AMERICA'S ESSENTIAL HOSPITALS

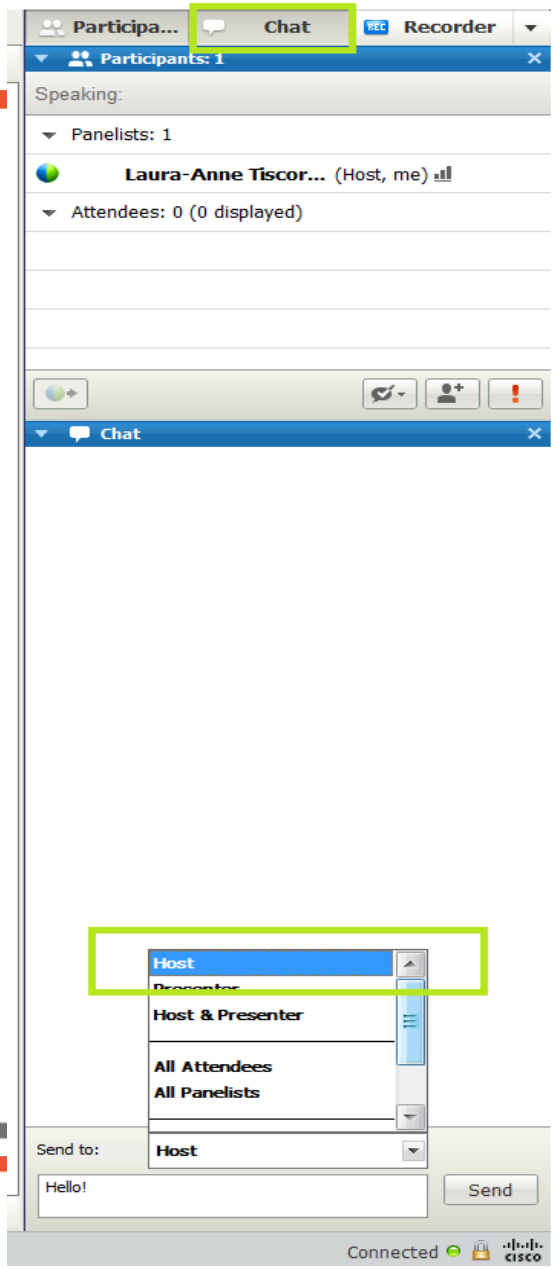
Avoiding Adverse Drug Events: Antibiotic Stewardship and Anticoagulation

Essential Hospitals Engagement Network

June 5, 2014

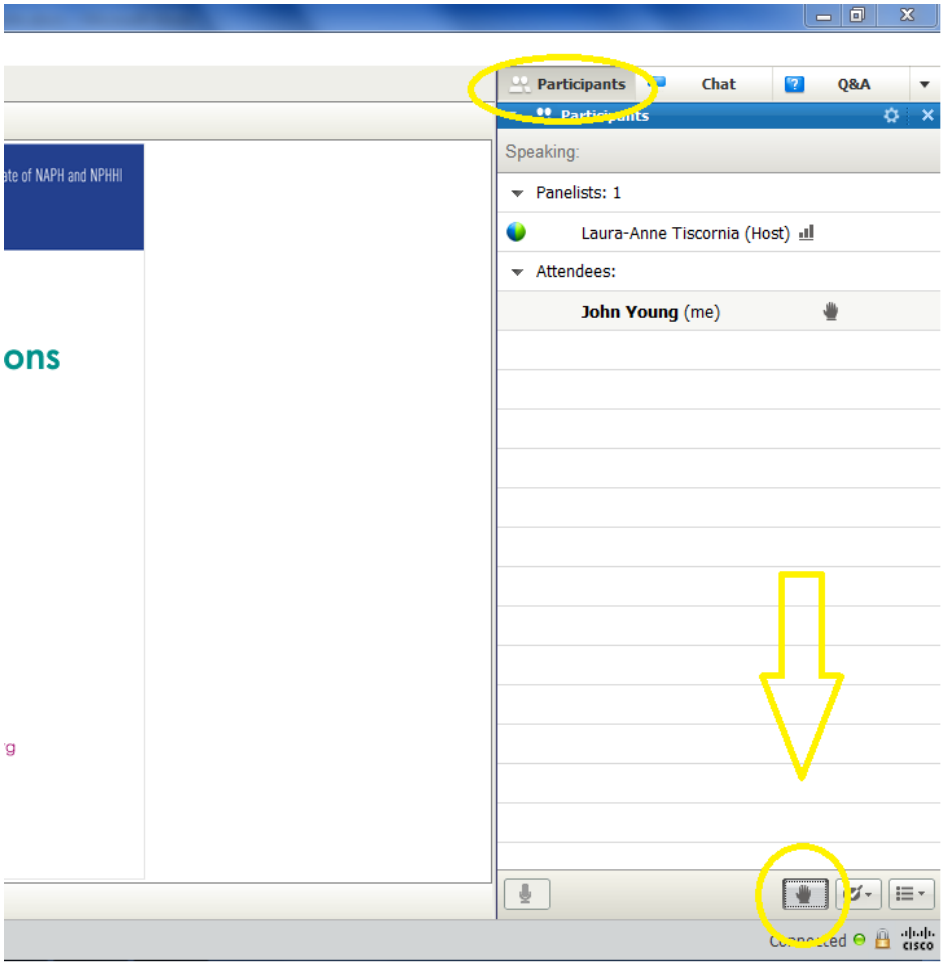
CHAT FEATURE

The chat tool is available to ask questions or comments at any time during this event.

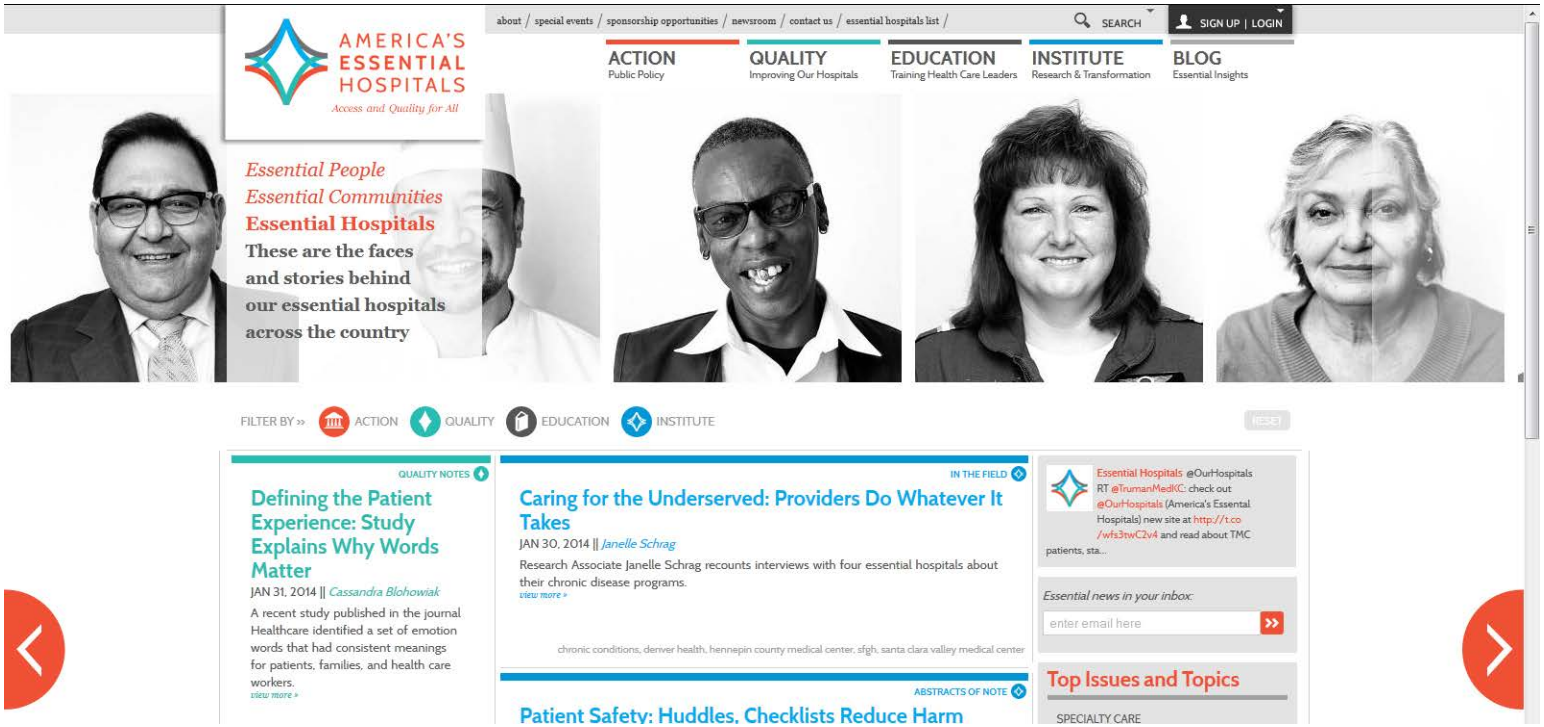


RAISE YOUR HAND

If you wish to speak telephonically, please "raise your hand." We will call your name, when your phone line is unmuted.



ENGAGE AT OUR NEW WEBSITE!



Network with peers, learn how essential hospitals are changing lives
Now live at essentialhospitals.org

AGENDA

- Partnership for Patients and 2014
- Building, sustaining and evaluating an antimicrobial stewardship program (UCLA Health)
- Reducing anticoagulation ADEs (Hennepin County Medical Center)
- Q & A
- Upcoming events

MEMBERS-ONLY ADE RESOURCES

- ADE tab includes
  - » Resources
  - » Links
  - » Discussion thread
  - » Recordings of past webinars

Visit http://essentialhospitals.org/groups/ehen/adverse-drug-events/ to learn more today.

