

Antimicrobial Stewardship

THE ROLE OF THE CLINICAL LABORATORY SCIENTIST IN EDUCATION, TRACKING AND REPORTING FOR AMS PROGRAMS

Laurence Schuermann, MT(ASCP), CIC ISU MPH Program
03/08/2019

Learning Objectives

- ▶ Define Antibiotic Stewardship and discuss its relevance to clinical outcomes.
- ▶ Discuss resistance mechanisms of bacteria.
- ▶ Outline Stewardship processes at various healthcare settings.
- ▶ Discuss Identification methods, susceptibility testing, and Antibiograms.
- ▶ Discuss the future of combating bacterial resistance.

Information about me

- ▶ 30+ years lab experience (5 as Microbiologist, 25+ as Generalist)
- ▶ Infection Control Coordinator at Valor Health for 10 years.
- ▶ ISU MPH Student
- ▶ Penicillin allergic

Take home lesson: Wash your hands, please.

- ▶ Wash your hands: single most important factor in fighting the spread of disease in the healthcare setting and at home.
- ▶ Stopping the spread of disease = fighting antibiotic resistance

One more key point: Get Vaccinated

The 911 on Vaccinations in Idaho

Why Immunize?

- ▶ Reduces preventable deaths from 14 serious childhood diseases
- ▶ Most kids get immunized before age 24 months
- ▶ 90% of the general public that is safe, gross, and efficient

Vaccination helps to protect all children

- ▶ By immunizing, you are helping to protect yourself and others from harmful diseases
- ▶ The benefits far outweigh the pain of a shot
- ▶ Immunization helps protect your child from the spread of disease and protects the spread of disease and protects the spread of disease

Immunize for life

- ▶ Immunization is important and given to children. It is tested extensively
- ▶ Immunization does not cause the disease it is meant to prevent
- ▶ Immunization does not cause the disease it is meant to prevent
- ▶ Immunization does not cause the disease it is meant to prevent

Vaccine vs antibiotic: TB

Treating superbug tuberculosis (TB)

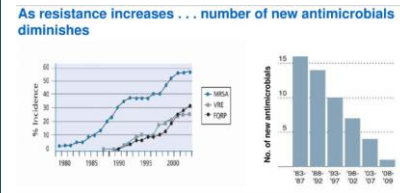


MRSA

1995 REGIONAL ANTIHIOGRAM (January 1, 1995 - December 31, 1995)
Gram Positive/Miscellaneous Isolates

Organism	Number of Isolates											
	Staph. Skin	Staph. Blood	Staph. Urinary	Staph. Other	Staph. Other	Staph. Other	Staph. Other	Staph. Other	Staph. Other	Staph. Other	Staph. Other	Staph. Other
<i>Staph. aureus</i> ***	1746	11			12	709	137	137	137	14	107	1000
<i>Staph. epidermidis</i> **	1361		122			91	292	14	12	36	101	1000
<i>Staph. Group III*</i>	289		130							100	14	100
<i>Staph. E. Faecalis/SCC*</i>	956	104						81			71	100
<i>Micrococci**</i>	1118											100
<i>Coag. Staph. Pasteurella</i> ***	20	54	80	100		10	100	15			47	1000

* Non-spore-forming Urine Isolates
** System isolates
*** System Isolates



News stories:

Novartis drops antibiotic development program

First Under Antimicrobial Development
Drug Cell Line Report | CDMJ Report | Jul 12, 2016

Editor's note: This story was updated on Jul 13 with comments from Kevin Outerson, JD.

Antibiotic development efforts were dealt a blow yesterday when drug maker Novartis AG announced its decision to drop its antibacterial and antiviral research programs.

The decision means Novartis will no longer be working on several antimicrobial projects currently in development.



