PREVENTING ANTIBIOTIC RESISTANCE
THE LOUISIANA PROGRAM

Infectious Disease Epidemiology Section
Office of Public Health
Louisiana Dept of Health & Hospitals

...Your Taxes at Work...

phone: (504) 568-5005
fax: (504) 568-5006
www.oph.dhh.state.la.us
Surveillance
Passive Surveillance

REPORTABLE DISEASE DATABASE

CENTRAL SITE

LOUISIANA

MAIN MENU

I have a nice day!
Passive Surveillance

- Web based reporting system for Infectious Diseases
- Reportable Diseases
  - MRSA Invasive Disease
  - VRE Invasive Disease
  - DRSP
- Limited Value
## Passive Surveillance

<table>
<thead>
<tr>
<th>Event Name</th>
<th>1997</th>
<th>1998</th>
<th>1999</th>
<th>2000</th>
<th>2001</th>
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<tr>
<td>Enterococcus faecium</td>
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<td>178</td>
<td>122</td>
<td>168</td>
<td>208</td>
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<td>Enterococcus fecalis</td>
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<td>23</td>
<td>25</td>
<td>35</td>
<td>36</td>
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<tr>
<td>Enterococcus spp</td>
<td>25</td>
<td>77</td>
<td>73</td>
<td>175</td>
<td>119</td>
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<tr>
<td>MRSA</td>
<td>490</td>
<td>936</td>
<td>1056</td>
<td>3689</td>
<td>4249</td>
</tr>
<tr>
<td>Drug Resistant S. pneumoniae</td>
<td>121</td>
<td>166</td>
<td>116</td>
<td>57</td>
<td>105</td>
</tr>
</tbody>
</table>
Active Surveillance

- Phone calls
- 30 hospital laboratories
- Lab aggregate data:
  - # resistant / # tested
  - No duplicates
- MRSA, DRSP, VRE
Laboratory Surveillance

- **OPH laboratory-based ab resistance surveillance**
- **Select bacterial pathogens**
  - Staphylococcus species with reduced susceptibility or with intermediate resistance to vancomycin,
  - Haemophilus Influenzae,
  - Neisseria meningitidis.
- **Enteric pathogens:**
  - Salmonella (10% total sample size),
  - Shigella (20% total sample size),
  - Campylobacter (25% total sample size)
- **ONLY isolates from invasive disease or sterile site**
- **Send to OPH Laboratory**
- **OPH participates in the National Antimicrobial Resistance Monitoring System (NARMS) by submitting every 10th non-typhoidal Salmonella isolate and one Campylobacter isolate per week to CDC for susceptibility testing.**
MRSA in the US

NNIS - nosocomial *S. aureus* isolates:

- **1991**: 29% MRSA
- **1999**: 52.3% MRSA
- 37% ↑ in resistance when compared to the mean resistance over previous 5 years
MRSA in Louisiana

- **Active surveillance for MRSA**
  - 1997-1999: 33%
  - 2000: 38%
  - 2001: 45%

- **Passive system:**
  - State Rate: 77.8 per 100,000
  - Passive system modified several times
  - NOW focus on MRSA invasive disease
  - To monitor severe disease
  - Unrealistic to use passive surveillance to evaluate disease burden
Streptococcus pneumoniae

NCCLS defined
- susceptible: MIC < 0.06
- intermediate: 0.12 < MIC < 1.0
- resistant: MIC > 2.0

→ penicillin effective on bacteria classified as resistant
→ for CSF, penicillin not effective

<table>
<thead>
<tr>
<th>Infection type</th>
<th>Cases</th>
<th>Mortality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Otitis media</td>
<td>7,000,000</td>
<td>5%</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>500,000</td>
<td>5%</td>
</tr>
<tr>
<td>Bacteremia</td>
<td>50,000</td>
<td>20%</td>
</tr>
<tr>
<td>Meningitis</td>
<td>3,000</td>
<td>30%</td>
</tr>
<tr>
<td>Deaths</td>
<td>40,000</td>
<td>25-50%</td>
</tr>
</tbody>
</table>
DRSP in Louisiana

- **Active surveillance for DRSP**
  - 1997-1999: 21%
  - 2000: 42%
  - 2001: 48%

- **Passive system:**
  - Region 1 had the highest rate in 2000
  - 39.5/100,000
Vancomycin Resistant Enterococcus (VRE)