SPEAKER INFORMATION

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UCLA Health

Our Facility

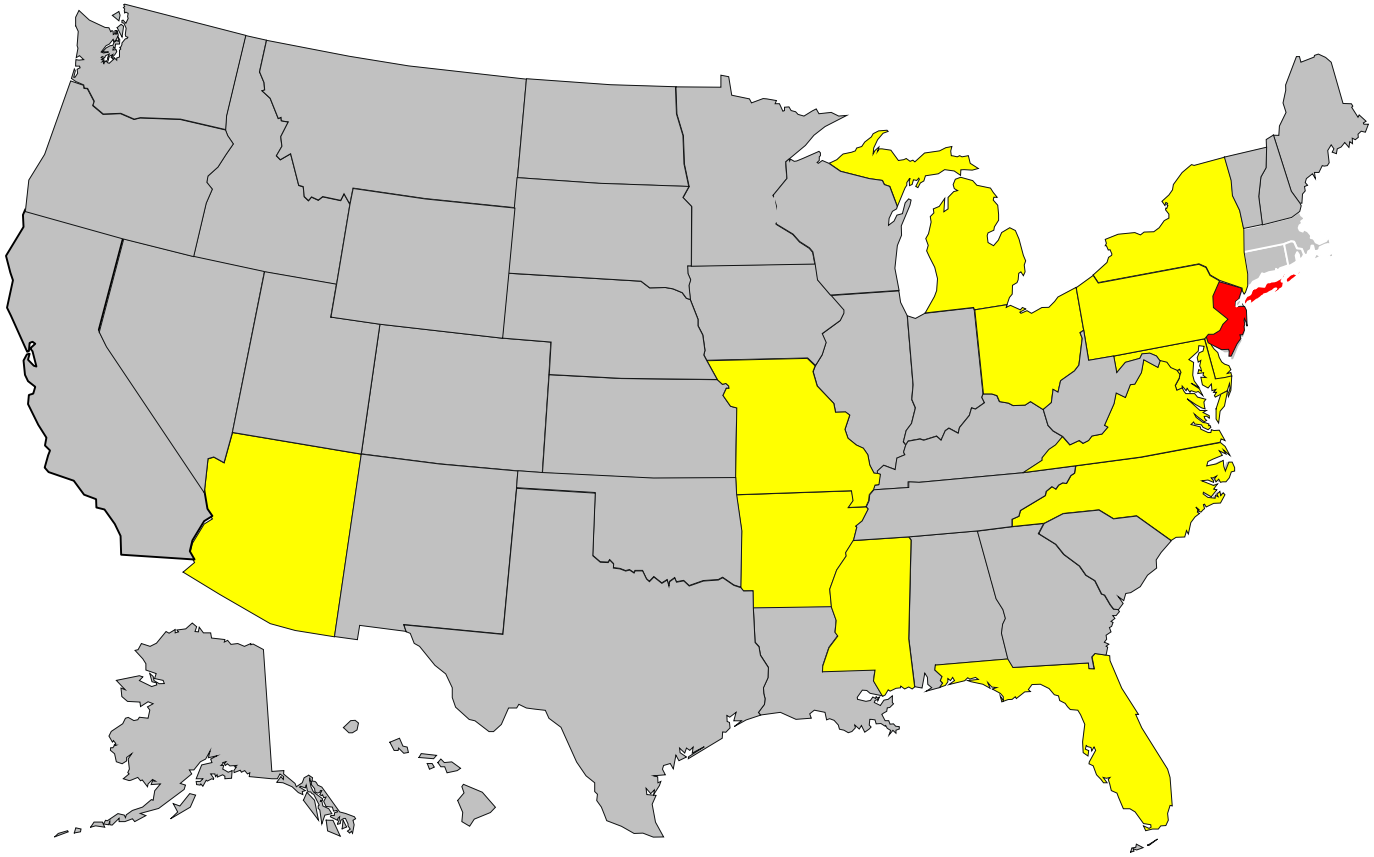
RONALD REAGAN MEDICAL CENTER

– 520 private patient rooms with capability to transform into intensive care room
– Level 1 trauma center
– 23 operating rooms
– 6 cardiac cath labs
– 8 procedural suites for interventional imaging
– 46 pre- and post-recovery spaces
– Surgical Observation Unit for additional post-operative or post-procedural care

PEOPLE

– Faculty (phys and non-phys): 2,000
– Clinical voluntary faculty : 1,877
– Registered nurses: 3,350
– Residents and fellows: 1,010
– Staff members (therapists, technicians and other staff): 11,476

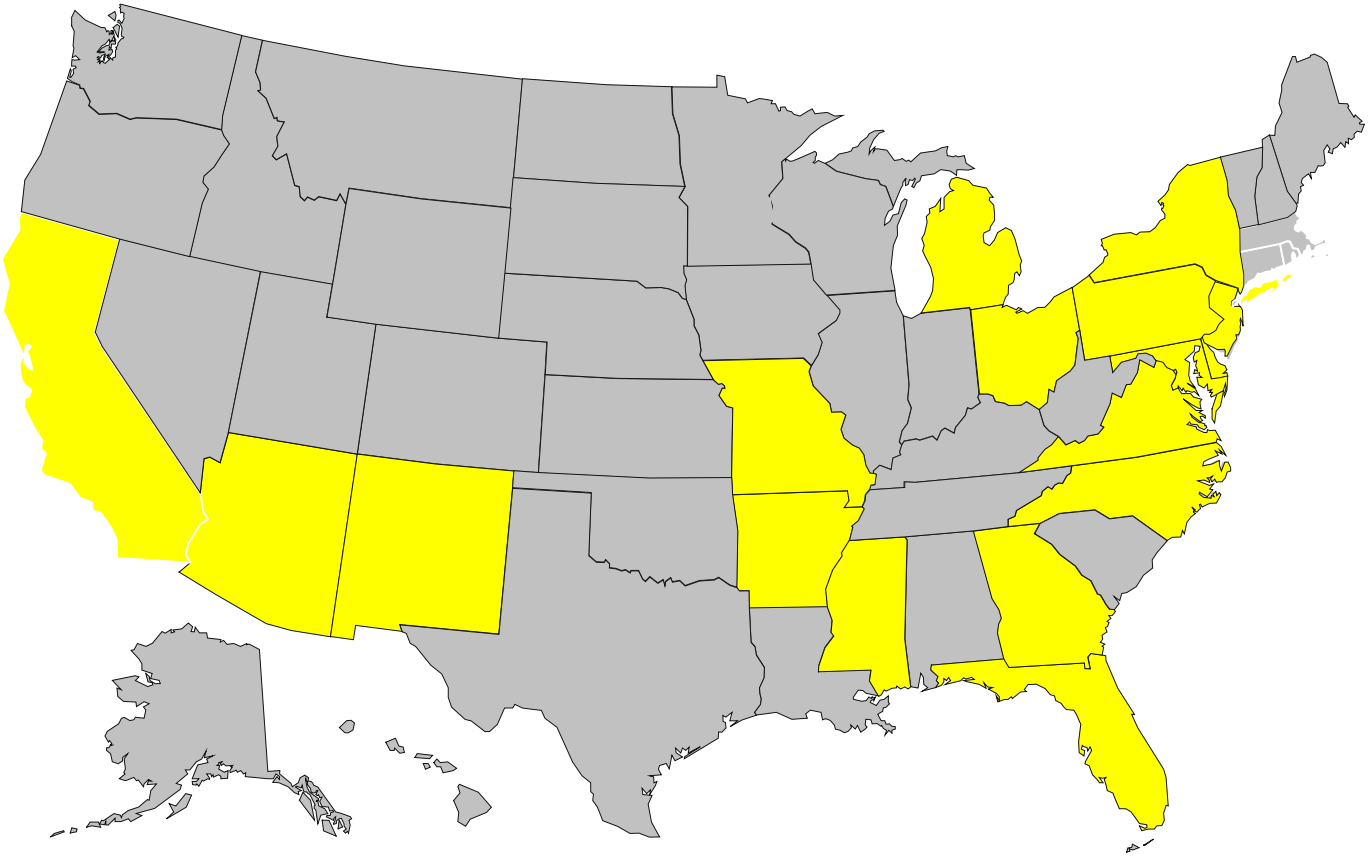
Geography of Carbapenemase producing Enterobacteriaceae