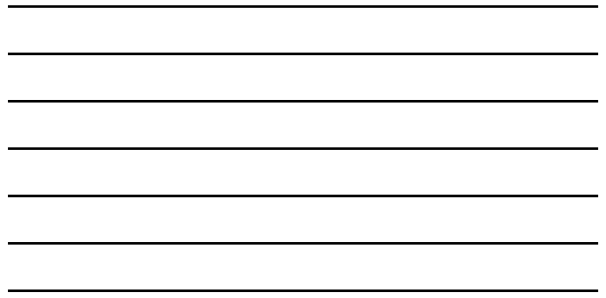
antibio / WJHealth Division

Colistin Resistance

Science News from research organizations

Threat of 'nightmare bacteria' exhibiting resistance to last-resort antibiotic colistin
Wide dissemination of colistin-resistant *Escherichia coli*, a growing therapeutic concern, in rural communities in Vietnam revealed

Date: December 22, 2015
Source: Osaka University
Summary: Researchers examined the dissemination of colistin-resistant bacteria among residents of rural communities in Vietnam to find that the prevalence of colistin-resistant *Escherichia coli* in the intestines was extremely high, at about 70 percent.



REPORT INFECTIOUS DISEASE

Increasing tolerance of hospital *Enterococcus faecium* to handwash alcohols

Sasha J. Patel¹, Wei Gan², Andrew N. Budjoni¹, Ian K. Cook¹, Renata Gaetfeli¹, Glen H. Carter¹, Juan Y. Lee¹, Meng...

DOI: 10.1093/cid/ciw119

Article Figures & Data Info & Metrics eLetters PDF

Alcohol loses its luster
Alcohol-based disinfectants are a key way to control hospital infections worldwide. Patel et al. now show that the multidrug-resistant bacterium *Enterococcus faecium* has become increasingly tolerant to the alcohols in widely used hospital disinfectants such as hand rub solutions. These findings may help explain the recent increase in this pathogen in hospital settings. A global response to *E. faecium* will need to include consideration of its adaptive responses not only to antibiotics but also to alcohols and the other active agents in disinfectant solutions that have become so critical for effective infection control.



Idaho Bureau of Laboratories Spring 2018 Volume 54, Issue 3

Clinical Forum

HAVE YOU HEARD OF CANDIDA AURIS?

ROZINA M. MORANIKI, PhD, MPH, SUSAN HEFFLER, RN, MATTHEW HURNS, BSC

Candida auris is an emerging fungal pathogen that causes serious infections and is often resistant to multiple classes of antifungal therapies. During early cases, the mortality rate among patients with *C. auris* infections was 66%. *Candida auris* isolates have demonstrated resistance to all three classes of antifungal drugs: echinocandins (e.g., micafungin), azoles (e.g., voriconazole), and triazoles (e.g., isavuconazole).

C. auris has been linked to healthcare facility outbreaks, and the Centers for Disease Control and Prevention (CDC) infection prevention recommendations require that patients with *C. auris* be placed on contact and cohort precautions.

C. auris can persist on surfaces in hospital settings, and currently has a high level of resistance to disinfectants. *C. auris* has been found to survive on surfaces for up to 28 days. The organism is also highly resistant to cleaning with an Environmental Protection Agency-registered hospital-grade disinfectant that is effective against *Candida auris*.

C. auris was first identified in 2009 from the ear canal of a patient in Japan. A strain of *C. auris* has been identified in patients from the United States and the United Kingdom. The first strain in the United States was identified in 2015.

When to Worry	Healthcare-associated yeast
Molecular tests	genomic sequencing
Drug resistance	Resistance testing has shown that some of isolates were resistant to echinocandins, azoles, and triazoles in combination with fluconazole.
Commonly Isolated From	Candida isolates have demonstrated resistance to all three classes.





A pig raised on 50 penicillin units per day.

Are antibiotics turning livestock into superbug factories?

By George Gajdoski | Sep 28, 2017, 2:00 PM

Almost 80% of all antibiotics in the United States aren't taken by people. They're given to cows, pigs, and chickens to make them grow more quickly or as a cheap alternative to keeping them healthy. These drugs could give rise to superbugs—bacteria that can't be treated with modern medicine—and things are only getting worse. In 2013, more than 131,000 tons of antibiotics were used in food animals worldwide; by 2030, it will be more than 200,000 tons.

CDC Congressional Testimony: April 28, 2010 Antibiotic Resistance and the Threat to Public Health



"... we are potentially headed for a post-antibiotic world in which we will have few or no clinical interventions for some infections."
(Thomas Frieden, MD, MPH, Director, CDC)



APIC 2017 June 14-16 - Portland, OR #APIC2017



Need for Antibiotic Stewardship

- Post-Antibiotic world
 - Ease of Bacterial acquiring resistance
 - Growing more connected world=ease of transmission
 - Lack of Development of new drugs
 - Impacts of not following Clinicians instructions

CCO, Washington, February, April 20, 2019. <https://www.cco-pain.org/pain/pain/pain/2019/02/04/190204-01>

Does it work?

