U. S. INFECTIOUS DISEASE LANDSCAPE
1982 - 1992

- Deaths 58% (AIDS, pneumonia and blood stream infections in otherwise healthy adults)
- Gram positive organisms became dominant cause of blood stream infections beginning in 1987
- Organ transplants (4000 to 18,000/yr) and complex medical procedures and devices became common
U. S. Infectious Disease Landscape

1982 - 1992

- Children < 6yrs old in day care centers \(\text{to 50\%}\)
- Middle ear infections \(\text{(14 mil 1980 to 24.5 1990 and 30 mil in 1997)}\) and became the leading cause of physician office visits and leading cause of emergency room visits accounting for \(>40\%\) of all outpatient antimicrobial use in children
- In 1992, antibiotic prescriptions by office based physicians \(\text{28\% over 1980}\)
Trends in Gram Positive Resistance: United States

1980 - 1998

Percent of Pathogens Resistant to Antibiotics

MRSE

MRSA

PRSP

VRE

NNIS, Various Reports
FACTORS CONTRIBUTING TO THE EMERGENCE OF INFECTIOUS DISEASES

- Human demographics and behavior
- Technology and Industry
- Economic development and land use
- International travel and commerce
- Microbial adaptation and change
- Breakdown of public health measures
International Passengers Arriving on Flights Into the U.S. Increased From 2 Million in 1950 to 280 Million in 1990

(>2000 Airline Passengers from India Arrive in New York City Per Day)
World trade in agricultural products has increased 5-fold since 1950
export of agricultural products by volume

Source: WTO, 2000
U.S. IMMIGRATION STATISTICS

From 1991 to 1993 there were 3,705,436 legal immigrants (most will reside in cities)*

vs. 7,338,062 for entire decade 1981 to 1990

vs. 3,321,677 for the decade 1961 to 1970

*At least 5% of New York City’s population is presently composed of illegal immigrants.
Addressing Emerging Infectious Disease Threats
A Prevention Strategy for the United States
Report of the ASM Task Force on Antibiotic Resistance
About antibiotics
Antibiotics are among the most powerful and important medicines known. When used properly, they can save lives, but used improperly, they can actually harm your child. Antibiotics should not be used to treat viral infections.

Bacteria and viruses
Two main types of germs—bacteria and viruses—cause most infections. In fact, viruses cause most coughs and sore throats and all colds. Bacterial infections can be cured by antibiotics, but common viral infections never are. Your child recovers from these common viral infections when the illness has run its course.

Bacterial infections can be cured by antibiotics, but viral infections never are.

Resistant bacteria
New strains of bacteria have become resistant to antibiotics. These bacteria are resistant to the antibiotic. Some of these bacteria can be treated with more powerful antibiotics, but others need to be treated with a special antibiotic.

When are antibiotics needed and when are they not needed?
This complicated question is best answered by your doctor, and the answer depends on the specific diagnosis. Here are a few examples:

Ear infections. There are several types; most need antibiotics, but some do not.

Sinus infections. Most children with thick or green mucus do not have sinus infections. Antibiotics are needed for some long-lasting or severe cases.

Cough or bronchitis. Children rarely need antibiotics for bronchitis.

Sore throat. Most cases are caused by viruses. Only one main kind, “strep throat,” requires antibiotics. This kind must be diagnosed by a laboratory test.

Colds. Colds are caused by viruses and may sometimes last for 2 weeks or more. Antibiotics have no effect on colds, but your doctor may have suggestions for comfort measures while the illness runs its course.

The infection may change
Viral infections may sometimes lead to bacterial infections. But treating viral infections with antibiotics to prevent bacterial infections does not work, and may lead to infection with resistant bacteria. Keep your doctor informed if the illness gets worse or lasts a long time, so that proper treatment can be given, as needed.
New and Reemerging Infectious Diseases:
A Global Crisis and Immediate Threat to the Nation’s Health

The Role of Research
Handwashing is one of the "most important means of preventing the spread of infection," according to the Centers for Disease Control and Prevention (CDC).
FOOD SAFETY FROM FARM TO TABLE

A National Food-Safety Initiative

A Report to the President
May 1997
Graph 1
NCID Funding (FY 85 - 94)

* Adjusted using the NIH BRDPI
Federal, State and Local Support for Infectious Disease Surveillance by Disease Category, United States, 1992*

<table>
<thead>
<tr>
<th>Disease</th>
<th>Federal</th>
<th>State</th>
<th>Local</th>
<th>Total ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS/HIV</td>
<td>25,794,280</td>
<td>7,478,557</td>
<td>1,317,359</td>
<td>34,590,196 (46)</td>
</tr>
<tr>
<td>TB</td>
<td>4,085,098</td>
<td>2,987,606</td>
<td>2,884,901</td>
<td>9,957,605 (13)</td>
</tr>
<tr>
<td>STDs</td>
<td>7,819,550</td>
<td>2,967,790</td>
<td>2,412,700</td>
<td>13,200,040 (18)</td>
</tr>
<tr>
<td>Vaccine preventable</td>
<td>2,921,175</td>
<td>1,193,222</td>
<td>1,116,091</td>
<td>5,230,488 (7)</td>
</tr>
<tr>
<td>All other diseases</td>
<td>1,535,059</td>
<td>5,830,516</td>
<td>4,193,480</td>
<td>11,559,055 (15)</td>
</tr>
<tr>
<td>Antibacterial/antiviral drug resistance</td>
<td>6,260</td>
<td>48,795</td>
<td>400</td>
<td>55,455 (&lt;1)</td>
</tr>
</tbody>
</table>