Nov, 2006

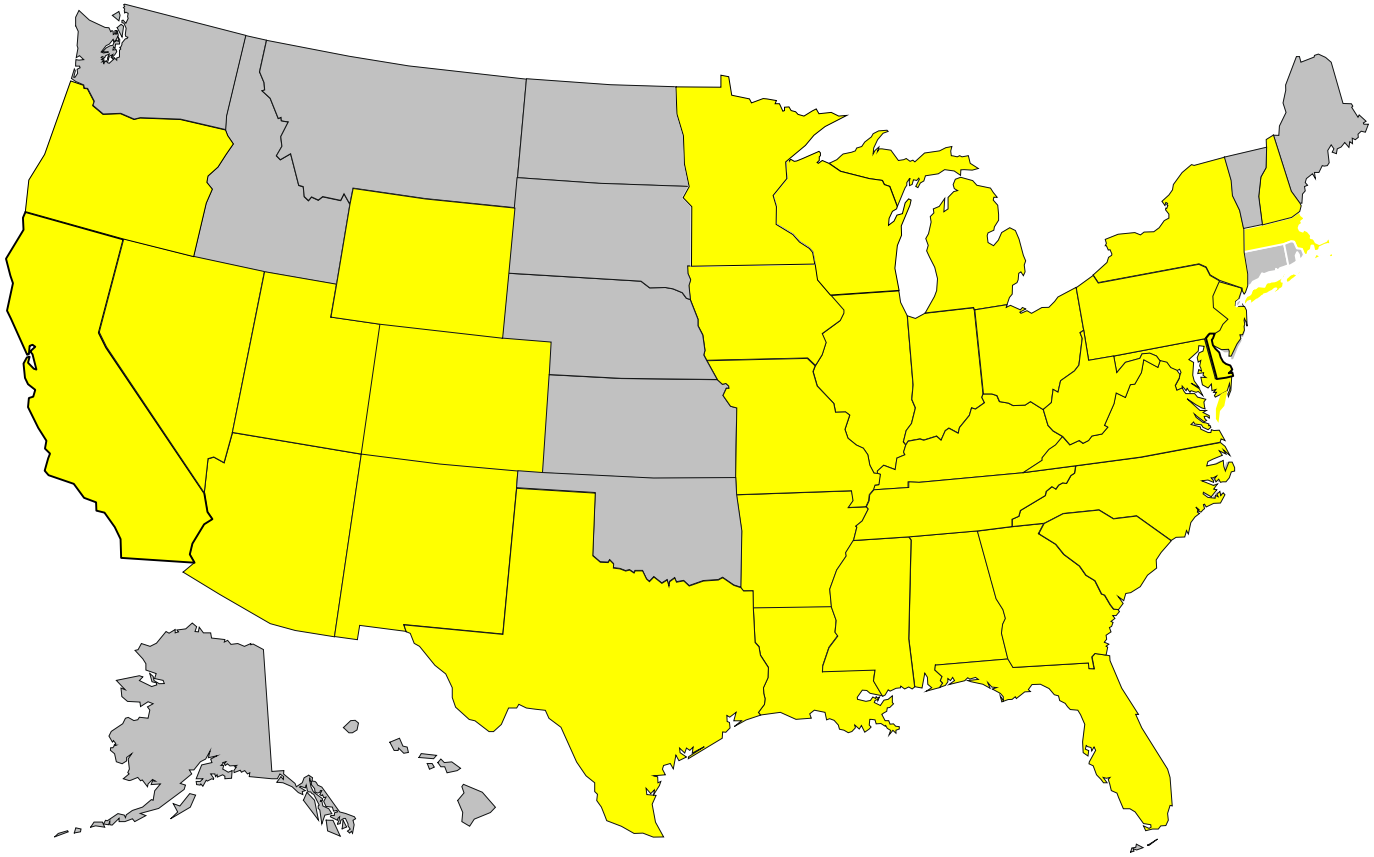
UCLA Health

Geography of Carbapenemase producing Enterobacteriaceae



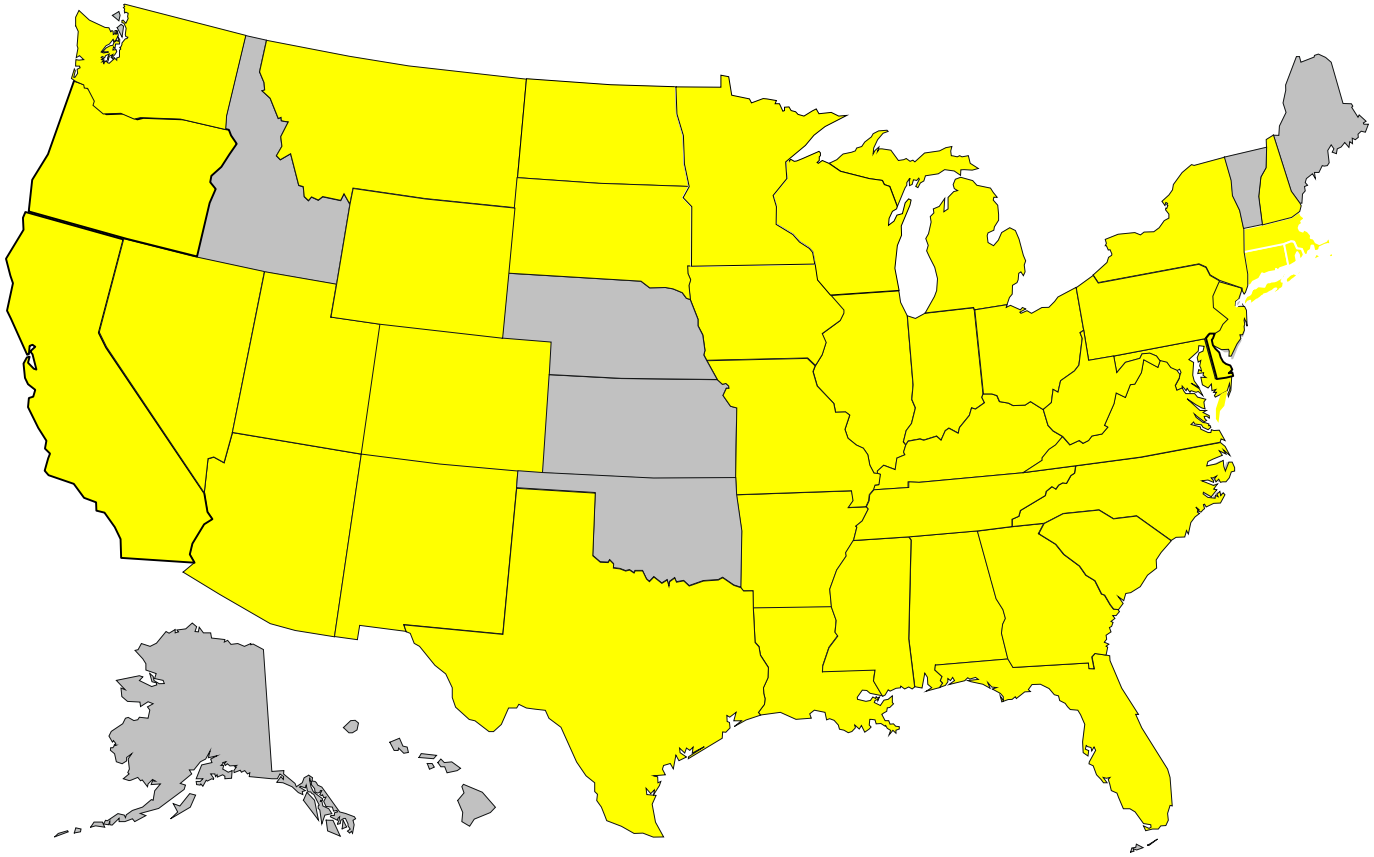
2007

Geography of Carbapenemase producing Enterobacteriaceae



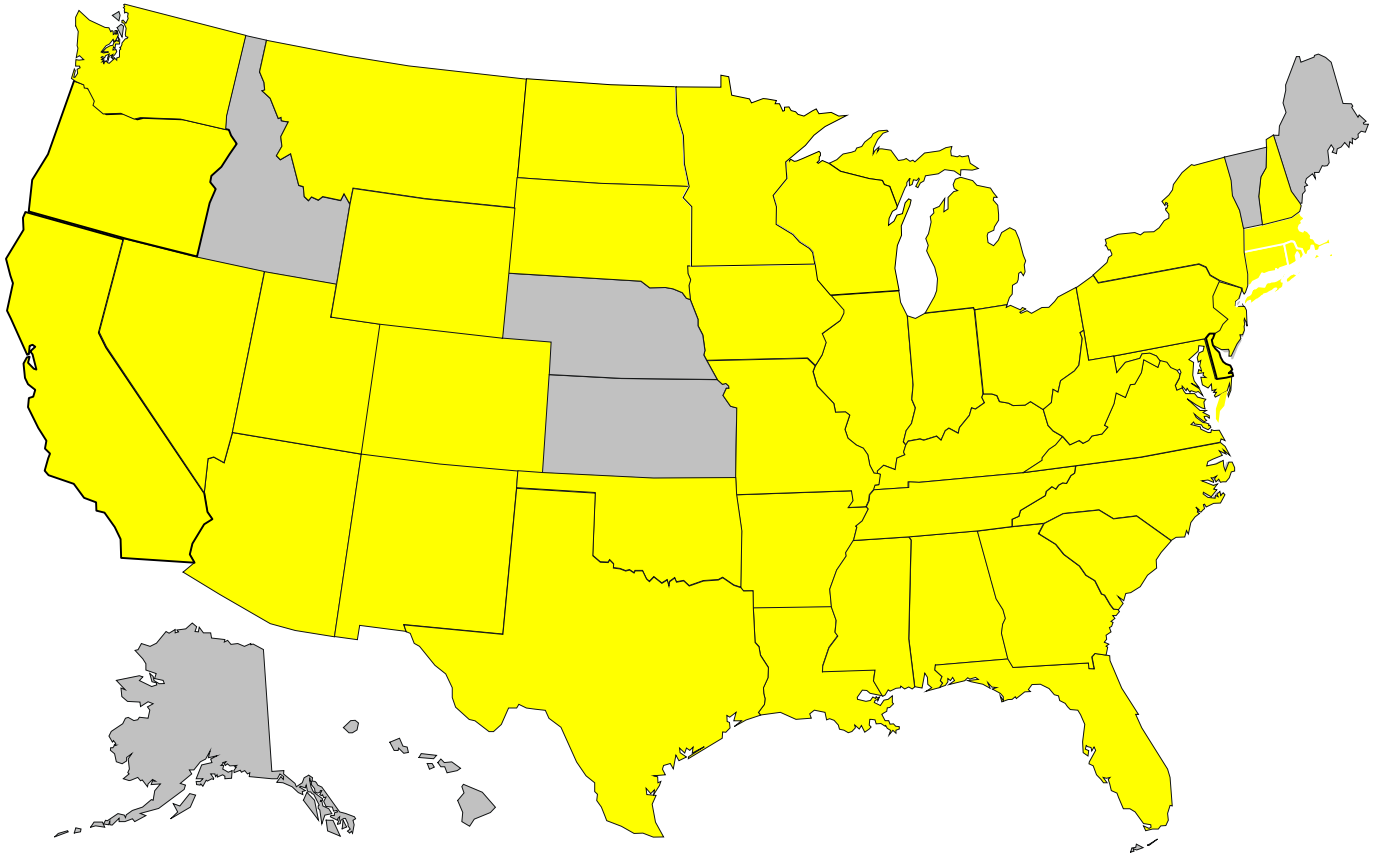
2011

Geography of Carbapenemase producing Enterobacteriaceae



2012

Geography of Carbapenemase producing Enterobacteriaceae



CDC

Current

UCLA Health

Antibiotic are Widely Abused

- *30% of all hospitalized inpatients at any given time receive antibiotics*
  - >60% at UCLA
- 1/3 to 1/2 are inappropriate or unnecessary
- Antimicrobials account for upwards of 30% of hospital pharmacy budgets.
- Inappropriate and excessive use leads to:
  - Resistance, *C. difficile*, increased morbidity, mortality, increased cost, increased litigation

Why so much misuse?