In various studies, Antibiotic Stewardship programs have been shown to:

- Increase effective prescribing patterns for patients with pneumonia reduced mortality (RR=0.89, 95% CI)
- Significant reductions in C. Diff incidence (68% reduction in one study)
- Large reductions in ABX use, improvements in use, overall cost savings

©2017 WEST VIRGINIA INSTITUTE FOR PAIN MANAGEMENT

Does it work?

- ▶ No significant difference in LOS (length of stay) (-0.04, 95% CI)
- ▶ Weak potential association with increased hospital readmissions.
- ▶ Some reports of improved susceptibility (limited data)

Antibiotic Stewardship

Antibiotic Stewardship, Defined

- **Infectious Diseases Society of America (IDSA):**
“...coordinated interventions designed to improve and measure the appropriate use of antimicrobials by promoting the selection of the optimal antimicrobial drug regimen, dose, duration of therapy, and route of administration.”





Why ABX Stewardship?

- ▶ Antibiotics are a shared resource – and becoming a scarce resource.
- ▶ 30-50% of antibiotic use in hospitals is unnecessary or inappropriate.
- ▶ Antibiotic overuse contributes to the growing problems of *Clostridium difficile* infection and antibiotic resistance in healthcare facilities.
- ▶ Reducing unnecessary antibiotic use can decrease antibiotic resistance, *Clostridium difficile* infections, and healthcare costs, and improve patient outcomes.
- ▶ Interventions to improve antibiotic use can be implemented in any healthcare setting—from the smallest to the largest.
- ▶ Improving antibiotic use is a medication-safety and patient-safety issue.

Why ABX Stewardship? (cont.)


- ▶ Accrediting Agency Requirement (Joint Commission, DNV)
 - ▶ Joint Commission began in 2017
- ▶ CMS: Stewardship required as a condition of participation
 - ▶ 2016: Long Term Care Centers
 - ▶ 2019: VA and Government Hospitals
 - ▶ 2020: All CMS participating Healthcare organizations

Problem Identified

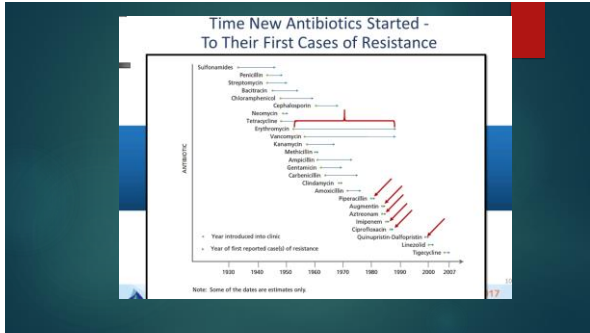
-  **Impact: 2 million people annually resulting in 23,000 deaths annually in U.S.**
-  **Cost of antibiotic resistance tops \$20 billion annually.**
-  **Federal pressures to include Antibiotic Stewardship as a condition of participation in Medicare**
-  **Small rural hospitals struggle to find the resources to implement antibiotic Stewardship programs.**

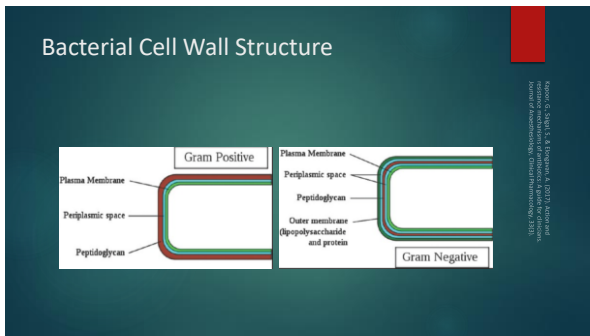
© 2018, September 10, Antibiotic Resistance Research Program, Inc. www.arp.org/antibiotic-resistance.html

