

BioTerror Modules in GIDEON

Several aspects of GIDEON are relevant to the field of Bioterror, including Diagnosis, Simulation, Syndromic Surveillance, Communications, Therapy, Vaccines and Microbiology.

The diagnosis module is based on a Bayesian matrix designed for decision support or simulation of all infectious diseases, in all countries. The user may input any combination of symptoms, signs, exposure data (country, dates of exposure, animals, foods, etc) and laboratory data. A specific sub-module has been developed for Bioterror events. The following figure depicts the data input screen for a scenario of hemorrhagic fever with onset four days following a suspected event.

The screenshot shows the GIDEON Diagnosis interface. The 'Symptoms and Signs' section on the left includes a list of symptoms with checkboxes. Checked items include 'Fever' and 'Jaundice'. The 'Clinical Summary' on the right lists the entered symptoms: Hemorrhagic fever, Fever, Jaundice, Diffuse or multifocal rash, Petechiae, Vomiting, Case cluster or evidence for contagion, Neutropenia, and Thrombocytopenia. The 'Incubation Period' section shows 'Onset of disease' as 7-Dec-04 and 'Illness First Appeared' as 3-Dec-04. The 'Disease acquired in' field is set to '<Bioterrorism simulator>'. The 'Personal Notes' section is empty.

Pressing the Diagnosis button generates the following differential diagnosis list:

GIDEON Diagnosis Results

Based on the clinical findings you entered, here is GIDEON's diagnosis:

Disease	Probability
<input type="checkbox"/> Crimean-Congo hemorrhagic fever	52.4%
<input type="checkbox"/> Brazilian hemorrhagic fever	25.4%
<input type="checkbox"/> Yellow fever	22.1%
<input type="checkbox"/> Marburg virus disease	< 1%
<input type="checkbox"/> Ebola	< 1%
<input type="checkbox"/> Rift Valley fever	< 1%
<input type="checkbox"/> Hantavirus infections - Old World	< 1%
<input type="checkbox"/> Lassa fever	< 1%

Total: 8 listed

indicates note exists for <Bioterrorism simulator>

This list is non-Bayesian (i.e., based on likelihood of symptom occurrence, without known incidence data). Options at this point allow the user to ask why any additional disease was NOT included in the differential diagnosis – or to generate a list of further discriminative clinical signs, laboratory tests, etc which would be useful in refining the differential diagnosis.

One option at this point allows the user to reexamine this scenario as a NON-bioterror event; i.e., same clinical features affecting a group of patients in Canada. The following screen is generated:

GIDEON Diagnosis Results

Based on the clinical findings you entered, here is GIDEON's diagnosis:

Compare
Why Not

Disease	Probability
<input type="checkbox"/> Leptospirosis	49.7%
<input type="checkbox"/> Colorado tick fever	46%
<input type="checkbox"/> Relapsing fever	4%
<input type="checkbox"/> Septicemia - bacterial	< 1%

Total: 4 listed

indicates note exists for Canada

The second module follows the status of all diseases in all countries, including the descriptive epidemiology of all bioterror diseases. Some representative screens for anthrax follow:

Diagnosis
Epidemiology
Therapy
Microbiology

Diseases

Fingerprint Synonym Graphs

Agent:

Vector:

Vehicle:

Reservoir:

Adenovirus infection

Aeromonas & marine Vibrio infx.

African tick bite fever

AIDS

Amoeba - free living

Amoebic abscess

Amoebic colitis

Angiostrongyliasis

Angiostrongyliasis - abdominal

Anisakiasis

Anthrax

Total: 338 listed

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General
Distribution
Images
Clinical

Disease: Anthrax

Agent: BACTERIUM.
Bacillus anthracis
An aerobic gram positive bacillus

Reservoir: Soil Goat Cattle Sheep Water Horse

Vector: Fly (rare)

Vehicle: Hair Wool Hides Bone products Air Meat

Incubation Period: 1d-7d; 1-12 cutaneous, 1-7 GI; 1-43 pulm.