- Fear of inadequate empiric coverage
- High number and complexity of drugs, syndromes, and pathogens
- Poor training in antibiotic use
- Perceived conflict between what is best for a patient and what is best for public health
  - *"Our patients are different…"*

What we set out to accomplish…

Our Team Aim:

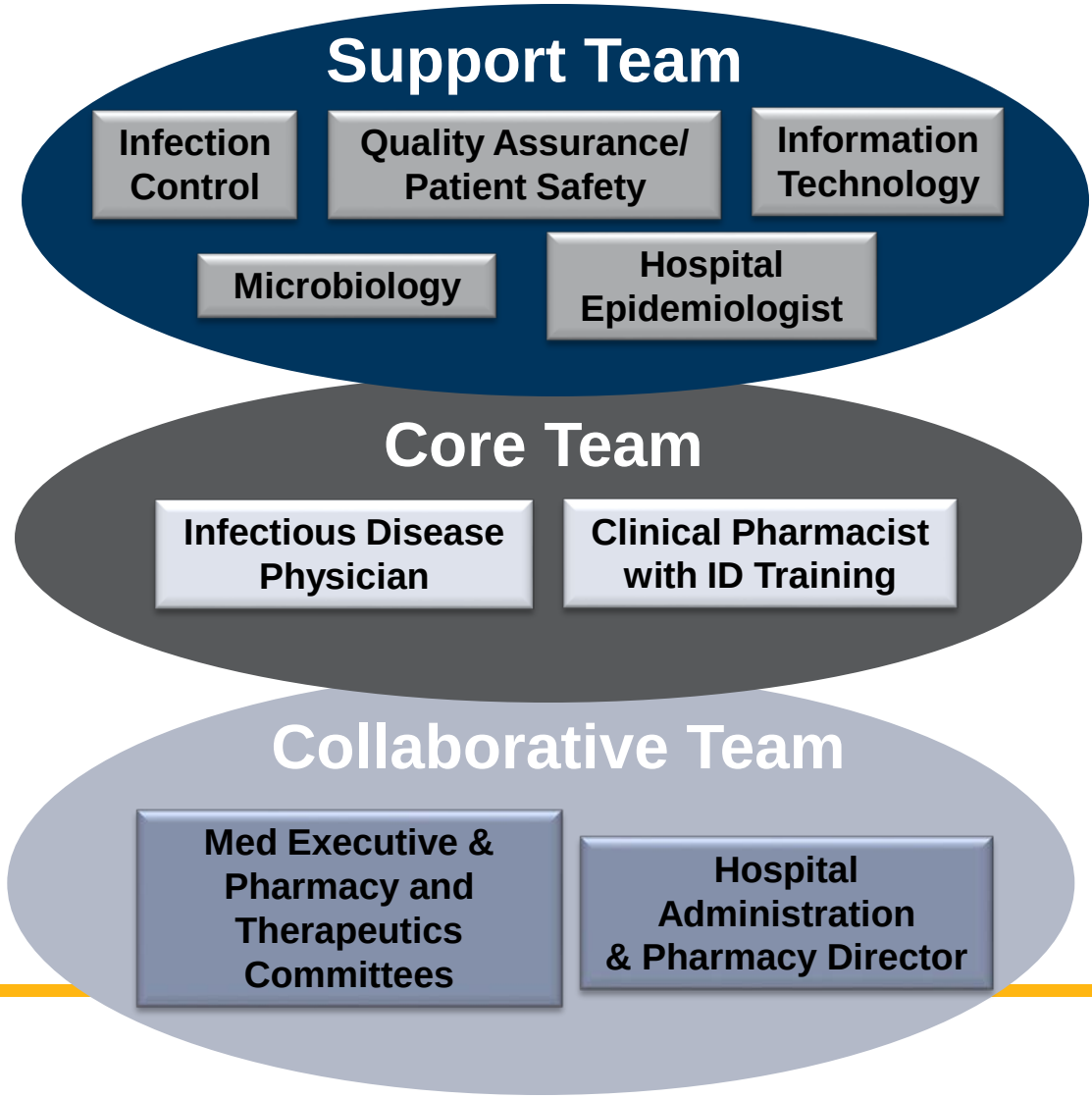
Goal: To promote the appropriate use of antimicrobials** by selecting the appropriate dose, duration and route of administration, to eliminate unnecessary and inappropriate use and to decrease adverse effects of overuse.

**including antifungals

Elevator Speech: We want to get the right antibiotics at the right time for the right length to the right patient. New antibiotics are not being developed, bacteria (and patients) are gaining resistance to the drugs we already have.

Developing an Antimicrobial Stewardship Program: The Core Team and Supporting Stakeholders

- Develop a culture change which embraces prudent antibiotic use
- Identify and gain solid commitment from members of the ASP
- Administrative support is essential
- ASP operates under auspices of the CMO and QA/Safety
- A commanding Chief Medical Officer, Medical Executive Committee, and Pharmacy and Therapeutics Committee enhance the success of an ASP
- Patient safety is linked to antibiotic resistance – make them believe it



UCLA Health

Adequate Opportunities to Exercise Stewardship and Interventions: "The 5 D's"

Select Accurate Empiric Drug Therapy

- Education using antibiograms
- Consensus Guidelines & clinical pathways; clinical decision support tools
- Antibiotic order forms
- Appropriate consideration of combination therapy

Select Dose

- Education using PK/PD concepts
- Consensus Guidelines & clinical pathways; clinical decision support tools
- Antibiotic order forms, especially for prolonged infusions
- Use adequate dose/duration to cure infection & reduce toxicity

De-Escalate

- Education
- Discontinue combinations if not indicated by C&S
- Pathogen-directed therapy based on C&S results
- IV-to-PO therapy

Adequate Duration

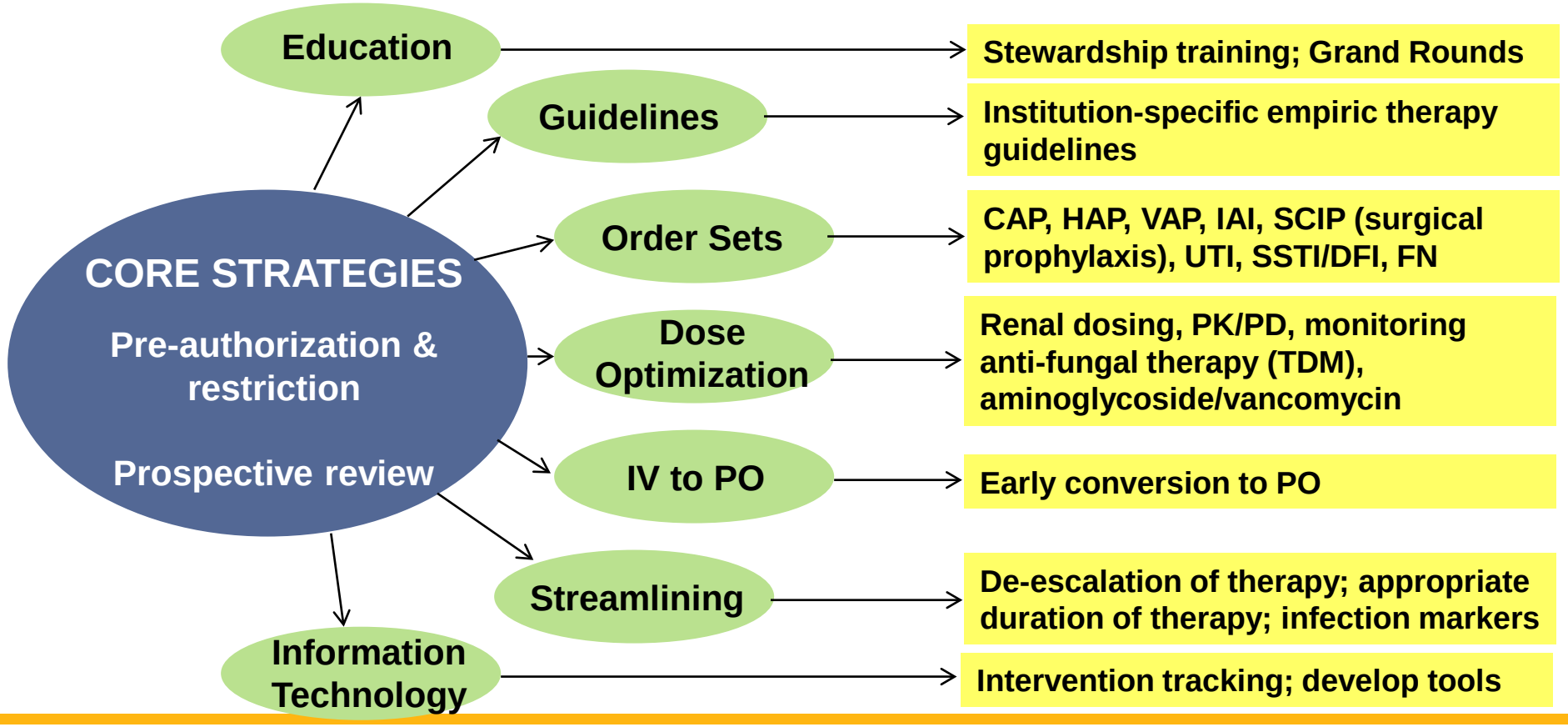
- Education
- Consensus Guidelines & clinical pathways for some infections
- Antibiotic order forms with automatic stop orders
- Clinical decision support tools and computer prompts
- Use adequate dose/duration to cure infection & reduce toxicity

Decreased Potential for Emergence of Resistance

Core Strategies Include a Large Number of Tactics

Definition: Judicious use of antimicrobials in order to improve patients outcomes, control resistance and decrease healthcare expense

Achieved through:



Dellit TH, et al. Clin Infect Dis. 2007;44:159-77

Antibiotic Stewardship Driver Diagram

Timely and appropriate antibiotic utilization in the acute care setting

Decreased incidence of antibiotic-related adverse drug events (ADEs)

Decreased prevalence of antibiotic resistant healthcare-associated pathogens

Decreased incidence of healthcare-associated *C. difficile* infection

Decreased pharmacy cost for antibiotics

Primary Drivers

Secondary Drivers

Timely and appropriate initiation of antibiotics

- Promptly identify patients who require antibiotics
- Obtain cultures prior to starting antibiotics
- Do not give antibiotics with overlapping activity or combinations not supported by evidence or guidelines
- Determine and verify antibiotic allergies and tailor therapy accordingly
- Consider local antibiotic susceptibility patterns in selecting therapy
- Start treatment promptly
- Specify expected duration of therapy based on evidence and national and hospital guidelines