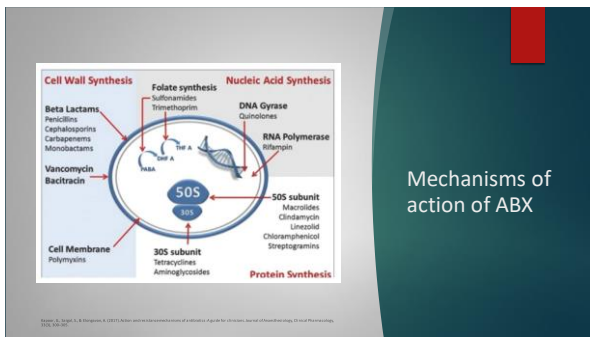
The Golden Age of Antibiotics Alexander Fleming











How bacteria become resistant

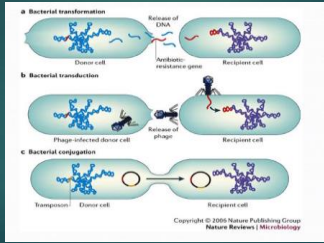
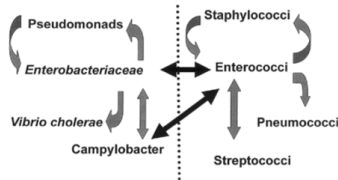


Figure 1. X. A. Lewis, F. B. (2010). Antimicrobial resistance in the community. *Nature Reviews Microbiology*, 8(1), 35-46.

Plasmids:

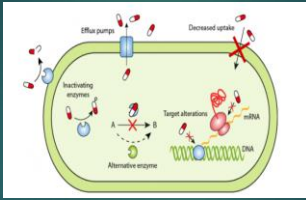
- ▶ Extra-chromosomal DNA elements
- ▶ Cyclical genetic material
- ▶ Can replicate independently and transfer material between strains
- ▶ Transposons: Can Translocate from one area of a chromosome to another, or to a plasmid or phage
- ▶ Integrons: DNA integration elements. Provides an insertion site for ABX resistance genes from a foreign DNA source.
- ▶ Major role in the spread of multidrug resistance in Enterobacteriaceae.

Figure 1 Diagram of the organisms known to exchange antimicrobial agent resistance genes in nature. Organisms on the ...



Tenover, 2003, Clin Infect Dis 2003; 38(suppl): S108

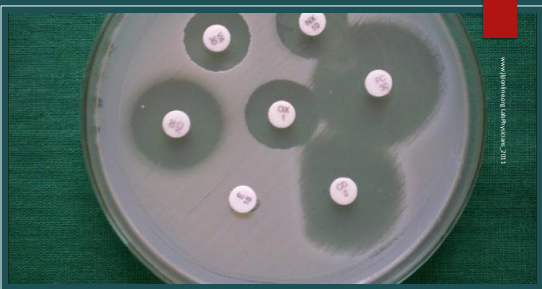
Resistance Mechanisms



Resistance mechanisms - Antibiotic resistance (14). From <http://www.pearsoned.com>

Inducible Resistance

- ▶ "Selectable" resistance
- ▶ Plasmid Mediated
- ▶ Associated with reports of Clindamycin failure
- ▶ Used primarily for Staph aureus and beta Strep
- ▶ Of particular importance to Penicillin allergic patients.
- ▶ Microscan, Vitek and BD Phoenix(?) all able to detect Inducible Clindamycin Resistance
- ▶ Tip of the iceberg for resistance???



ESCC, copyright Thomson Laboratory 2007

C. difficile Infections

1978: Discovered that the apparent normal flora organism was found to cause Pseudomembraneous colitis in patients treated with antibiotics.

Age was a significant factor.

In the United States, data from vital records showed that the number of death certificates with enterocolitis due to C. difficile listed as the primary cause of death increased almost 10-fold between 1999 and 2008

Wheeler, L. Weber, L. MPH (2008) Enterobacteriaceae: emerging zoonotic infections.

Figure 1.2. Discharge rate for CDI from U.S. short-stay hospitals by age, Nationwide Inpatient Sample, United States, 2000-2009.

