Setting Up an Antibiotic Stewardship Program in an Nursing Home-A Case History 2006-2013

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Intervention to Nursing Home Physicians and Staff, and Its Effect on Antibiotic Use and Antimicrobial Resistance Within the Institution

Joe Boero MD, Karen Haegerl RN
Park Manor Nursing Home
Park Falls, WI 4/9/11
WE ARE THE HEART OF OUR ESOP

Park Manor Nursing Home

- 147 bed skilled nursing facility in Northern Wisconsin.
- Owners Preisler-Nutting and Mel Lynn
- ESOP (Employee Stock Ownership Plan) was started in September of 1998 and we became 100% employee owned December 31, 2009.
- Our philosophy is that we are all a part of the organization and all take an active roll in the organization.
- 168 Employees
- As far as we know we are the only 100% ESOP nursing home in the nation.

This is a story

To Illustrate what we’re doing
To Encourage you to not be afraid
To Empower you to own your program
Our Program in a Nutshell

• We looked and noticed something-2006
• We decided what it might mean
• We intervened
• We looked and noticed something else
• We decided what it might mean
• We intervened
• We looked and noticed something else
• We decided what it might mean
• We intervened
• We looked and noticed something else…..
• …….. We’re still looking at stuff-2013.

Where Antibiotic Stewardship fits
Stewardship

- March 2011, Annual Symposium AMDA-Tampa Florida
- A vendor hall pamphlet (Pfizer)
- “Antimicrobial Trends” issue ONE, 2011
- “Stewardship as the Solution”
- Second Nursing Home institutional Antibiogram

Two main core strategies

- 1. prospective auditing of antibiotic use with direct interaction and feedback to the prescribing physician
- 2. formulary restriction and prior authorization requirements.
“Antibiotic Stewardship
Combines a comprehensive infection control program with antimicrobial management to limit the emergence and transmission of antibiotic resistant micro-organisms.”

Guidelines for Antibiotic Stewardship-IDSA
Clinics of ID 2007 January

1. Identify core team members: IDMD, PharmD, epidemiologist, IT, micro, infec control. And they should be compensated.
2. Collaboration among hospital P&T, IC committees.
3. Support of Administration, medical leadership, and local providers is essential. Operate under the auspices of quality assurance and patient safety.
4. The IDMD and PharmD should negotiate with administration for authority, compensation, and expected outcomes.
5. Administrative support for necessary infrastructure to measure and tract antimicrobial use.
6. Two core strategies are prospective audit with intervention and feedback and formulary restriction and pre-authorization.
Why assume some degree of control?

• "The primary goal of antimicrobial stewardship is to optimize clinical outcomes while minimizing unintended consequences of antimicrobial use including toxicity, the selection of pathogenic organisms and the emergence of resistance....

• Given the association between antimicrobial use and the selection of resistant pathogens, the frequency of inappropriate antimicrobial use is often used as a surrogate marker for the avoidable impact on antimicrobial resistance."
  
  IDSA, 2007

The Story Starts Now

It was a dark and stormy night. The Steward had lost the key to the wine cellar.
The Story Starts Now

• It was a dark and stormy night…
### MRSA associated skin infection in Staff

<table>
<thead>
<tr>
<th>Staff Year</th>
<th>Month</th>
<th>Number</th>
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<tbody>
<tr>
<td>2006</td>
<td>January</td>
<td></td>
</tr>
<tr>
<td></td>
<td>February</td>
<td></td>
</tr>
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<td></td>
<td>October</td>
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<tr>
<td></td>
<td>November</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>December</td>
<td>1</td>
</tr>
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</table>

| 2007       | January  | 1 repeater |
|            | February |            |
|            | March    | 1 repeater |
|            | April    | 2          |
|            | May      | 2          |
|            | June     |            |
|            | July     |            |
|            | August   | 1 repeater |

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![Image of children playing on a playground with mountains in the background.](image-url)
Lifeline

The Audience always knows the correct answer.

“We have a lot of antibiotic resistance”
The Antibiogram

• The total number of organisms by species isolated from your institution per year
• The frequency or percent each isolated bacteria is sensitive to antibiotics

Microbiology <101

• It’s not as complicated as some people lead you to believe.
• We’re just talking about the common bacteria that are showing up in your positive cultures.
• Most of them will be from urine.
• A few of them are from skin.
• A rare bacteria will be from blood or other sources.
Resources in microbiology

- Your Laboratory Microbiologist.
- Your laboratory Pathologist.
- Your janitor who happens to have a degree in microbiology.
- Your part-time CNA who happens to be taking her microbiology course.
- Your Medical Director.