Appropriate administration and de-escalation

- Make antibiotics patient is receiving and start dates visible at point of care
- Give antibiotics at the right dose and interval
- Stop or de-escalate therapy promptly based on the culture and sensitivity results
- Reconcile and adjust antibiotics at all transitions and changes in patient's condition
- Monitor for toxicity reliably and adjust agent and dose promptly

Data monitoring, transparency, and stewardship infrastructure

- Monitor, feedback, and make visible data regarding antibiotic utilization, antibiotic resistance, ADEs, *C. difficile*, cost, and adherence to the organization's recommended culturing and prescribing practices

Availability of expertise at the point of care

- Develop and make available expertise in antibiotic use
- Ensure expertise is available at the point of care

Leadership and Culture

Current Status and Plans for working on the Secondary Drivers

Primary Driver: Appropriate selection, administration and de-escalation	
Secondary Driver	**UCLA**
Local antibiotic susceptibility patterns	**-Prospective audit/feedback** -Online antibiotic handbook with web-app, annual revisions to reflect antibiogram -Increase visibility of antibiogram -Epic Decision Support/Order Sets
Antibiotic allergies and tailor therapy	**-Prospective audit/feedback** -Antibiotic hotline
Do not give abx w/ overlapping activity or unsupported by evidence	**-Prospective audit/feedback** -Epic antimicrobial dosing -Online antibiotic handbook with web-app
Abx at right dose and interval	**-Prospective audit/feedback** -Epic antimicrobial dosing -Vanc/AG dosing per pharmacy

Current Status and Plans for working on the Secondary Drivers

Primary Driver: Continued	
Secondary Driver	**UCLA**
Stop or de-escalate therapy promptly based on culture/sensitivity results	**-Prospective audit/feedback** -Blood culture monitoring for drug/bug mismatches
Monitor & adjust at all transitions and changes in patient's condition	-Vanc/AG monitoring per pharmacy -Hospitalist outreach
Monitor for toxicity reliably and adjust agent/dose promptly	-Vanc/AG monitoring per pharmacy **-Prospective audit/feedback**

Current Status and Plans for working on the Secondary Drivers

Primary Driver: Data Monitoring and Transparency	
Secondary Driver	**UCLA status/plans**
Monitor, feedback and make visible data regarding abx utilization, abx resistance, ADEs, *C. difficile*, cost and adherence to the organization's recommended culturing and prescribing practices	-**Prospective audit with concurrent review and feedback** -Participation in Infection Control, Clinical Effectiveness Committees -Standardize MD protocols and pathways -Surveillance and reporting of antimicrobial utilization -Academic detailing -Get Smart About Antibiotics Week (CME, Nov 19th) -Housestaff education curriculum -Education and marketing campaign (see posters)

Current Status and Plans for working on the Secondary Drivers

Primary Driver: Availability of expertise at the point of care	
Secondary Driver	**UCLA status/plans**
Develop and make available expertise in pharmacology and antimicrobial spectrum and activity	-Get Smart About Antibiotics, including CME course (November 19, 2011) -ASP website with resources -Online antibiotic handbook with web-app -Working with Epic team to develop Abx link and information at point of care -ASP Hotline -Vancomycin/AG dosing per pharmacy protocol
Ensure expertise is available to clinicians at the point of care	-ASP Hotline -Website/handbook -Academic detailing -Educational curriculum

Barriers to Implementation

- Economic
  - Program costs money (funding for an ID pharmacist, ID physician, data analyst; space)
  - Program does not generate revenue
- Philosophic
  - Prescribers must accept that a 3rd party will be involved in decisions made about their patients
  - Institution must support this principle
- Administrative
  - Coordination of several groups required (e.g. hospital leadership, pharmacy, infectious diseases division, microbiology, etc.)

Economic Issues

- Few people can put together a plan on paper that provides an economic reason for a stewardship program
- Danger of basing case for a stewardship on plan for saving money
  - Takes a while to happen
  - Continuous cost reduction not possible
  - Cost-shifting may not be meaningful to the bottom line of departments
- The economic impact of a program on ID consultation requests

Philosophic Issues

- Must assess the climate at the institution to determine optimal approaches to getting physician buy-in
- Reframe goals—many physicians respond poorly to the construct of saving money for the greater good
  - Limit antibiotic resistance
  - Limit antimicrobial toxicity
  - Optimize patient care and safety
  - Education
  - My patients are different

Philosophic Issues

- Common approach has been to identify leaders who buy-in to the concept and influence their own
  - Champion in administration
  - Champion in departments (e.g. surgery, OB)
- Very physician-oriented
- Approach may be different in teaching vs. non-teaching environment
- Others who should be involved in changing the philosophy of antimicrobial use
  - Nursing, non-ID pharmacists, hospitalists

Making the Business Case for Antimicrobial Stewardship

- Quality of care
- Core measures/regulatory issues
- Reimbursement (lack of) for healthcare associated infections
- Antimicrobial resistance
- *Cost*

EDUCATION

RESOURCES

FEEDBACK

ASP Implementation Prioritization 2011

Effort x Impact Matrix

These recommendations have been categorized by impact and amount of effort for implementation. Implementation will be completed in three phases: immediate, short-term, and long-term

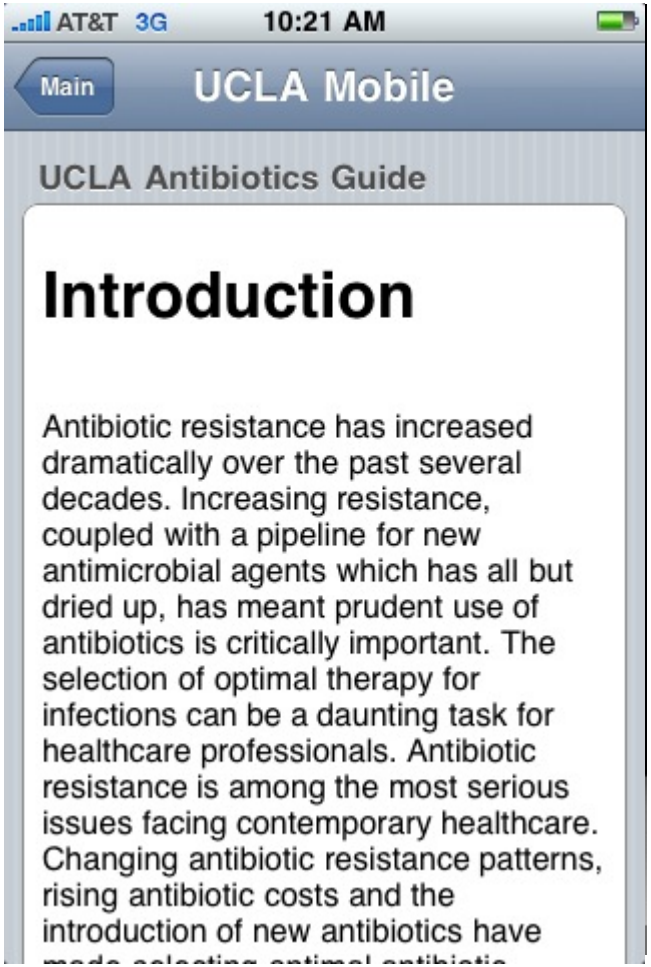
IMPACT: HIGH ↑ LOW

EFFORT: LOW → HIGH

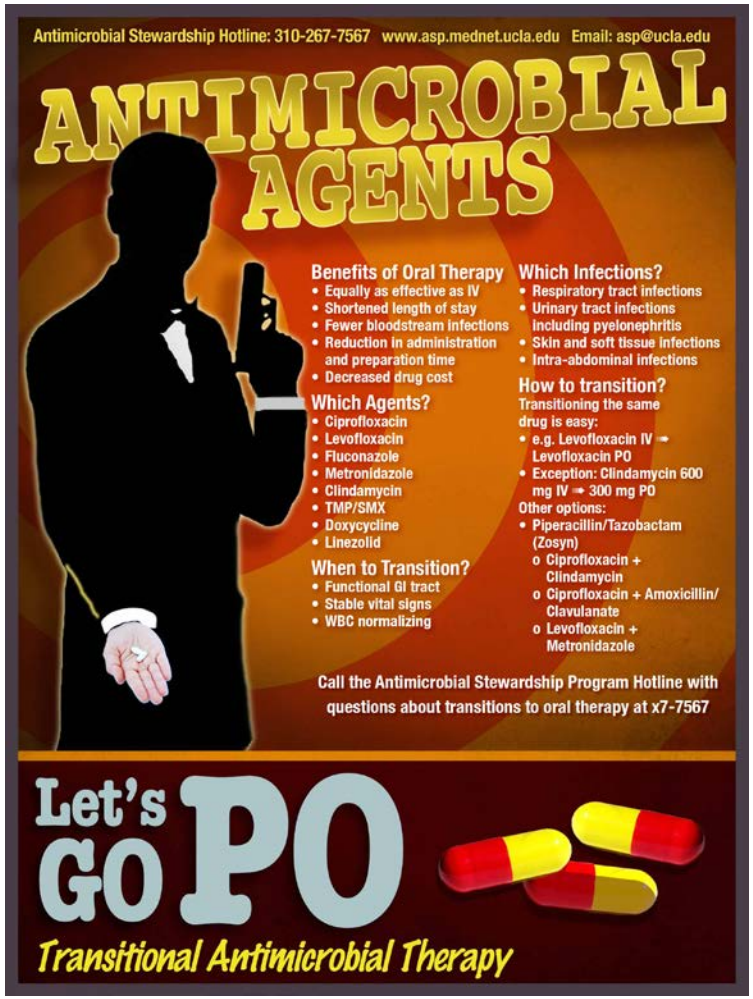
Immediate: • Prospective audit with concurrent review and feedback **Short Term**: • Surveillance and reporting of antimicrobial utilization • Initial formulary restrictions • IV/PO conversion per pharmacy **Long Term**: • Develop health system ASP dashboard	**Immediate**: • Online antibiotic handbook with web-app **Short Term**: • Standardize MD protocols and pathways • Vancomycin/AG dosing per pharmacy protocol **Long Term**: • Novel PD strategies and dose optimization • Evidence-based CareConnect content • CareConnect reporting & BPAs
Immediate: • Education and marketing campaign **Short Term**: • Disease state-specific DUEs • CareConnect antimicrobial dosing • Develop and report outcome measures **Long Term**: • Improve micro lab test utilization • Discharge planning optimization	**Immediate**: • Academic detailing • ASP website with resources **Short Term**: • Get Smart About Antibiotics Week (CME) **Long Term**: • Housestaff education curriculum • Develop physician-based utilization reports for benchmarking • NHSN AUR module