Year	<18	18-64	65-84	85+
2000	2.0	4.0	8.0	10.0
2001	2.0	4.0	9.0	11.0
2002	2.0	4.0	10.0	12.0
2003	2.0	4.0	11.0	13.0
2004	2.0	4.0	12.0	14.0
2005	2.0	4.0	13.0	15.0
2006	2.0	4.0	14.0	16.0
2007	2.0	4.0	15.0	17.0
2008	2.0	4.0	16.0	18.0
2009	2.0	4.0	17.0	19.0

Source: Healthcare Cost and Utilization Project, NIS summary statistics. Available at: <http://www.hcup-us.ahrq.gov/db/nation/nis/nisummstats.jsp>, Accessed March 23, 2012.

Bad Bugs, No Drugs: No ESKAPE! An Update from the Infectious Diseases Society of America

Helen W. Boucher,¹ George H. Talbot,² John S. Bradley,^{3,4} John E. Edwards, Jr.,^{5,6,7} David Gilbert,⁸ Louis B. Rice,^{9,10} Michael Scheld,¹¹ Brad Spellberg,^{2,4,7} and John Bartlett¹²

- Enterococcus faecium → VRE
- Staphylococcus aureus → MRSA
- Klebsiella pneumoniae ed Escherichia coli → MDR
- Acinetobacter baumannii → MDR
- Pseudomonas aueruginosa → PR
- Enterobacter species → ESBL e AMP-C

A word about Penicillin allergies:

- 10% of pateints, often receive less effective, more toxic, more broad spectrum and more expensive agents.
- Associated with increased length of hospital stay, hospitalization costs, ABX resistance (MRSA, VRE, C. diff) and mortality.
- Stewardship: Is it a true allergy? What is the severity of the allergy? Patient History is key.

Summary of Core Elements of Hospital Antibiotic Stewardship Programs



CDC Core Elements

- Leadership Commitment from CEO/Administration
- Accountability: Single Committed Physician
- Drug Expertise: PharmD as a member of the Committee/Program
- Action: At least one action in which Providers must review prescribing patterns.
- Tracking: Monitoring of prescribing patterns and antibiotic resistance patterns.
- Reporting: Regular reporting of patterns and use to providers
- Education of Providers, Patients and Community.

CDC. Data Elements of Hospital Inpatient Stewardship Programs. Atlanta, GA, USA. Department of Health and Human Services, USA, 2014.

Valor Health

- ▶ Rural Critical Access Hospital in Emmett, Idaho
- ▶ Inpatient Stewardship Grant: Worked with Weiser Memorial in Cohort.
- ▶ Qualls: Clinic based Stewardship and current ECHO cohort.

Budget

- ▶ One Full Time IC Nurse/IC Coordinator/Employee Health Nurse
- ▶ IC Committee work and AMS subcommittee work
- ▶ Grant Cohort
- ▶ ISU MPH Intern
- ▶ Grant Funds
- ▶ No Infection Control Budget

Leadership Commitment

- ▶ Formal written statement of support from Leadership.
- ▶ This implies the use of money and time to support these activities
- ▶ At many smaller hospitals: Lab, Nursing, Surgery, and Facilities share the cost of Infection Control and Antimicrobial Stewardship activities.



Leadership Commitment

Accountability

- ▶ Person responsible for all Stewardship efforts.
- ▶ Larger institutions: ID MD, Infection Control Manager

**Accountability
(Valor Health)**

- ▶ Currently we have one of our Nurse Practitioners as the individual responsible for stewardship activities at Valor Health.
- ▶ We are working on recruiting one of our surgeon's to be this individual in the future or Infection Control Committee physician member.

Drug Expertise

- ▶ Expertise in infectious disease and antibiotic use.
- ▶ Can be a ID MD
- ▶ Pharmacist can be this person at smaller facilities.

Drug Expertise

- ▶ Pharmacist is the drug expert at Valor Health
- ▶ Our Pharmacist: Mike G, PharmD

ACTION

- ▶ Specific steps done to reduce inappropriate antibiotic use at your facility

Action:

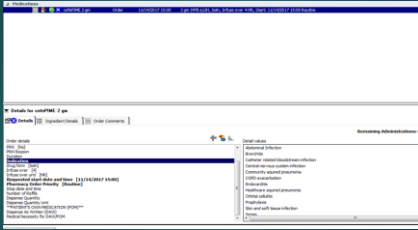
- Drug formulary restrictions
- Prospective feedback
- 48-72 hour Abx time-out

Action: example

- ▶ State of Nevada is now requiring prior authorization on all Medicaid 3rd Generation Cephalosporins, Fluoroquinolones and Oxazolidinones in outpatient settings.