- **Nationwide (NNIS Data):**
  - 1989: 0.3%
  - 1993: 13.6%
  - 1999: 25.2%
  - attributable mortality 40-50%

- **Statewide:**
  - 1996: 1% resistant
  - 1997: 3% resistant
  - 1998: 5% resistant
## Louisiana Antibiogram

- Most hospitals issue once a year an “Antibiogram”
- Table listing bacteria and antibiotics showing sensitivity
- Shows the spectrum of resistance for common bacteria detected by hospital lab
- Useful information for the selection of empiric antibiotic treatment before specific results known

- Statewide Antibiogram is a compilation of individual hospital antibiograms
- Useful to compare one individual hospital antibiogram to the rest of the state.
# Louisiana Antibiogram

Louisiana Office of Public Health  
Infectious Disease Epidemiology Section  
Phone: 1-800-256-2748  
www.oph.dhh.state.la.us

## Louisiana Antibiogram (Antimicrobial Susceptibilities of Selected Pathogens) 1999-2000

For epidemiologic purpose ONLY — Not for making therapeutic decisions

### Coagulase-positive Staphylococci

<table>
<thead>
<tr>
<th>Gram</th>
<th>Pentaillin</th>
<th>Cephalothin</th>
<th>Cefoxitin</th>
<th>Ceftriaxone</th>
<th>Gentamicin</th>
<th>Clindamycin</th>
<th>Erythromycin</th>
<th>Spectinomycin</th>
<th>Trimethoprim</th>
<th>Tetracycline</th>
<th>Vancomycin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staph aureus cost + (1)</td>
<td>17</td>
<td>9/18</td>
<td>30/30</td>
<td>65/65</td>
<td>80/80</td>
<td>60/60</td>
<td>50/50</td>
<td>70/70</td>
<td>90/90</td>
<td>30/30</td>
<td>22/22</td>
</tr>
<tr>
<td>MRSA only</td>
<td>7</td>
<td>6/6</td>
<td>15/15</td>
<td>20/20</td>
<td>50/50</td>
<td>60/60</td>
<td>50/50</td>
<td>70/70</td>
<td>90/90</td>
<td>30/30</td>
<td>22/22</td>
</tr>
<tr>
<td>Staph epidermidis cost neg</td>
<td>16</td>
<td>5/20</td>
<td>15/15</td>
<td>20/20</td>
<td>50/50</td>
<td>60/60</td>
<td>50/50</td>
<td>70/70</td>
<td>90/90</td>
<td>30/30</td>
<td>22/22</td>
</tr>
<tr>
<td>Staph epidermidis</td>
<td>4</td>
<td>2/10</td>
<td>4/10</td>
<td>6/10</td>
<td>8/10</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
</tr>
<tr>
<td>Staph pyogenes</td>
<td>12</td>
<td>3/20</td>
<td>4/20</td>
<td>6/20</td>
<td>8/20</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
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<td>10/10</td>
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</tr>
<tr>
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<td>4/20</td>
<td>6/20</td>
<td>8/20</td>
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<td>10/10</td>
<td>10/10</td>
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</tr>
<tr>
<td>Staph pyogenes cost neg</td>
<td>4</td>
<td>3/10</td>
<td>4/10</td>
<td>6/10</td>
<td>8/10</td>
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<td>10/10</td>
<td>10/10</td>
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<td>10/10</td>
<td>10/10</td>
</tr>
</tbody>
</table>

### Coagulase-negative Staphylococci

<table>
<thead>
<tr>
<th>Gram</th>
<th>Pentaillin</th>
<th>Cephalothin</th>
<th>Cefoxitin</th>
<th>Ceftriaxone</th>
<th>Gentamicin</th>
<th>Clindamycin</th>
<th>Erythromycin</th>
<th>Spectinomycin</th>
<th>Trimethoprim</th>
<th>Tetracycline</th>
<th>Vancomycin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staph epidermidis</td>
<td>12</td>
<td>5/20</td>
<td>15/15</td>
<td>20/20</td>
<td>50/50</td>
<td>60/60</td>
<td>50/50</td>
<td>70/70</td>
<td>90/90</td>
<td>30/30</td>
<td>22/22</td>
</tr>
<tr>
<td>Staph epidermidis cost neg</td>
<td>12</td>
<td>3/20</td>
<td>4/20</td>
<td>6/20</td>
<td>8/20</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
</tr>
<tr>
<td>Staph epidermidis</td>
<td>8</td>
<td>3/20</td>
<td>4/20</td>
<td>6/20</td>
<td>8/20</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
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<tr>
<td>Staph epidermidis cost neg</td>
<td>4</td>
<td>3/10</td>
<td>4/10</td>
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<td>8/10</td>
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<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
<td>10/10</td>
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</tbody>
</table>