UCLA Health

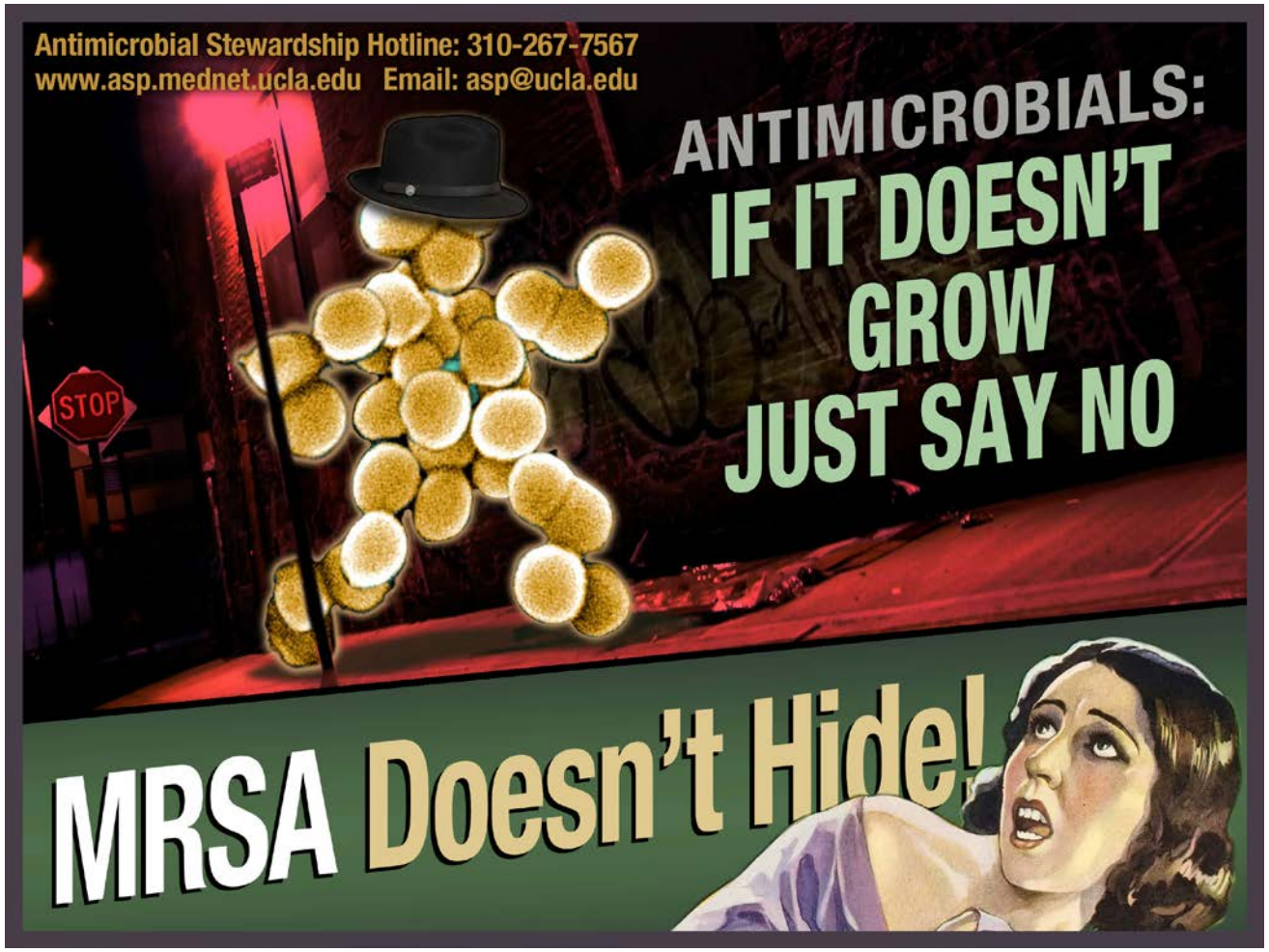
ASP Handbook – Mobile Web App



Education and marketing campaign

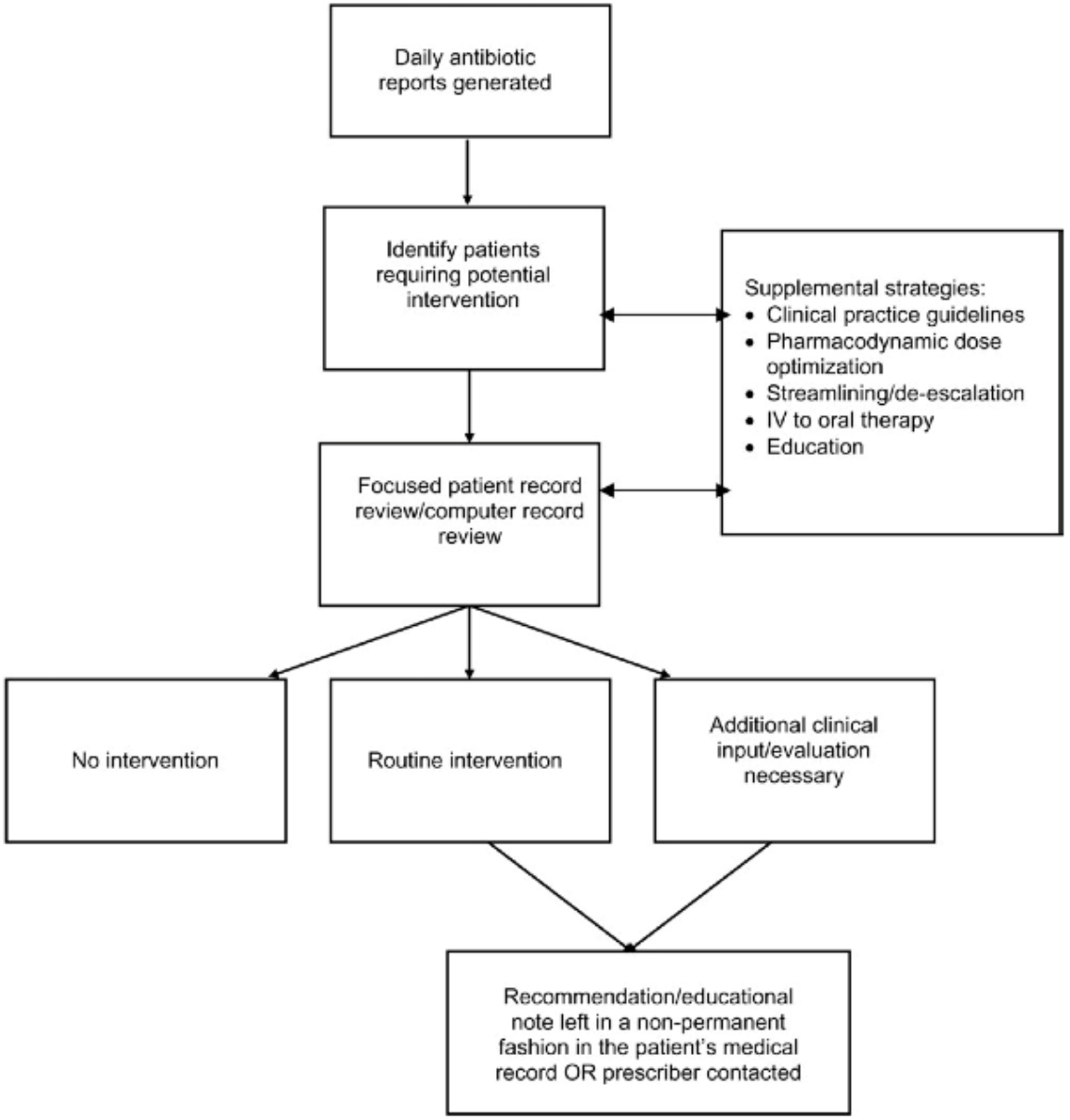


Education and marketing campaign



FEEDBACK

1. Timeliness
   - Monthly (or more frequent) associated with better performance than quarterly or annually
2. Individualization
   - Rather than group or aggregated feedback
3. Lack of punitivity
4. Customizability
   - Feedback deemed meaningful associated with better performance


Daily antibiotic reports generated
Identify patients requiring potential intervention
Supplemental strategies:
• Clinical practice guidelines
• Pharmacodynamic dose optimization
• Streamlining/de-escalation
• IV to oral therapy
• Education
Focused patient record review/computer record review
No intervention
Routine intervention
Additional clinical input/evaluation necessary
Recommendation/educational note left in a non-permanent fashion in the patient's medical record OR prescriber contacted

Types of Interventions

- Streamlining
- Regimen Change
- Drug Addition
- IV to PO
- Dose Change
- Drug Interaction
- ID Consultation
- Surgical Prophylaxis

- Impact Measures:
  - *Decrease Resistance*
  - *Improve Quality*
  - *Decrease Cost*

Data Tracking

- Use existing software/systems to create DOT/1000 Pt days run charts
- Software: Excel (it's free!)
- Information:
  - Antimicrobial start/stop date for each patient
  - Item description (drug)
  - Route
  - Census data

Pharmacy IT

IP or Quality

- Formulas: (see next slide, also free!)

Formulas

Adjusted Start/Stop Times

=IF(D3>D1,D1,D3) **or** =IF(D3<D1,D1,D3)

This corrects the date to the 'adjusted date' to make sure you are only counting days between the particular time period.