The Survey 10/10/12

- Long Term Care Baseline Prevention Practices Assessment Tool for States Establishing HAI Prevention Collaborative Using ARRA Funds F-00662 (9/20/12)

- 438 surveys sent
- 145 responded
Question 39

- What external sources of information are used by your facility to address infection-control related questions (please check all that apply)?

<table>
<thead>
<tr>
<th>Source</th>
<th>Percentage</th>
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</thead>
<tbody>
<tr>
<td>CDC</td>
<td>94%</td>
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<tr>
<td>Health Department</td>
<td>86%</td>
</tr>
<tr>
<td>AMDA</td>
<td>74%</td>
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<tr>
<td>APIC</td>
<td>72%</td>
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<tr>
<td>Corporate</td>
<td>27%</td>
</tr>
<tr>
<td>Hospital IC</td>
<td>24%</td>
</tr>
<tr>
<td>Nat Ass Directors of Nursing</td>
<td>11%</td>
</tr>
<tr>
<td>Infection control consultant</td>
<td>7%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
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</tbody>
</table>

One of 143 institution used the Medical Director
Medical Director’s Role
F-Tag 501

“The Medical Director helps the facility identify, address and resolve medical and clinical concerns and issues that affect resident care related to provisions of services by physicians and other licensed health care providers. “

The stars are

• E.coli
• Klebsiella pneumoniae
• Proteus mirabilis
• Enterococcus Gp D
• Staph aureus-MRSA and Non-MRSA.
• Enterobacter cloaca
The co-stars are

- Citrobacter sp, Non-Gp D Enterococcus, Gram negative bacillus, Gram positive cocci, Klebsiella sp. Proteus Morgani, Yeast, Enterobacter sp., Coag negative Staph
## PMNH Antibiogram 2006

<table>
<thead>
<tr>
<th>Bug</th>
<th>#</th>
<th>amp</th>
<th>ceph</th>
<th>cip</th>
<th>ntf</th>
<th>tmxs</th>
<th>levo</th>
<th>vanc</th>
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<tbody>
<tr>
<td>Ecoli</td>
<td>27</td>
<td>14</td>
<td>8</td>
<td>96</td>
<td>17</td>
<td>89</td>
<td>81</td>
<td>-</td>
</tr>
<tr>
<td>Kleb</td>
<td>14</td>
<td>8</td>
<td>93</td>
<td>100</td>
<td>93</td>
<td>64</td>
<td>93</td>
<td>50</td>
</tr>
<tr>
<td>Prot</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>-</td>
</tr>
<tr>
<td>Gd E</td>
<td>31</td>
<td>7</td>
<td>86</td>
<td>-</td>
<td>-</td>
<td>86</td>
<td>3</td>
<td>55</td>
</tr>
<tr>
<td>St au</td>
<td>7</td>
<td>7</td>
<td>14</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>100</td>
<td>17</td>
</tr>
<tr>
<td>mrsa</td>
<td>7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>100</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

### Organism

<table>
<thead>
<tr>
<th>Organism</th>
<th>Park Manor NH-2006 114 isolates</th>
<th>St. Michael/SP 3551 isolates</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. Coli</td>
<td>27(24%) 14(12%) 14(12%) 31(27%)</td>
<td>2090(56%) 657(18%) 377(10%)</td>
</tr>
<tr>
<td>Staph Aureus</td>
<td>14(12%) 14(12%)</td>
<td>166(5%) 261(7%)</td>
</tr>
<tr>
<td>Klebsiella pneumo</td>
<td>14(12%)</td>
<td>(96%)</td>
</tr>
<tr>
<td>Proteus mirabilis</td>
<td>31(27%)</td>
<td></td>
</tr>
<tr>
<td>Enterococcus</td>
<td>(87%)</td>
<td></td>
</tr>
</tbody>
</table>
Lifeline

The Audience always has the right answer.

Any problem in any nursing home can be solved by the conscientious application of the collective knowledge and experience of the people in this room.

The team said, “It’s those damn Doctors, they treat everything. DO SOMETHING!”
Get Me the Data!

START COUNTING STUFF

December 2006

We coughed up a gnat and swallowed a cow!
Rainbow Spreadsheet (Antibiotic Worksheet)

- Resident
- Wing in the building
- Physician responsible
- Date of Culture
- Specimen type
- Urine microscopic results
- Culture results....
- Colony count

Rainbow Spreadsheet cont.