### Other Gram-negative bacilli

<table>
<thead>
<tr>
<th>Gram</th>
<th>Pentaillin</th>
<th>Cephalothin</th>
<th>Cefoxitin</th>
<th>Ceftriaxone</th>
<th>Gentamicin</th>
<th>Clindamycin</th>
<th>Erythromycin</th>
<th>Spectinomycin</th>
<th>Trimethoprim</th>
<th>Tetracycline</th>
<th>Vancomycin</th>
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</thead>
<tbody>
<tr>
<td>Enterobacteriaceae</td>
<td>30</td>
<td>9/11</td>
<td>40/40</td>
<td>80/80</td>
<td>70/70</td>
<td>60/60</td>
<td>50/50</td>
<td>70/70</td>
<td>90/90</td>
<td>30/30</td>
<td>22/22</td>
</tr>
<tr>
<td>Enterobacteriaceae</td>
<td>20</td>
<td>4/20</td>
<td>8/20</td>
<td>16/16</td>
<td>32/32</td>
<td>64/64</td>
<td>50/50</td>
<td>70/70</td>
<td>90/90</td>
<td>30/30</td>
<td>22/22</td>
</tr>
<tr>
<td>Pseudomonas</td>
<td>12</td>
<td>5/20</td>
<td>10/10</td>
<td>20/20</td>
<td>40/40</td>
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<td>70/70</td>
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<td>Pseudomonas</td>
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<td>50/50</td>
<td>70/70</td>
<td>90/90</td>
<td>30/30</td>
<td>22/22</td>
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<tr>
<td>Salmo media</td>
<td>2</td>
<td>7/8</td>
<td>16/16</td>
<td>32/32</td>
<td>64/64</td>
<td>96/96</td>
<td>80/80</td>
<td>90/90</td>
<td>100</td>
<td>100</td>
<td>100</td>
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<tr>
<td>Shigella sonnei</td>
<td>2</td>
<td>2/2</td>
<td>4/4</td>
<td>8/8</td>
<td>16/16</td>
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<td>16/16</td>
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<td>64/64</td>
<td>128/128</td>
<td>256/256</td>
</tr>
<tr>
<td>Other Gram- Rods</td>
<td>15</td>
<td>5/15</td>
<td>10/15</td>
<td>20/20</td>
<td>40/40</td>
<td>60/60</td>
<td>50/50</td>
<td>70/70</td>
<td>90/90</td>
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<td>22/22</td>
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<tr>
<td>Pseudomonas</td>
<td>12</td>
<td>5/20</td>
<td>10/10</td>
<td>20/20</td>
<td>40/40</td>
<td>60/60</td>
<td>50/50</td>
<td>70/70</td>
<td>90/90</td>
<td>30/30</td>
<td>22/22</td>
</tr>
<tr>
<td>Acinetobacter baumannii</td>
<td>4</td>
<td>1/4</td>
<td>2/4</td>
<td>4/4</td>
<td>8/8</td>
<td>16/16</td>
<td>32/32</td>
<td>64/64</td>
<td>128/128</td>
<td>256/256</td>
<td>512/512</td>
</tr>
</tbody>
</table>

*Only 1 or 2 hospitals reporting

**Notes:**
- Pentaillin = Pentaillin (Pentamidine isethionate)
- Cephalothin = Cephalothin (Cephalothin)
- Cefoxitin = Cefoxitin (Cefoxitin)
- Ceftriaxone = Ceftriaxone (Ceftriaxone)
- Gentamicin = Gentamicin (Gentamicin)
- Clindamycin = Clindamycin (Clindamycin)
- Erythromycin = Erythromycin (Erythromycin)
- Spectinomycin = Spectinomycin (Spectinomycin)
- Trimethoprim = Trimethoprim (Trimethoprim)
- Tetracycline = Tetracycline (Tetracycline)
- Vancomycin = Vancomycin (Vancomycin)