Wilson et al. Nevada Division of Health Care Financing and Policy 2018

Action: with help from EMR



ACTION (Valor Health)

- ▶ Restrictions on Carbapenems and Daptomycin
- ▶ Review of all Inpatient Abx orders by PharmD.

Tracking

- ▶ Identification of important organisms in the laboratory:
 - ▶ C. difficile
 - ▶ MRSA
 - ▶ ESBL
 - ▶ Influenza
 - ▶ Sepsis

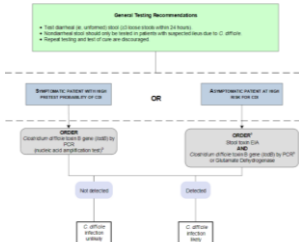
Primary Role of Lab in AMS: Tracking and Reporting

- Time is critical: Time to test.
 - Get the culture set up as quickly as possible (48 to 72 hour time out)
- Culture vs PCR
 - Rapid identification/empiric therapy vs complete identification and susceptibility pattern.
 - EIA: Sensitivity issues (importance of the quality of the specimen)
- Time: EMR's: using the tools that EMR's provide decreases time to de-escalation of broad spectrum antibiotics, or discontinuation of treatment.

C. diff

- Clinical data
- Lab Testing (PCR/EIA)
- Antibiotic Stewardship
- Hand Hygiene

C. Diff Testing algorithm



AMLP Consult, CDiff Algorithm 2018

MRSA

MEC-A gene cross reacts with all B-Lactams.

Lab detection:

Culture:

Kirby-Bauer: Oxacillin Disc zone size of <14 mm (include cefoxitin disc)

Broth dilution: MIC >4 ug/mL

Agar Based detection: Chrome Agar/MRSASelect/MRSA2

PCR: Rapid detection of MRSA in select isolate types: Blood or Nares

Influenza

- ▶ Rapid Diagnosis of Influenza rules out the use of antibiotics
- ▶ Cost effective
- ▶ Specimen collection is key to increasing sensitivity of test.
- ▶ New CDC RIDT recommendations does not include Molecular or PCR based testing
- ▶ Must include A vs B.
- ▶ Should be reported at every Infection Control or AMS subcommittee meeting

ID and susceptibility testing

- ▶ Gives the Clinician the complete Identification and antibiotic profile tailored to hospitals formulary.
- ▶ Time to results varies depending on analyzer/ organism. (BD, Vitek, Microscan)
- ▶ Data compiled = antibiogram
- ▶ Decreasing time to results key to stewardship.

MALDI

- ▶ Rapid Identification of cultures: can be taken as soon as detectable growth of colonies.
- ▶ Approx. 30 hours from setup to identification for most pathogens
- ▶ Does not give sensitivities (16 -20 hours later)
- ▶ Does Identify Resistant organisms
- ▶ Decrease time to identification of blood cultures

Sepsis

- ▶ Rapid Identification of Bacteremic conditions are critical to patient survival.
- ▶ Blood Culture, CBC, CMP, CRP (ESR)
- ▶ Lactate/Procalcitonin: Initial diagnosis and monitoring
- ▶ Accelerate Diagnostics: Rapid ID and AST of positive blood cultures (approx. 30 -40 hours of time saved for ID/AST of positive blood culture)

PCR

- ▶ Accurate and specific
- ▶ Cepheid GeneXpert
- ▶ Biofire Torch (Biomerieux)
- ▶ RT-PCR: Alere-i, BD Veritor (CLIA Waived)
- ▶ Molecular amplification: Aletia (Illumigene)
- ▶ Approx 1-2 hour TAT for most assays.
- ▶ No Sensitivities but accurate ID of some resistant organisms (VanA, VanB, MeCA, KPC)

Tracking

- ▶ At Valor Health: tracking of C. Difficile infections, MRSA rates, ESBL rates and resistance patterns for yearly antibiogram
- ▶ Working on utilizing our EMR to track Days of therapy.

