Antibiotic Resistance Education

Health Education Evaluation At Work

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Oregon AWARE Program Coordinator
About Oregon AWARE

- The Oregon Alliance Working for Antibiotic Resistance Education (AWARE) is a coalition whose mission is to encourage the appropriate use of antibiotics and aims to reduce the problem of antibiotic-resistant bacteria in Oregon.

- Key messages:
  - Never use antibiotics for viral infections like colds or flu, because antibiotics have no effect against viruses, and that this type of use can cause serious side effects.
  - Taking antibiotics when they’re not necessary puts members of the community at risk for developing resistant infections.
  - If a doctor prescribes an antibiotic, then the patient should finish the prescription even if their symptoms have lessened or disappeared.
  - Never share antibiotics, take leftover antibiotics or use them without a prescription.
Antibiotic resistance has been called one of the world’s most pressing public health problems.

Repeated and improper uses of antibiotics are primary causes of the increase in drug-resistant bacteria.

Children are of particular concern because they have the highest rates of antibiotic use.

Antibiotics were prescribed in 68% of acute respiratory tract visits – and of those, 80% were unnecessary according to CDC guidelines.

$1.1 billion is spent annually on unnecessary adult upper respiratory infection antibiotic prescriptions.

http://www.cdc.gov/getsmart/antibiotic-use/fast-facts.html
Curriculum Purpose

• Furthers the goal of educating the general public about the judicious use of antibiotics and the burden of antibiotic resistance in Oregon.
• Informs young adults that will soon make their own healthcare choices about judicious use.
• Provides comprehensive health and science review/information.
But MOSTLY...

BACTERIA

BACTERIA EVERYWHERE
CURRICULUM OVERVIEW
Module One:

- What are microbes?
- What are viruses?
- What are bacteria?
  - Structure
  - Where do they live?
- Bacteria and humans
  - Bacterial identification
  - Colonization
  - Host cell defenses
  - How bacteria cause infection
MODULE TWO:

- Antibiotics
  - How they work
  - How bacteria become resistant
    - Mutations in bacterial genes
    - Selection pressure (evolution)
    - Exchange of genetic material between bacteria
- Strategies for overcoming antibiotic resistance in bacteria
  - Appropriate use
  - Research and development of new antibiotics
  - Healthy habits
Access/Delivery

Traditional Use
Team Instruction
Self Study

Additional Resources

- Interactive Activities/Games
- Videos
- Lab Exercises
- Additional Lesson Plans
- Resources for Student Research

http://www.ipmglobal.net/resource-management/project-management-software-timesheets.htm
Implementation and Results

Pilot and General Curriculum Release
Pilot Release

Pilot presentations: June 4, 2012/June 5, 2012
Salem-Keizer/Hermiston School Districts
N = 48 students

<table>
<thead>
<tr>
<th>Question Number</th>
<th>Percentage Correct Pre-Test</th>
<th>Percentage Correct Post-Test</th>
<th>Percentage of Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>91.7%</td>
<td>95.8%</td>
<td>4.47%</td>
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<tr>
<td>2</td>
<td>62.5%</td>
<td>66.7%</td>
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<tr>
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<td>100%</td>
<td>20.04%</td>
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<td>58.3%</td>
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<td>37.68%</td>
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<td>100%</td>
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<td>14</td>
<td>8.3%</td>
<td>58.3%</td>
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<tr>
<td>15</td>
<td>91.7%</td>
<td>100%</td>
<td>9.05%</td>
</tr>
</tbody>
</table>
Instructor Feedback

- Was the content about the differences between viruses and bacteria clear and age appropriate for 9th and 10th grade biology students?
  - Yes: 44  No: 0  Other:  Maybe module 2 (4 comments)

- Did the information flow in a meaningful, logical way?
  - Yes: 44  No: 0  Other:  4

- Do you believe you received enough information to answer the posttest questions?
  - Yes: 48  No: 0

- What part of the presentation did you enjoy the most (other than the speaker)?
  - Diagrams (17)
  - Resistance (13)
  - How big of a problem antibiotics are/global issues (13)
  - Process of how bacteria become resistant (5)
Instructor Feedback

- Was any part of the presentation too easy?
  - Yes: 4   No: 44

- What would make this presentation more “interesting” in the classroom setting?
  - should be more interactive (24)
  - simplify visuals for viruses vs. bacteria (2)
  - pictures/more visually appealing slides (8)
  - no comment (14)

- Is there any part of the presentation you believe should not be included, and, if so, what(which) part(s):
  - Just make slides more interesting (4)
  - a lot of unnecessary information on slides (4)
  - antibodies (antibiotic?) description got out of control (4)
  - too many examples (4)