- What drug?
- Was the drug appropriate?
- Was it changed to an appropriate drug?
- Was it stopped?
- Did infection meet criteria?
- What was physician’s response?
- Was follow up culture done?
And Then....

• We made mistakes...
• We learned some useful microbiology.
• We adjusted data definitions.
• We worked within the institutional IC program
• We modified policies.
• We learned a ton about our institution
• We started talking to our attending physicians with confidence.

Nurses began diligent effort to get follow up contact with attending physicians regarding every culture and sensitivity report.

Cue the doctors when culture negative to stop antibiotic.

Cue the doctors when antibiotic needs to be changed based on the sensitivity report.
Letter to Physicians December 2006

• We have a problem....
• We have this program....
• Gentle scrutiny of your antibiotic usage
• > 50% empiric antibiotic use is a quinolone
• Note copy of our antibiogram sensitivity pattern
• You will be cued: Change antibiotic if sensitivity pattern does not match your first choice
• You will be cued to stop unnecessary antibiotics

Letter to Physicians December 2006, cont.

• Please read “Managing Urinary Tract Infection: Guide for Nursing Home Practitioners” Annals of Long Term Care 2005 September
• Consider local wound care to MRSA colonized wounds rather than Vanco
• Introduced Paula Kock, RN as Certified Wound Care Nurse
• Invitation to participate in institutional infection control committee
Free Lunch Jan 2007

Rainbow Spreadsheet

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Letter to Physicians June 2007

- Follow-up from Dec 2006-Thank you
- Significantly less use empiric quinolone except for one
- Most are responding to our nurse’s cues
- Most have been comfortable with not treating asymptomatic bacteriuria
- May be receiving requests for surveillance cultures on your residents or our staff who are your patients
- Please consider becoming a member of our infection control committee
- “…the responsibility for multi-drug resistant pathogens lies with those of us who prescribe within our community”
"Dear Dr. Outlier,

You’re the outlier in Antibiotic usage for UTI at PMNH.... Your practice is the last holdout for use of antibiotics in Sterile pyuria and empiric quinolone therapy.... Please consider your approach.... I would be happy to speak with you directly or electronically....

Sincerely,
Joe Boero MD
dr.boero@pfrmc.com

CC: Regional Medical Director.

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**Comprehensive Review for MD**

<table>
<thead>
<tr>
<th>MD</th>
<th>Date</th>
<th>Sympt</th>
<th>Spec</th>
<th>UA</th>
<th>Cx</th>
<th>CC</th>
<th>Abx</th>
<th>F/U</th>
</tr>
</thead>
<tbody>
<tr>
<td>F/U</td>
<td>1/16/11</td>
<td>Ment.chg</td>
<td>St cath</td>
<td>Leu(-), nit(-)</td>
<td>Strep vind</td>
<td>&gt;100,000 pcn</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1/25/11</td>
<td>St cath</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2/23/11</td>
<td>ccmu</td>
<td>Leu(tr), nit(-)</td>
<td>Strep B</td>
<td>15,000</td>
<td>macrobid</td>
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<tr>
<td>F/U</td>
<td>3/7/11</td>
<td>ccmu</td>
<td>Leu(-), nit(-)</td>
<td>No growth</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5/12/11</td>
<td>Visual hallucin</td>
<td>Leu(tr), nit(+)</td>
<td>Klebs gr gr (+) lac</td>
<td>100,000/90,000</td>
<td>macrobid</td>
<td>yes</td>
<td></td>
</tr>
<tr>
<td>F/U</td>
<td>5/27/11</td>
<td>St cath</td>
<td>Leu(-) nit(+)</td>
<td>Klebsiella pneu</td>
<td>&gt;100,000</td>
<td>cipro</td>
<td>no</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7/21/141</td>
<td>Conf, hallucin</td>
<td>ccmu</td>
<td>Leu(sm) Nit(+)</td>
<td>E.Coli Strep B</td>
<td>&gt;100,000</td>
<td>Cipro &amp; doxy</td>
<td>No</td>
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<tr>
<td></td>
<td>8/18/11</td>
<td>Conf, dysuria</td>
<td>St cath</td>
<td>Leu(tr) Nit(+)</td>
<td>E.Coli gram(-)</td>
<td>&gt;100,000/7,000</td>
<td>macrobid</td>
<td>no</td>
</tr>
<tr>
<td></td>
<td>10/18/11</td>
<td>Somatic c/o</td>
<td>St cath</td>
<td>Leu(tr) Nit(+)</td>
<td>E.Coli</td>
<td>&gt;100,000</td>
<td>macrobid</td>
<td>No</td>
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<tr>
<td></td>
<td>12/15/11</td>
<td>Somatic c/o</td>
<td>ccmu</td>
<td>Leu(mod) nit(+)</td>
<td>Proteus mirabilis</td>
<td>&gt;100,000</td>
<td>Rocphin to bactri</td>
<td>no</td>
</tr>
</tbody>
</table>
Letter of notice for inappropriate antibiotic use 2013