Reporting

- ▶ Annual Antibiogram
- ▶ DOT (compared to empiric dosage recommendations)
- ▶ ARI vs ABX prescribing patterns
- ▶ C. Difficile rates
- ▶ MRSA surveillance
- ▶ ESBL Rates
- ▶ Influenza surveillance
- ▶ Hand Hygiene compliance

Reporting

- ▶ Reporting pertinent information to providers about Antibiotic prescribing patterns, Day of Therapy, and diagnoses related info.
 - ▶ URI diagnosis vs antibiotic use
- ▶ This gives clinicians data they can use to compare themselves with their peers.

Antibiograms

- ▶ Aid in the initial empiric therapy for a given infection.
- ▶ Monitor resistance trends over time within an institution, ward or type of infection (UTI vs non-UTI)
- ▶ Compare antibiograms between institution
- ▶ EMR interfaces may provide us with comparison between networks, regions, and nationally.
- ▶ Assist in formulary decisions
- ▶ Great if you can make this handy (PDF, Pocket guide, hospital website link)
- ▶ State of Idaho working on a Statewide Antibiogram

CLSI M39



Rules of Antibiograms:

- ▶ Each facility should have its own antibiogram. Difficult for Small institutions
- ▶ Publish Annually
- ▶ Do not include non-clinical Isolates
- ▶ 30 (less than 30 should be considered anecdotal but may be useful, add note about significance)
- ▶ Only Final, Verified results

Rules of Antibiograms (cont)

- Only report % Susceptible
- Very important to only include first isolate.
- Only report first isolate of a given species per patient per analyzed period (e.g. Year)
 - Irrespective of body site, specimen type, phenotypical characteristic, or AST.
 - Other data on additional isolates may be useful (Cerner Patient specific antibiogram).
- Only include antibiotics routinely tested against the organism (Lab Developed Test??)
- Select or non-reporting of selective agents tested on resistant organisms (colistin and MDR P. aeruginosa)

Limitations of Antibiograms

- Qualitative measure of susceptibility, no specific MIC data
- Does not provide info at time of publication of emergence of resistance or outbreaks.
- Not useful for subsequent infections
- Timing: outbreaks, upon admission, HAI
- True isolates or colonization: criteria for specimen collection

Susceptibility - Systemic & Urine Cultures (01/18-12/18)

Gram Positive Organisms	Total isolates	Ampicillin	Ampic/Sulbactam	Nafcillin/oxc on Vth panel	Penicillin G	Ceftriaxone	Clindamycin	Daptomycin	Erythromycin	Genamycin	Levofloxacin	Linezolid(Not on Vth panel)	Rifampin	Tetracycline	Trimeth/Sulf A	Vancomycin	Nicotifuransoic(LTI only)
E. faecalis	9	100		100			100	25					85	100	52	100	100
MRSA	13						75	85	0	100	28						0
Staph aureus	28			100	93	86	63	100	86		100		100	93	100	100	100
Staph epidermidis	25			87	96	93	85	62			95		69	69	100	100	100

Organisms with less than 20 isolates not statistically robust to infer susceptibility of total population.

25 Susceptibility - Systemic & Urine Cultures (02/2018-12/2018)

Gram Negative Organisms

Organism	Total Isolates											
	Respiratory	UTI	Wound	Other	Other	Other	Other	Other	Other	Other	Other	Other
<i>E. coli</i>	154	100	96	93	99	79	90	96	99	87	80	61
<i>K. coli (EHEC)</i>	4	100	100	100	100							
<i>Enterobacter pneumoniae</i>	25	97	96	94	97	100	89	89	91	100	100	87
<i>K. pneumoniae (EHEC)</i>	1	100	0	0	100							
<i>Pseudomonas aeruginosa</i>	13	100	100	100	100	87	100	100	100	100	100	100
<i>Pseudomonas aeruginosa</i>	90	90	90	89	90		100	100	100	100	100	100

Organisms with less than 30 isolates not statistically robust to infer susceptibility of total population.