Diagnostic Tests: Bacteriological culture.
Alert laboratory that organism may be present.
Serology and rapid tests by Ref. Center

Typical Adult Therapy
Isolation [secretions].
Ciprofloxacin; alt. doxycycline, penicillin.
Add clindamycin + rifampin for pulmonary infection.
Dosage/route/duration as per severity

Typical Pediatric Therapy
Isolation [secretions].
Ciprofloxacin [doxycycline if age >= 8y].
Add clindamycin + rifampin for pulmonary infection.
Dosage/route/duration as per severity

Diagnosis Epidemiology Therapy Microbiology

Diseases

Fingerprint Synonym Graphs

Agent: <Any Agent>

Vector: <Any Vector>

Vehicle: <Any Vehicle>

Reservoir: <Any Reservoir>

Country: <Bioterrorism simulator>

Reset [Search >](#)

Adenovirus infection
Aeromonas & marine Vibrio infx.
African tick bite fever
AIDS
Amoeba - free living
Amoebic abscess
Amoebic colitis
Angiostrongyliasis
Angiostrongyliasis - abdominal
Anisakiasis
Anthrax

Total: 338 listed
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General Distribution Images Clinical

Disease is found worldwide or in virtually every country

< Worldwide > @
< Bioterrorism simulator > + @
Afghanistan + @
Albania + @
Algeria + @
American Samoa + @
Andorra + @
Angola + @
Anguilla + @
Antigua & Barbuda + @

Note:
+ indicates that a country is endemic or potentially endemic.
@ indicates that a country-specific note is available.

< Bioterrorism simulator > @

In 1915, German agents in the United States are believed to have injected Army horses, mules, and cattle with anthrax en route to Europe. Allegedly, a German-American scientist cultivated *Bacillus anthracis* and *Pseudomonas (Burkholderia) mallei* strains supplied by the German government, in his Washington D.C. home. The agents and an inoculation device were given to sympathetic dock workers in Baltimore to infect 3000 head of horses, mules, and cattle, destined for the Allied troops in Europe. As a result, it was claimed that several hundred troops were also affected.

In 1936, Japan created Unit 731, a bio-warfare unit masquerading as a water-purification facility. This 150-building complex near Harbin, Manchuria eventually orchestrates the deaths of over 9,000 victims. Unit 100, another biological warfare site was also developed near Changchun for experimentation on Chinese civilians and soldiers. Tens of thousands died as a result of plague, cholera, anthrax and other diseases.

Field trials of anthrax weapons were conducted by the British Military on Guinard Island during World War II, and survived at concentrations of many thousands per gram until the island was decontaminated in 1986.

In 1943, the United States began developing anthrax for use in war.

Diagnosis Epidemiology Therapy Microbiology

Diseases

Fingerprint Synonym Graphs

Agent: <Any Agent>

Vector: <Any Vector>

Vehicle: <Any Vehicle>

Reservoir: <Any Reservoir>

Country: <Bioterrorism simulator>

Reset [Search >](#)

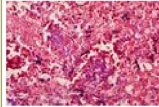
Adenovirus infection
Aeromonas & marine Vibrio infx.
African tick bite fever
AIDS
Amoeba - free living
Amoebic abscess
Amoebic colitis
Angiostrongyliasis
Angiostrongyliasis - abdominal
Anisakiasis
Anthrax


Total: 338 listed
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General Distribution Images Clinical

Anthrax
(68 images)