Based on 15 reports
Community Outbreak Investigation
Prison Outbreak Investigation

- Oct/Nov 2001: all skin infections cultured
- 1,600 inmates
- 42 viable cultures:
  - 11 MSSA
  - 28 MRSA
    - (71% of pos cultures)
  - 3 Other
- 210 MRSA Skin infections /1,000 pop /yr
Prison Outbreak Investigation

- MRSA Multi-sensitive strain
- % sensitive to
  - Cipro 73%
  - Clindamycin 84%
  - Tetracycline 61%
  - TMP-SXT 73%

- PFGE in prison outbreak
  - 5 type G61
  - 4 type G36

- PFGE in city isolates from hospitals
  - 32% G36
  - 54% G61
  - High prevalence of few PFGE types
Educational Motivational Programs for Professionals
Building a Coalition

Statewide Antibiotic Resistant Pathogens Advisory Committee SARPAC

Resistant Staphylococcus aureus Management Guidelines

MRSA & VRSA

TABLE OF CONTENTS

1. INTRODUCTION 1

1.1 MRSA in Institutions 1

1.2 MRSA as a Community Acquired Organism 1

1.3 Basic Facts about MRSA 1

1.3.1 What is Staphylococcus aureus (S. aureus)? 1

1.3.2 What is the Difference Between Colonization and Disease? 2

1.3.3 How is it Spread? 2

1.3.4 What is Methicillin resistance? 2

1.3.5 MRSA Started in Hospitals and other Medical Care Institutions 3

1.3.6 MRSA Spread in the Community 3

1.3.7 HA-MRSA vs. CA-MRSA 3

1.3.8 MRSA are Usually Not More Virulent than other S. aureus 3

1.3.9 Colonized individuals are the main reservoir of MRSA 4

2. MANAGEMENT OF MRSA IN INSTITUTIONS 4

2.1 Admission 4

2.2 Nursing Home/Extended Care Facility 5

2.3 Discharge to Home 5

2.4 Infection Control in Institutions 5

2.5 Surveillance and Management of MRSA in Institutions 6

2.5.1 Screening 6

2.5.2 Culturing Patients 6

2.5.3 Surveillance Data Collection and Analysis 6

2.5.4 Other Preventive Measures Applicable to Institutions 6

Guidelines for the Management of Antibiotic Resistant Pathogens in Health Care Facilities

Background

The Antibiotic Sensitivity Active Surveillance System commenced five years ago in an attempt to track the emergence of antibiotic resistant organisms. Until January 2002, the surveillance system was called the Emerging Pathogens Active Surveillance System. This federally funded surveillance program allows Louisiana to be part of a nationwide project to track and evaluate antibiotic resistant trends. Our surveillance system monitors three pathogens: Methicillin resistant Staphylococcus aureus (MRSA), drug resistant Streptococcus pneumoniae (DRSP), and Vancomycin resistant enterococcus (VRE).

The goals of the Antibiotic Sensitivity Active Surveillance System are:

1. To estimate the percent of selected bacteria in the state that are resistant to antibiotics, (MRSA, DRSP, and VRE) by the reporting of laboratory aggregate data

2. To describe the demographic characteristics of newly infected cases through the reporting of information as required by the Louisiana Sanitary Code, Chapter II, Section 2:003 and 2:004

The Surveillance System

There are two components to the Antibiotic Sensitivity Surveillance System. First, the Microbiology laboratory should report the total number of Staphylococcus aureus, Streptococcus pneumoniae, and enterococcus...
Themes: CDC Campaign

Campaign to Prevent Antimicrobial Resistance

Centers for Disease Control and Prevention
National Center for Infectious Diseases
Division of Healthcare Quality Promotion

Clinicians hold the solution!
Themes: The Big Five Campaign

Est Visit in LA /year
- Non Specific URTI: 30,000
- Bronchitis: 30,000
- Pharyngitis: 20,000
- Sinusitis: 40,000
- Otitis Media: 40,000

*URTI = Upper Respiratory Tract Infection

17% Antibiotic Rx = 75% of all antibiotic Rx
Guidelines for Appropriate Antibiotic Use for Treatment of Acute Respiratory Tract Infections in Adults