Count the days between start/stop times

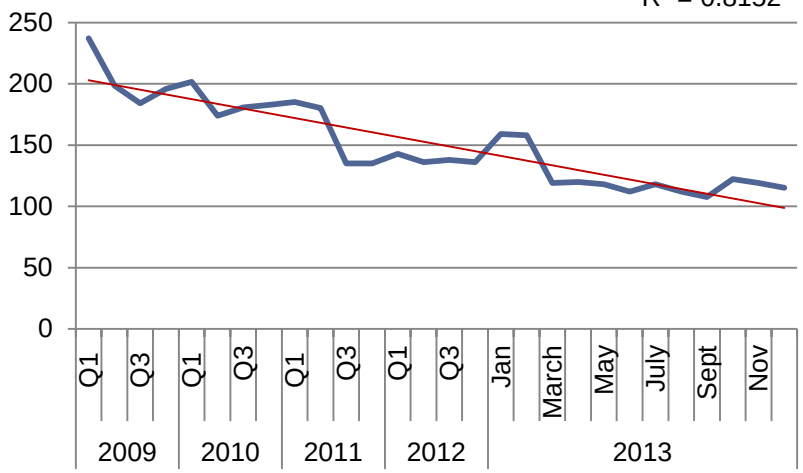
=IF(DAYS360(C3,E3)<1,1,(DAYS360(C3,E3)))

This counts the number of days between two cells. If it is less than 1, it makes it 1. This one can also be adjusted to estimate prophylactic DOT/1000 pt days. If days360<2 then you make it 0.

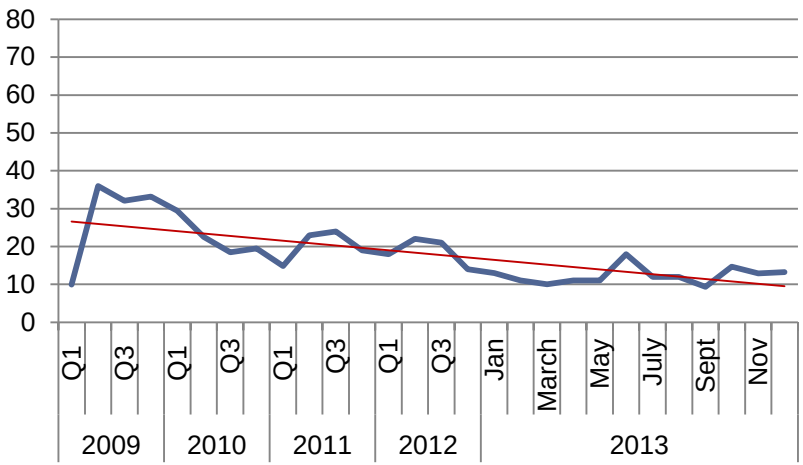
Sum all days of therapy to create total

=sum(C2:C123)

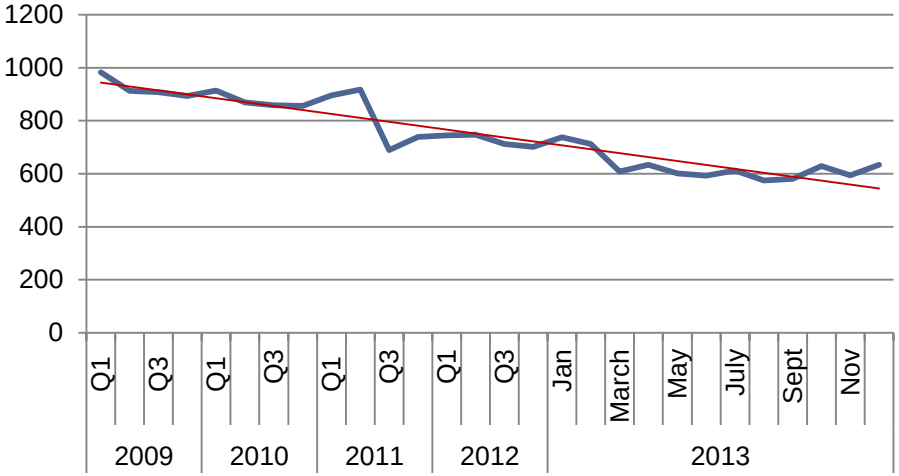
Vancomycin - IV



Daptomycin



Total Antibacterials, Excluding Antifungals



SPEAKER INFORMATION

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Hennepin County
Medical Center

Reducing Anticoagulation ADEs – Hennepin County Medical Center

Haley Holtan, PharmD, BCPS, BCACP
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Hennepin County Medical Center

HCMC

Hennepin County Medical Center

- Safety Net Hospital
- Level 1 Adult & Pediatric Trauma Center
- Major teaching hospital

2013 Statistics

- 455 operating beds
  - Average daily census 348
- >107,000 ED Visits
- >65,000 Ambulance runs
- >537,000 Clinic visits
- >66,000 Poison Center calls

Hennepin County Medical Center

Patient Story – Warfarin/Drug Interaction

- *June 4th - Inpatient admission Dx: asthma exacerbation*
- *Medication list includes warfarin with recent therapeutic INR & prednisone 10 mg daily*
- *Prednisone dose increased (burst of 40 mg daily then a taper)*
- *Augmentin x 10 day initiated*
- *Warfarin monitoring by PharmD*
- *Discharge to home*

Patient readmitted 6/17 for supratherapeutic INR of 7.4

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Patient Story – Warfarin/Drug Interaction

Where the system went wrong:

- *Patient was discharged on PTA dose of warfarin and prednisone taper over 16 days down to dose of prednisone 10 mg daily.*
- *Patient also discharged on Augmentin 875mg BID x 10 days*
- *Possible interaction was not clearly addressed in documentation in either case*
- *No follow-up appointment scheduled with anticoagulation clinic at time of DC*

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Patient Story - Duration of therapy

- *Patient placed on warfarin in 2009*
- *Reason for therapy – unprovoked DVT*
- *Patient seen regularly by anticoagulation clinic*
- *Multiple notes in chart about patient not liking to take warfarin*
- *Inpatient admission due to supratherapeutic INR in 2010 (minor bleed)*

Hennepin County Medical Center

Patient Story - Duration of therapy

- *April 2013, first visit with PharmD in anticoagulation clinic.*
- *Identified: recommended duration of therapy with warfarin was 3-6 months*
- *PCP contacted re: indication for therapy*
- *May 2013, warfarin discontinued*

Estimated cost avoidance: one avoidable hospitalization, 3.5 yrs of warfarin therapy and associated clinic visits, improved patient quality of life, improved patient satisfaction = $$$

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MN Hospital Association

MN Hospital Association (MHA)

- MHA represents 143 hospitals and health systems
- Supply resources, best practices and guidance to provide high quality, affordable service and support to patients
- Partnership for Patients program

Hennepin County Medical Center

Partnership for Patients

- MHA Hospital Engagement Network (HEN)
  - 113 hospitals providing data
  - Total of 10 focus areas
- MHA Road Map to Adverse Drug Event Reduction Program
  - ADE advisory group developed a “road map” based on evidence based best practices focusing on:
    - **Anticoagulants**
    - Hypoglycemics
    - Opioids
- Tool Kit
- Gap Analysis documents

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Tool Kit

- MHA provides Tools Kits to member hospitals. The Anticoagulation Tool Kit includes:
  - CHEST guidelines
  - Joint Commission Sentinel Event Alert #41
  - IHI Anticoagulation Took Kit
  - ISMP Anticoagulation Self Assessment Tool
  - Joint Commission Stroke Document
  - INR Range and Duration sample document
  - Staff Education examples

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Gap Analysis

Anticoagulation Agent Adverse Drug Event Gap Analysis

5 areas addressed:

- Antithrombotic Management Practices
- Warfarin Management Practices
- Parenteral Antithrombotic Management Practices
- Critical Thinking & Knowledge Strategies
- Patient Education

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Gap Analysis

Anticoagulation Agent Adverse Drug Event Gap Analysis:

http://www.mnhospitals.org/Portals/0/Documents/ptsafety/ade/Medication-Safety-Gap-Analysis-Anticoagulation-Agent.pdf

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Gap Analysis Results

- 2012 & 2013 data
  - 43% reduction in events resulting in an INR > 5
  - The hospital with highest compliance achieved 85% of best practices
  - MN hospitals overall were at 78% compliance

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Gap Analysis

All hospitals compliant in the following areas:

- Providers have ready access to inpatient and outpatient laboratory results and drug-drug interaction information
- Blood draws for INR and warfarin dosing occur at the same time each day
- INR is primary laboratory test used to monitor warfarin therapy
- UFHs are available in limited concentrations/vial sizes/prefilled syringes or premade solutions
- PTT drawn no sooner than 6 hours after UFH initiated
- Pharmacists are available to assist with education for any patients at risk of non-compliance

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Gap Analysis

Areas that continue to be difficult to achieve:

- Automatic nutrition consults when patients are placed on warfarin (41%)
- Prior to ordering any heparin product, the facility requires prescribers to specifically ask patients if they have a known history of HIT (31%)
- For initial antithrombotic education for new hires and existing staff, education includes a post-test incorporating a case-study approach (28%) and plans for targeting gaps in knowledge (38%)
- Use of a standardized tool prior to initiating antithrombotics including nutritional status, bleeding associated with previous antithrombotic use, clotting history, and recent trauma (31-55%)
- For critical test results, a defined acceptable length of time between receipt of results and clinically appropriate antithrombotic dose change (52%)

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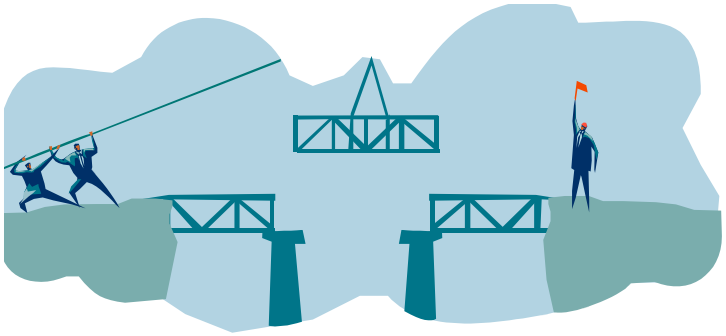
Medical Center

Gap Analysis

How is HCMC doing?