Click on thumbnail for larger image and full description

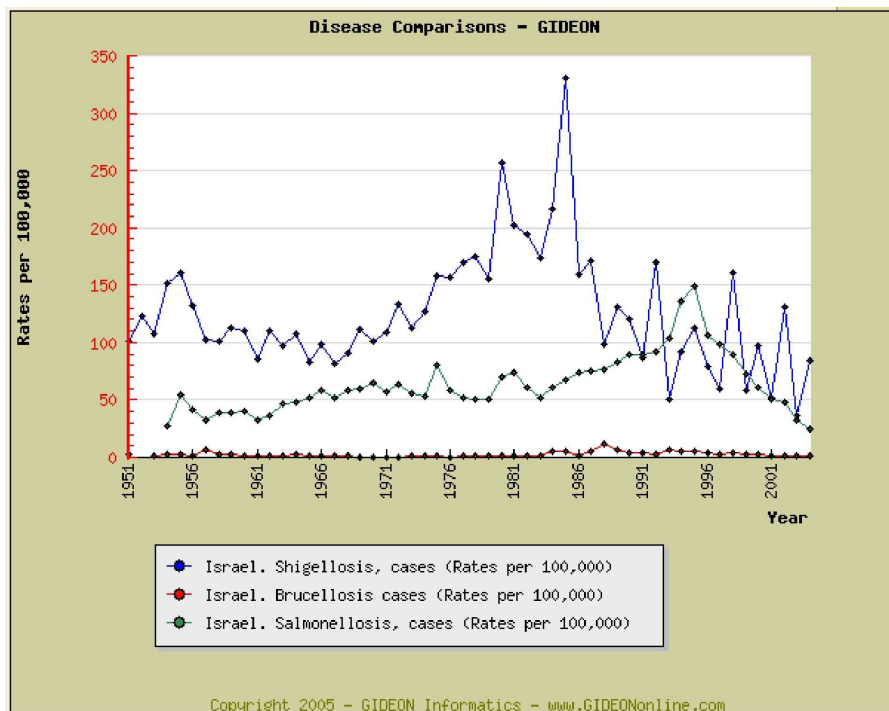
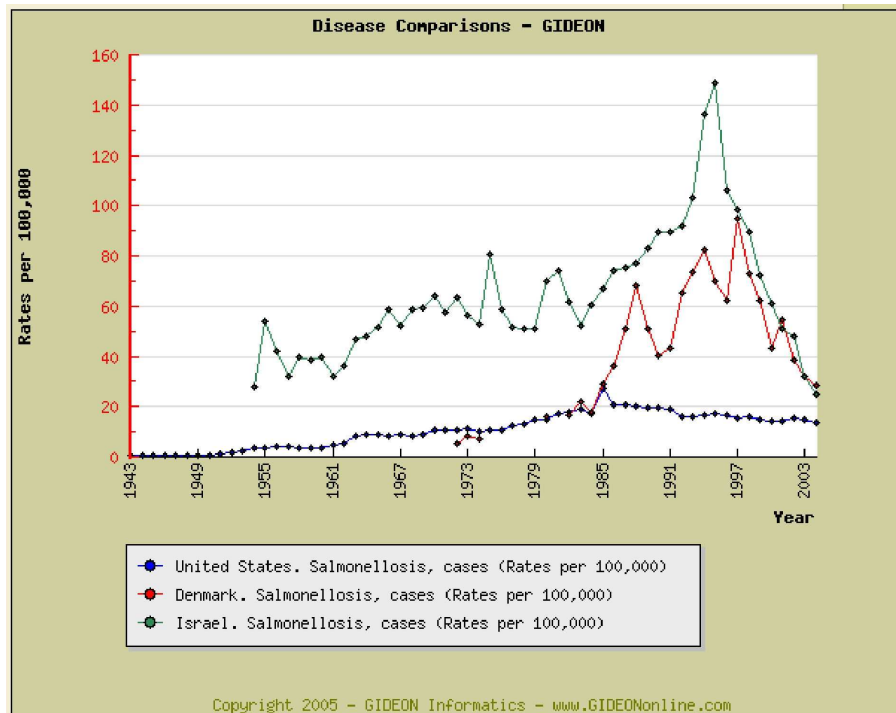
 Histopathology of mediastinal lymph node in fatal human anthrax.

 *Bacillus anthracis*. Gram stain.

Personal Notes

GIDEON currently contains over 2,500 images – skin lesions, roentgenograms, life cycle charts, and photomicrographs – which can be copied to PowerPoint, word processor, etc. Note that the box at the lower right box allows for entry of additional disease-specific data in Hebrew: key contact numbers, specimen submission criteria and procedures, ongoing projects, etc. Since GIDEON may be maintained on an Intranet, all hospitals (clinics, Emergency Rooms, military facilities, laboratories) can be updated continually regarding all relevant diseases.

The program also contains 30,000 graphs – incidence, rates, death rates, etc. All may be combined in any fashion by the user:



Additional interactive modules present a comprehensive and up-to-date 'encyclopedia' of all vaccines, antimicrobial agents and pathogens ... including those relevant to bioterrorism. As in the other modules, associated text boxes allow for addition of custom notes– specimen collection, available vaccines and their usage, phone numbers and more.