呼吸道分泌物，之後要洗手
  - 盡可能保持與別人距離1公尺以上

呼吸道衛生及咳嗽禮節之提升作為：II

- 醫療機構要推行呼吸道衛生及咳嗽禮節：
  - 管制執行呼吸道侵襲性醫療行為
  - 醫療機構全面口罩政策
  - 張貼告示要求有呼吸道症狀的人不要到機構探病
  - 在院內公共區及門診區提供口罩給有呼吸道症狀者
  - 在院內公共區及門診區提供衛生紙及揮發性洗手劑

肆、監測計畫

- 院內疫情監測計畫
  - 員工體溫與缺席監測
  - 院內疑似與確認個案之監測
- 國內與國際疫情監測計畫
- 監測計畫為後勤計畫中重要的一環，作戰的步伐可依疫情監測的結果而調整。監測計畫用以調整作戰步調，因此所有的監測必須real-time

伍、訓練計畫

- 傳染病應變計畫啟動時就該對全體員工執行教育訓練，訓練的內容應包括
  - 疾病的介紹
  - 醫院的介入政策
  - 人力徵調與防疫物資使用規範
  - 動員分組
- 立即建構e learning系統，任何醫院或國家新政策之改變均應以real time之e learning有效傳達到醫院每一個人

陸、支持計畫

- 整個傳染病緊急應變計畫之成功關鍵在於醫院之佔床率，醫院若能維持低的佔床率，將會騰出足夠的人力與物力執行防疫戰爭。而壓低佔床率的關鍵在於如何引導病患進行Nonhospital medicine
- Nonhospital medicine是指居家治療，讓病患能在門診與居家之間達到治療的效果，是整個傳染病緊急應變計畫中無時無刻都要執行的政策。使得人力與物力能夠有效到位。

懇請賜教