- *Everyone generally agreed that all of the information should be included.*
Public Release

- Curriculum released in October 2012
- Online/In-Person Options Offered
- 11 Schools Adopt Curriculum in 2012
- 15 Schools Request/Adopt in 2013
- 6 Schools Request/Adopt in 2014
### Curriculum delivery method

<table>
<thead>
<tr>
<th></th>
<th>Pre-Test</th>
<th></th>
<th>Post-Test</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Raw Score</td>
<td>Mean Percent Correct</td>
<td>Mean Raw Score</td>
<td>Mean Percent Correct</td>
</tr>
<tr>
<td>AWARE Guest lecturer (n= 288 )</td>
<td>9.51</td>
<td>63.4490</td>
<td>13.70</td>
<td>91.381707</td>
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<tr>
<td>Online only (n=192 )</td>
<td>9.46</td>
<td>63.125</td>
<td>13.01</td>
<td>86.769741</td>
</tr>
</tbody>
</table>

- Students educated through lecture showed statistically higher improvement than students educated online (4.2 points improved for students in lectures, 3.6 online, p=0.005).

- Although students in both groups showed statistical improvement in knowledge between pre- and post-tests.

- There was no statistical difference in pre-test scores for these groups, suggesting that differences in improvement are attributable to teaching forum.
Grade level success

<table>
<thead>
<tr>
<th></th>
<th>Pre-Test</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Raw Score</td>
<td>Mean Percent Correct</td>
</tr>
<tr>
<td>Grade 9 (n=205)</td>
<td>8.96</td>
<td>59.7403</td>
</tr>
<tr>
<td>Grade 10 (n=275)</td>
<td>9.87</td>
<td>65.8179</td>
</tr>
</tbody>
</table>

- Students in Grade 9 improved more than students in Grade 10 (4.3 points vs. 3.7, p=0.01).

- Students in both groups showed statistical improvement in knowledge between pre- and post-tests.

- Students in Grade 9 had significantly lower pre-test scores (p=0.0007), suggesting that the greater improvement for students in grade 9.
## School Specific Scores

<table>
<thead>
<tr>
<th>School</th>
<th>Pre-Test</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Raw Score</td>
<td>Mean Percent Correct</td>
</tr>
<tr>
<td>School A (n= 53 )</td>
<td>9.33</td>
<td>62.265094</td>
</tr>
<tr>
<td>School B (n= 55 )</td>
<td>10.58</td>
<td>70.545273</td>
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<tr>
<td>School C (n=54 )</td>
<td>9.74</td>
<td>64.938333</td>
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<tr>
<td>School D (n= 53 )</td>
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<td>63.395660</td>
</tr>
<tr>
<td>School E (n= 52 )</td>
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<tr>
<td>School F (n= 54 )</td>
<td>9.51</td>
<td>63.455741</td>
</tr>
<tr>
<td>School G (n= 56 )</td>
<td>8.87</td>
<td>59.167679</td>
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<tr>
<td>School H (n=25 )</td>
<td>9.08</td>
<td>60.534000</td>
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<td>School I (n= 29 )</td>
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<td>69.655517</td>
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<tr>
<td>School J (n= 30 )</td>
<td>9.53</td>
<td>63.555333</td>
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<tr>
<td>School K (n= 19 )</td>
<td>8.63</td>
<td>57.542632</td>
</tr>
</tbody>
</table>

- When comparing scores from different high schools, there were no major statistical differences.
Overall improvement

- Students increased their scores on the 15-point test from an average of 9.5 points on the pre-test to 13.4 on the post-test (median improvement was from 10 to 14 points).
## Summary

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Barriers</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Flexible curriculum</td>
<td>• Difficulty measuring level of adoption in</td>
</tr>
<tr>
<td>• Easy to access</td>
<td>download only schools</td>
</tr>
<tr>
<td>• Proven success with multiple forms of</td>
<td>• Pre/Post Test</td>
</tr>
<tr>
<td>implementation</td>
<td>• Multiple year adoption</td>
</tr>
<tr>
<td>• Interactive</td>
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<tr>
<td>• Hot topic/Current event focused</td>
<td></td>
</tr>
</tbody>
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**Benefits**: Flexible curriculum, Easy to access, Proven success with multiple forms of implementation, Interactive, Hot topic/Current event focused.

**Barriers**: Difficulty measuring level of adoption in download only schools, Pre/Post Test through, Multiple year adoption, Marketing to teachers/schools.
Questions? Comments?

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971-673-0968

Curriculum Access Information:
www.healthoregon.org/antibiotics
Click on “Educators”
Fill out curriculum request form