Total 42,161,422  20,506,486  11,924,931 74,592,839 (100)

*Includes data from 50 states and one territory
<table>
<thead>
<tr>
<th>Disease</th>
<th>Federal FTE (%)</th>
<th>State FTE (%)</th>
<th>Local FTE (%)</th>
<th>Total FTE (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AIDS/HIV</td>
<td>349 (43)</td>
<td>72 (18)</td>
<td>39 (10)</td>
<td>460 (29)</td>
</tr>
<tr>
<td>TB</td>
<td>102 (13)</td>
<td>76 (19)</td>
<td>115 (38)</td>
<td>333 (21)</td>
</tr>
<tr>
<td>STDs</td>
<td>220 (27)</td>
<td>58 (15)</td>
<td>51 (13)</td>
<td>329 (20)</td>
</tr>
<tr>
<td>Vaccine Preventable</td>
<td>99 (12)</td>
<td>33 (8)</td>
<td>26 (6)</td>
<td>158 (10)</td>
</tr>
<tr>
<td>Food/waterborne</td>
<td>5 (2)</td>
<td>41 (10)</td>
<td>18 (4)</td>
<td>64 (4)</td>
</tr>
<tr>
<td>All other diseases</td>
<td>28 (3)</td>
<td>118 (30)</td>
<td>118 (29)</td>
<td>264 (16)</td>
</tr>
<tr>
<td>Total</td>
<td>803 (100)</td>
<td>398 (100)</td>
<td>407 (100)</td>
<td>1608 (100)</td>
</tr>
</tbody>
</table>

*Includes 50 states and 1 territory*
WAR against the MICROBES
How drug makers are fighting back against a global resurgence of infectious disease.

Dr. David Slaes of Wyeth-Ayerst
THE ANTIBIOTIC LANDSCAPE: 2001 - 2003

- Only one remaining Pharma company with robust antibiotic drug discovery program
- Antibiotic pipeline Ph I-III greatly reduced number. In 2002 of 754 new drugs emerging on the market, there were no new antibacterials. Since 1998, only 7 new antibacterials approved by FDA out of a total of 1597 drugs.
- Existing drug shortages (cefixime *N.gonorrhoeae*. Drug discontinued in U.S. yet only CDC-recommended oral antimicrobial agent to which the organism has not developed significant resistance; Penicillin Group B strep, syphilis due to manufacturing recall)
- “9/11” World Trade Center Tower and Anthrax mailings
## ANTIBACTERIALS IN CLINICAL DEVELOPMENT

**Penicillins, cephalosporins, beta-lactams**
- E-1010 (Eisai)
- R-115685 (Sankyo)
- BAL-5788 (Basilea Pharmaceutical)

**Macrolides, tetracyclines, quinolones**
- WCK-771A (Wockhardt)
- DK-507k (Daiichi Pharmaceutical)
- p1025 (Active Biotech)
- MBI-594AN (Micrologix Biotech)

**Peptide antibiotics**
- CS-834 (Sankyo)
- doripenem (Shionogi)
- CS-834 (Sankyo)
- doripenem (Shionogi)

### Phase 1
- WQ-3034 (Abbott)
- tebipenem (Meiji Seika)
- E-1010 (Eisai)
- R-115685 (Sankyo)
- BAL-5788 (Basilea Pharmaceutical)
- RWJ-333442 (Essential Therapeutics/J&J)
- RWJ-54428 (Essential Therapeutics/J&J)

### Phase 2
- fandofloxacin hydrochloride (Dong Wha)
- WQ-3034 (Abbott)
- garenoxacin (Toyama/Bristol-Myers Squibb)
- olamufloxacin mesylate (Abbott)
- tebipenem (Meiji Seika)

### Phase 3
- doripenem (Shionogi)
- tebipenem (Meiji Seika)
- E-1010 (Eisai)
- R-115685 (Sankyo)
- BAL-5788 (Basilea Pharmaceutical)
- RWJ-333442 (Essential Therapeutics/J&J)

### Preregistration
- doripenem (Shionogi)
- E-1010 (Eisai)
- R-115685 (Sankyo)
- BAL-5788 (Basilea Pharmaceutical)
- RWJ-333442 (Essential Therapeutics/J&J)

**Source:** PJB Pharmaprojects

**February 7, 2003 - Lilly University**
PRESIDENT BUSH’S INITIATIVE: PROJECT BIOSHIELD