Contents
Background, Specific Aims and Methods
NonSpecific Upper Respiratory Tract Infections in Adults
Acute Sinusitis in Adults
Acute Pharyngitis in Adults
Acute Bronchitis in Adults
Theme: Infection Control Campaign
Prevent Propagation

- propagation from
  - 1-spread of the resistance strain in a single host
  - 2-spread of the resistance between bacterial populations in different hosts
  - handwashing and barrier precautions

- transmission networks more intense in hospital setting, less in the community: infection control
Theme: Campaign for Hospital Controls

- **Educational & Persuasive Approaches**
  - minor effect

- **Facilitative Strategies**
  - clinical specialist or pharmacy clinician to advise
  - computer help screens when ordering

**Power Strategies**
- Formulary Control
- Monitor usage with time limits on prophylactic, empiric, therapeutic uses
- Restriction of Drugs classified as:
  - Uncontrolled: available for all physicians,
  - Monitored: usage monitored thru system
  - Restricted: ID specialist only
The Trainers

- Infectious Disease Epidemiology Section
- Infection Control Nurse Consultant
- Surveillance Epidemiologists
- Regional Directors
- Regional Epidemiologists
- Regional Disease Surveillance Specialists
- Members of the Statewide Antibiotic Resistant Pathogens Advisory Committee
Health Care Plans

- Blue Cross Blue Shield of Louisiana
- Oschner Health Plan
- Tenet Choices
- United Healthcare
Medical Curriculum

UNIVERSITY PARTNERSHIPS

• TULANE UNIVERSITY SCHOOL OF MEDICINE AND SCHOOL OF PUBLIC HEALTH

• LOUISIANA STATE UNIVERSITY SCHOOL OF MEDICINE

LSU & Tulane University
Reaching out to Physicians /HCW

Louisiana Morbidity Report

Distributed to 8,000 physicians
Educational Motivational Programs for Public
Public

- Distribution of Brochures at physician’s practices and hospital outpatient services to promote appropriate antibiotic use. Main focus pediatricians and other primary care physicians.

- Distribution of flyers at pharmacies statewide with each antibiotic prescription filled including information on how to reduce the spread of resistance
Evaluation
Antibiotic Use: Medicaid Study

- Year 2000
- Medicaid population = 720,615 people
- 16% of state population
- Records for 530,598 Rx written for 186,658 patients
- Limited list of ICD9 codes selected for their potential of including unnecessary antibiotic prescriptions
## Antibiotic Use: Medicaid Study

<table>
<thead>
<tr>
<th>Disease /condition</th>
<th>Number of prescriptions</th>
<th>Observed % with antibiotics</th>
<th>% with antibiotics according to best use standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Common cold</td>
<td>11,144</td>
<td>32%</td>
<td>0%</td>
</tr>
<tr>
<td>Influenza</td>
<td>1,528</td>
<td>22%</td>
<td>0%</td>
</tr>
<tr>
<td>Viral pneumonia, unspecified</td>
<td>231</td>
<td>27%</td>
<td>0%</td>
</tr>
<tr>
<td>Miscellaneous viral infections</td>
<td>17,895</td>
<td>25%</td>
<td>0%</td>
</tr>
<tr>
<td>Upper Respiratory Infection</td>
<td>80,199</td>
<td>32.20%</td>
<td>0%</td>
</tr>
<tr>
<td>Pharyngitis</td>
<td>41,041</td>
<td>42%</td>
<td>15%</td>
</tr>
<tr>
<td>Tonsillitis</td>
<td>11,690</td>
<td>50%</td>
<td>15%</td>
</tr>
<tr>
<td>Acute bronchitis</td>
<td>25,676</td>
<td>30%</td>
<td>0-5%</td>
</tr>
<tr>
<td>Otitis Media, suppurative</td>
<td>8,264</td>
<td>50%</td>
<td></td>
</tr>
<tr>
<td>Otitis Media, NON suppurative</td>
<td>11,957</td>
<td>44%</td>
<td></td>
</tr>
<tr>
<td>Sinusitis</td>
<td>40,767</td>
<td>32.30%</td>
<td>Few %</td>
</tr>
</tbody>
</table>
Antibiotic Use: Medicaid Study

- For same diagnostic categories: shows that the younger age groups receive more often unnecessary antibiotics
- Mean age of viral infections treated with antibiotics is 8 while the mean age of those not treated with antibiotics is 17.