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HCMC Gap Analysis

Areas of high compliance at HCMC:

- Pharmacist dosing of warfarin
- Order sets for all anticoagulants which include baseline labs, dosing, and monitoring
- Guidelines (such as VTE prophylaxis, anticoagulant reversal, surgical holds) frequently imbedded into documentation with Smart text/smart phrase and use of flowsheets
- Building best practices into EHR as defaults
- Use of Smart pumps
- Availability and timing of labs (recently went to bedside barcoding of labs which significantly decreased wrong patient/wrong test errors)

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HCMC Gap Analysis

Areas difficult to achieve:

- Automatic nutrition consults when patients are placed on warfarin
  - Not automatically ordered, dietary follows low Vitamin K menu
- Prior to ordering any heparin product, the facility requires prescribers to specifically ask patients if they have a known history of HIT
  - Difficult to require and control questions asked by each provider
- Use of a standardized tool prior to initiating antithrombotics including nutritional status, bleeding associated with previous antithrombotic use, clotting history, and recent trauma
  - Something that we need to build into EHR
- For critical test results, a defined acceptable length of time between receipt of results and clinically appropriate antithrombotic dose change
  - Time for critical result to be reported is defined, but we have yet to formally define time goal for when to act on the result

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How is our performance?

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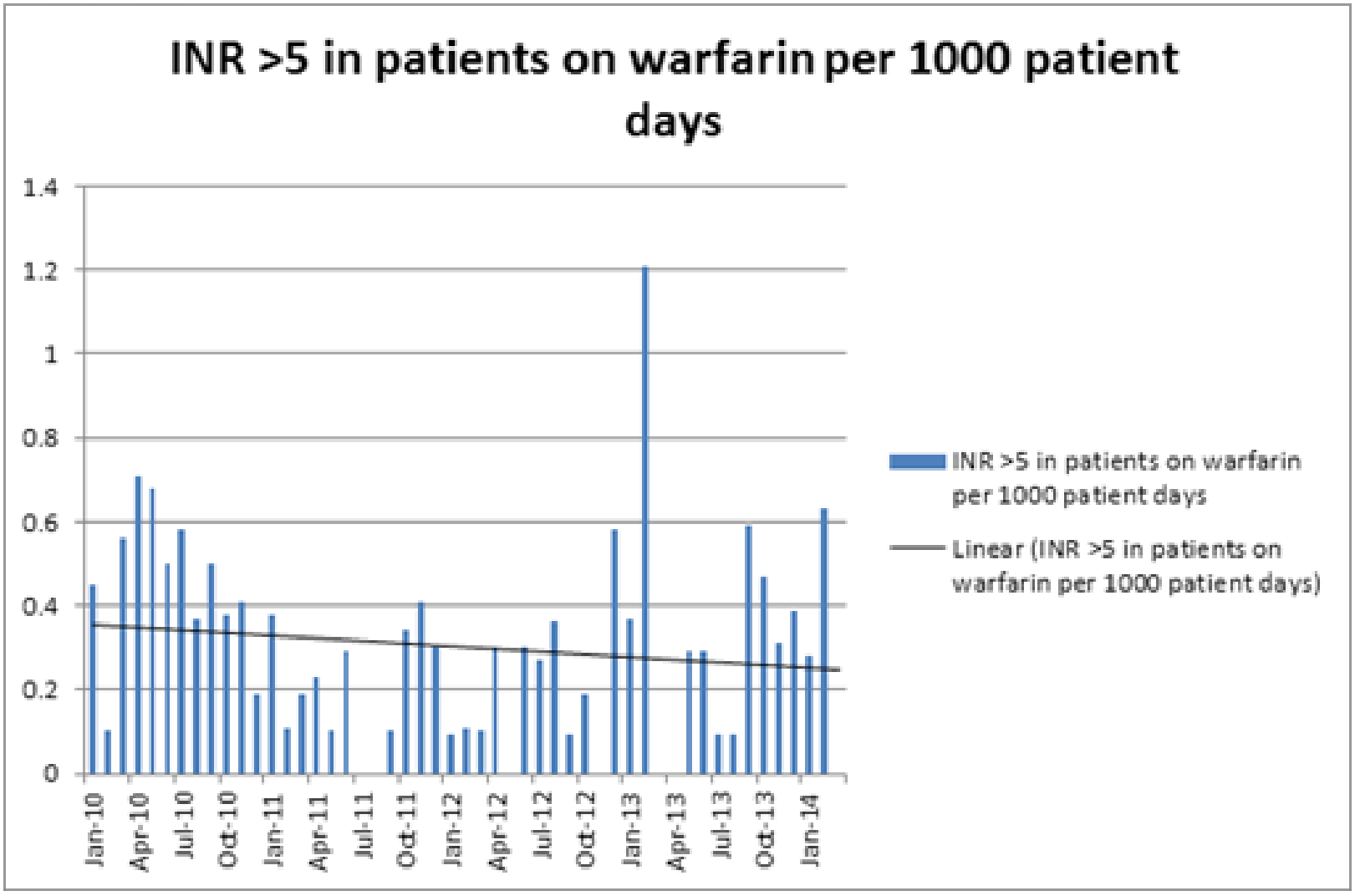
HCMC ADE Data



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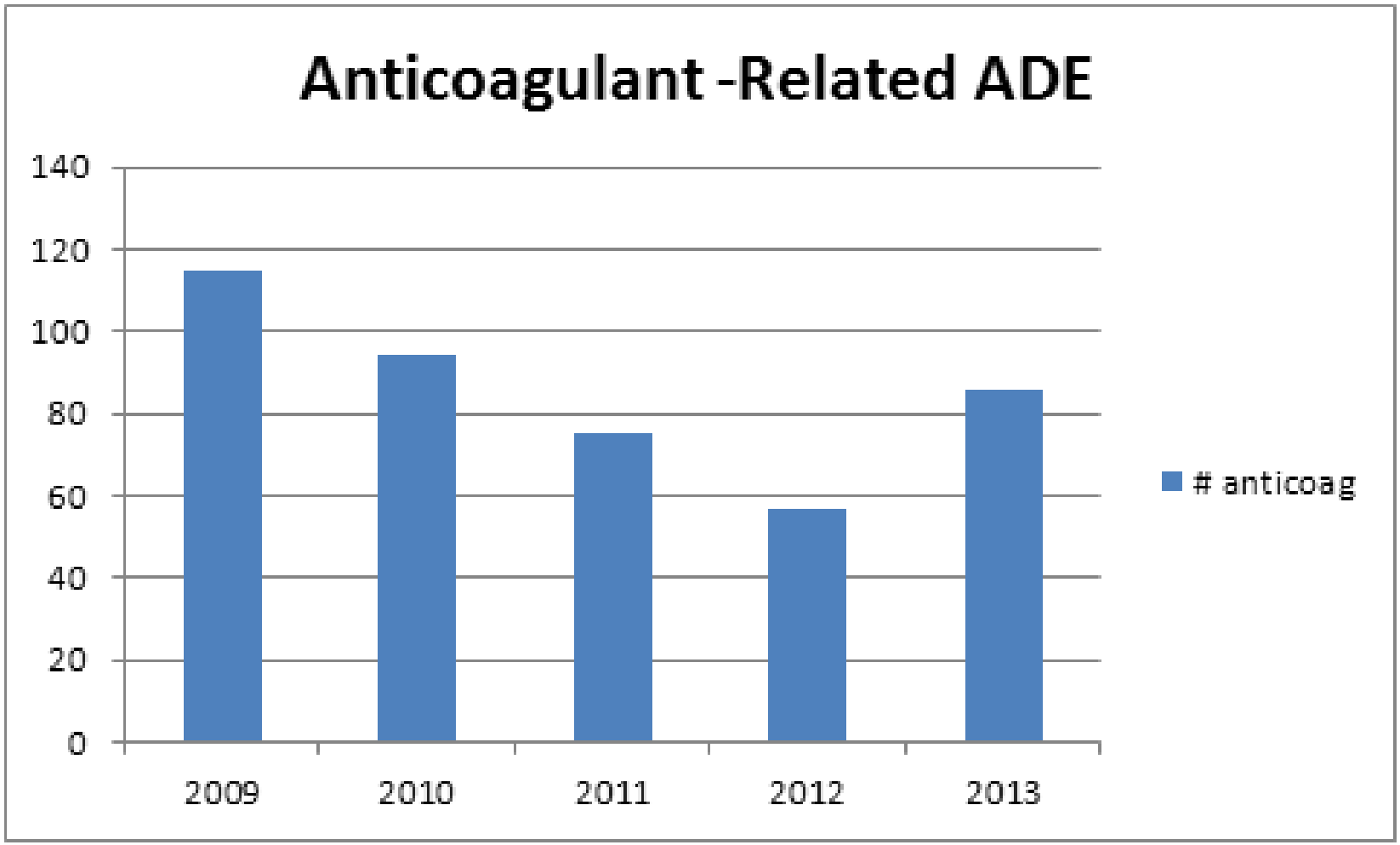
HCMC ADE Data



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Increased use of anticoagulants

Inpatient Only	# warfarin orders	# enoxaparin orders	# heparin SQ orders	# heparin Infusion orders	# dabigatran/ rivaroxiban orders
Q1 2012	1726	1286	2062	283	8/4
Q1 2013	1779	1265	2399	298	10/1
Q1 2014	1903 (10% increase)	1556 (20%)	2286 (11%)	326 (15%)	8/12 (67%)

* Increased use of anticoagulants → increased amount of ADEs

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Why the increase?

Timeline of Events possibly related:

- 2012 VTE core measures work begun
- 2013 VTE order sets added
- 2013 All clinical personnel educated on reporting any event (ex. ADEs) – spike in voluntary reporting seen

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What about the patients?

- Enhanced documentation
- Enhanced flowsheet (inpatient and outpatient see/document in same location)
- Collaboration with clinic to ensure patient slots always available for hospital follow-up
- Updated patient education materials (same inpatient/outpatient)
- Updated anticoagulation information on the AVS to include duration of therapy
- Work towards certification of RNs in anticoagulation clinic
- Define stand role of PharmD in outpatient anticoagulation management (ex. high risk cases)

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Planned Improvements

- Integration of SMART pumps with EHR
- Formation of Anticoagulation Oversight Committee for improved transitions of care
- Updated patient education materials (same for inpatient/outpatient)
- Updated anticoagulation information on the AVS to include duration of therapy
- Continue to refine the VTE program

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UPCOMING EVENTS

- **Leadership for Safety: Safety and the EHR**
  JUL 10, 2014 AT 12:00 PM EDT

- **Learning New Ways of Communicating**
  AUG 13, 2014 AT 2:00 PM EDT

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