• Greetings from yours truly,
• Your patient Mrs. Tuulkala was treated for uti with ciprofloxin. Please note..., 
• There was no dysuria, fever, leukocytosis, incontinence. Hematria,.... If you have further clinical information...
• Urine culture 1000 cfu Gram neg rod, 
• Nurse prompted to de-escalate therapy, 
• You chose to continue and said “...because I’m the Doctor!”
• Although......, I feel this represents inappropriate Abx use. 
• Please read “Treatment of Bacteriuria in Older Adults Still Room for Improvement” Crnich, Drinka JAMDA Oct. 2008.
• Please consider participating in our IC Committee.

Park Manor Antibiotic Reportcard 2013

<table>
<thead>
<tr>
<th>DOCTOR</th>
<th>Antibiotic Rx’s</th>
<th>Appropriate Abx</th>
<th>In-appropriate Abx</th>
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<tbody>
<tr>
<td>Vacation</td>
<td>12</td>
<td>10</td>
<td>2</td>
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<td>Off-call</td>
<td>5</td>
<td>5</td>
<td>0</td>
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<tr>
<td>Yesmaam</td>
<td>12</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>Notme</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Nobel</td>
<td>22</td>
<td>22</td>
<td>0</td>
</tr>
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It’s about changing behavior

• Nurses’ role: Not to tell physicians how to practice medicine, but to give information to help them practice better and to seek their clinical reasoning.

• Medical Director’s role: To tell physicians how to practice medicine when they mis-practice.

The System’s approach to problem solving

What constitutes an antibiotic event?
   A resident who receives antibiotic for at least 24 hours, or a new admission with at least 24 hrs of antibiotic to continue.

What constitutes an infection?

How do you keep tract of culture orders and reports?
System’s cont.

Who will review Abx use against criteria?

How will you handle physician communication?

What about week-ends?

Who’s responsible for each task along the way?

How to educate staff key participants?

Almost at

the end of the story
Antibiotic utilization review and direct provider feedback

• Copies of antibiogram to physicians including ER physicians-2006.
• Evolving concurrent nurse contact to physician by incident-2007.
• Medical Director annual letters with antibiogram-2007 to 2013.
• Direct letter to physician per incident of inappropriate antibiotic use 2013.
• Antibiotic usage report card to physicians.

Formulary restriction prior authorization

?
So What?

<table>
<thead>
<tr>
<th>Year</th>
<th>Antibiotic</th>
<th>Abx/Kdays</th>
<th>Abx/patient</th>
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<tbody>
<tr>
<td>2006</td>
<td>503</td>
<td>11.75</td>
<td>2.57</td>
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<tr>
<td>2007</td>
<td>400</td>
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<td>2008</td>
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<td>2009</td>
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<td>2010</td>
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<td>2011</td>
<td>295</td>
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<td>1.52</td>
</tr>
<tr>
<td>2012</td>
<td>315</td>
<td>8.13</td>
<td>1.23</td>
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Policy Statement on Antibiotic Stewardship by the Society for Healthcare Epidemiology of America, the Infectious Diseases Society of America, and the Pediatric Infectious Diseases Society March 15, 2012

“SHEA, IDSA, PIDS recommend that the CMS require participating healthcare institutions to develop and implement anti-microbial stewardship programs. This can be achieved by incorporating the requirement into existing regulations via expansion of interpretive guidelines of the relevant regulations.”

F-tag 329 unnecessary drug
Antibiotic Stewardship

• Our system is in place
• Every antibiotic prescription is reviewed for appropriateness
• We contact physicians for de-escalation
• We identify antibiotic misuse
• We bring it to attending physician attention
• Our Medical Director does physician peer review.
“...the microbes are educated to resist penicillin and a host of penicillin-fast organisms is bred out....In such cases the thoughtless person playing with penicillin is morally responsible for the death of the man who finally succumbs to infection with the penicillin-resistant organism. I hope this evil can be averted.”

Sir Alexander Fleming  June 26,1945  
New Your Times
Wisconsin Association of Medical Directors  
Annual Meeting 2013  
October 18-19  
Madison, WI

“Building Bridges to Quality”