Education

- ▶ Designed for the Clinician, the patient and the community as a whole
- ▶ Wide range of formats:
 - ▶ Journal articles
 - ▶ Info graphs
 - ▶ CDC Be Antibiotics Aware (Get Smart about Antibiotics)
 - ▶ APIC
 - ▶ IDSA

Education (Valor Health)

- ▶ MAD ID Training
- ▶ AMS Symposium
- ▶ Assigned Staff E-Learning Modules (MCN Learning)
- ▶ Staff communications:
 - ▶ Emails/contest during Antibiotic Awareness week and Lab Week.
- ▶ Yearly Provider toolkit w/ antibiogram
- ▶ Clinic Posters from Qualis

Provider Tool Kit

- ▶ Local Valor Health Antibigram
- ▶ Regional St. Luke's Antibigram
- ▶ Regional URI Prescribing data
- ▶ Patient Infographics
- ▶ Provider Demographics
- ▶ Two Journal based Articles
- ▶ Quick Reference Card

Toolkit





2019 plans (Valor Health)

- ▶ Work with Qualls on Clinic based Core elements and ECHO Inpatient Cohort
- ▶ Will publish annual toolkit with most current Regional/Local Antibigram data
- ▶ Assign AMS competencies using our E-learning modules for nursing, surgery and lab staff.
- ▶ Ensure all the Core elements in our Policies/Procedure are in line with CMS/DNV standards.
- ▶ Action element: Work on making adding more actions such as 48 Abx time out and prospective feedback.

The Future of fighting resistance

- ▶ Phage treatment of infections
- ▶ New Antibiotics such as Cefiderocol which acts as a "trojan horse" by using a novel mechanism of cell entry that takes advantage of the bacteria's need for iron to survive.
- ▶ CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats)
 - ▶ Non-lytic phage delivers gene/enzyme system, places self-destruct sequence in resistance gene

Center for Medical Research, University of Michigan

New antibiotics could be developed using fish slime, scientists say

Microbes that protect fish contain substances that could help tackle MRSA and E.coli



Fish slime could be key to the development of new antibiotics, researchers say

Questions

- ▶ Laurence Schuermann, MT(ASCP), CIC
- ▶ lablarry@outlook.com

Thank you.

▶

Purpose of Project

This study aims to improve antibiotic awareness and proper stewardship practices in a Rural Idaho Outpatient Clinic Setting.

Aims

1. To assess the change in individual antibiotic knowledge and attitudes as result of community education. More specifically, this study aims to increase community knowledge:
 - ▶ Concerning the differences between bacteria and viruses
 - ▶ Between the different classes of antibiotics
 - ▶ The rise of antibiotic resistance
 - ▶ Patient/community's responsibility to practice good stewardship practices

Aims (continued)

2. This study also aims to show that providing rural clinicians with feedback concerning prescribing patterns decreases the rate of inappropriate use of antibiotics over time.

Hypothesis

- ▶ In the Rural Idaho setting, providing prescribing pattern feedback to clinicians and antibiotic Stewardship education to the community lowers the rate of Antibiotic prescribing for patients in a rural outpatient setting.

Study design: Focus groups

- ▶ Two focus groups
 - ▶ Study group: Antibiotic Stewardship target
 - ▶ Control group: general medication information, w/o antibiotic emphasis.

Study Design (continued)

- ▶ Pre-education assessment of medication use:
 - ▶ 20 questions
 - ▶ 10 specific questions concerning antibiotic use, viruses, bacteria, and resistance mechanisms.
- ▶ 1 education session for each group:
 - ▶ Study group will focus on Antibiotic use and general microbiology
 - ▶ Control group will receive general medication education with antibiotic and microbiology subjects omitted.
- ▶ Setting: Senior Center in town.
- ▶ Incentives: meal provided and will solicit for gift cards for each participant or have a drawing for gift card.

Study Design: Prescriber data

- ▶ The second part of study:
 - ▶ Analysis of clinicians prescribing patterns over a period of two years.
 - ▶ Coincides with implementation of Antimicrobial stewardship program at local critical access hospital.
 - ▶ Analysis of data for antibiotic prescriptions written for upper respiratory infections (URI) over two year period.
 - ▶ Part D Medicare: aligns with focus of education opportunity.
 - ▶ Hospital EMR data to be utilized as well (Non-Part D Medicare).

Data analysis

- ▶ Initial target of 10% improvement in both:
 - ▶ Antibiotic and Microbiology knowledge in study group
 - ▶ 10% decrease in prescribing patterns for URI

Conclusions

- ▶ Increased quality at Rural Critical Access Hospitals
- ▶ Increased Community awareness
- ▶ Generalizability
- ▶ Ease of implementation
