Infection Control in the Deployed Environment

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8 March 2019

Disclosures

- **None**

Objectives

- **Illustrate the importance of infection control, deployed and at home**
- **Review the most resistant and pathogenic bacteria in CENTCOM**
- **Review and remove bias against infection control efforts**
- **Highlight the importance of physician buy-in**

Why did I get into this?

Organized?

Detailed?

Hygienic?

Me

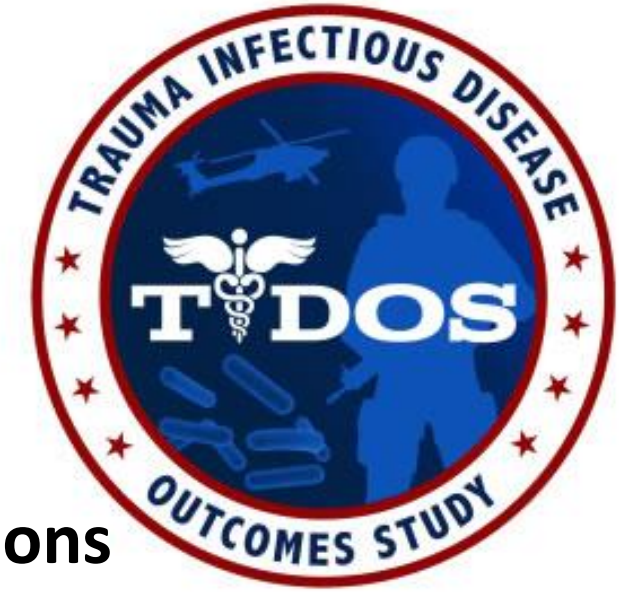
My Patients Were Getting Sick

E1 | Date of Culture

	Diagnosis	First Name	Last Name	Accession Number	Date of Culture	Culture Type	Culture Site	Organism ID	Amox/Clavul	Amp/Sulbac	Ampicillin	Ticar/Clavul	Norfloxacin	Oxacillin	Penicillin	Pip/Tazoba	Aztreonam	Cefazolin	Cefepime	Cefotaxime	Cefotetan	Cefoxitin	Ceftazidime	Ceftriaxone	Cefuroxime	Cephalothin	Ertapenem	Imipenem	Meropenem	Azithromyci	Erythromyci	Amikacin	Gentamicin	Tobramycin	Ciprofloxaci	Gatifloxacin	Levofloxaci	Moxifloxacin	Chloramphe	Clindamycin	Nitrofurantoi	Tetracycline	Trimethopri	Linezolid	Vancomycin	Rifampin
2	Bacteremia	ASHRAF	ANJSHIR	180506 MI 440	05/06/2018	Blood	Arm	baumannii/haemolyticus	R	I	R	R					R	R	R	R	R	R	I	R	R	R	R		R			S	R	S	R		I	R			R	S	R			
3	Bacteremia	TRAUMA	SLIM	180802 MI 814	08/02/2018		Arm	Enterobacter cloacae	R	R	R	R				R	R	R	R	R	R	R	R	R	R	R	R	R	R			R	R	R	R		R	R			R	R	R			
4	Bacteremia	DAH5000	JACK	180915 MI 971	09/15/2018	Blood		Escherichia coli	S	I	R	S				S	R	R	R	R	S	S	R	R	R	R	S	S	S			S	S	S	S		S	S			S	S	S			
5	Bacteremia	LKE0064	ROCK	180707 MI 667	07/07/2018		Blood	Klebsiella pneumoniae	R	R	R	R				R	R	R	R	R	S	S	R	R	R	R	I	S	S			R	R	R	R		R	R			S	S	R			
6	Bacteremia	AHMAD	JAN	180716 MI 720	07/16/2018	Blood	Forearm	Klebsiella pneumoniae	R	R	R	R				R	R	R	R	R	S	S	I	R	R	R	I	S	S			R	R	R	R		R	R			I	S	R			
7	Bacteremia	AHMAD	JAN	180719 MI 736	07/19/2018	Blood	Blood	Klebsiella pneumoniae	R	R	R	R				R	R	R	R	R	S	S	I	R	R	R	I	S	S			R	R	R	R		R	R			S	S	R			
8	Bacteremia	ROCK	LKE0064	180707 MI 667	07/07/2018	Blood	Blood	Klebsiella pneumoniae	R	R	R	R				R	R	R	R	R	S	S	R	R	R	R	I	S	S			R	R	R	R		R	R			S	S	R			
9	Bacteremia	ROCK	LKE0064	180710 MI 679	07/10/2018	Blood	Blood	Klebsiella pneumoniae	R	R	R	R				R	R	R	R	R	S	S	I	R	R	R	I	S	S			R	R	R	R		R	R			S	I	R			
10	bacteremia	DASHER	CHA0213	180616 MI 585	06/18/2018	Blood	Blood	Klebsiella pnuemoniae	S	R	R	S				S	R	R	R	R	S	S	R	R	R		S	S	S			S	S	S	S		S	S				S	S			
11	bacteremia	TRAUMA	OHABAT	180701 MI 628	07/01/2018	Blood	Blood	Klebsiella pnuemoniae	R	R	R	R				R	R	R	R	R	R	R	R	R	R		R	R	R			S	R	R	R		R	R				S	R			
12	Bacteremia	KAF6167	NEW	180709 MI 677	07/09/2018		Blood	Staphylococcus haemolyticus	R	R	R		R	R	R			R	R	R				R		R		R		R	I		R		R	R	R		R	R	S	S	R	R		R
13	Bacteruria (coloniz	CHA0220	KITKAT	180820 MI 884	08/20/2018	Urine		Morganella morganii	R	R	R	S				I	S	R	R	R	S	I	S	R	R	R	S	S	S			S	R	R	R		R	R			S	I	R			
14	CAUTI	OLIVER	STCCCC	180517 MI 476	05/17/2018	Urine	Catheter	baumannii/haemolyticus	R	I	R	R					R	R	R	R	R	R	R	R	R	R	R		R			R	R	S	R		R	R			S	S	R			
15	CAUTI	OLIVER	STCCCC	180517 MI 476	05/17/2018	Urine	Catheter	E.Coli	S	S	R	S				S	R	R	R	R	S	S	R	R	R	R	S	S	S			S	S	S	I		S	I			S	R	R			
16	CAUTI	WARRICK	BAF0588	180514 MI 460	5/14/2018	Urine	Clean Catch	K pneumoniae	R	R	R	R				R	R	R	R	R	R	R	R	R	R	R	R	R	R			R	R	R	R		R	R			R	R	R			
17	CAUTI	AHMAD	JAN	180714 MI 708	07/14/2018	Urine	Urine	Klebsiella pneumoniae	R	R	R	R				R	R	R	R	R	S	R	R	R	R	R	R	R				R	R	R	R		R	S			R	S	R			
18	CAUTI	OLIVER	STCCCC	180621 MI 600	06/21/2018	Urine		Klebsiella pnuemoniae	R	R	R	R				R	R	R	R	R	S	S	R	R	R		S	S	S			S	S	R	R		R	R				I	R			
19	CAUTI	CHA0220	KITKAT	180820 MI 884	Urine		Catheter	Morganella morganii	R	R	R	S				I	S	R	R	R	S	I	S	R	R	R	S	S	S			S	R	R	R		R	R			S	I	R			
20	CAUTI	WARRICK	BAF0588	180514 MI 460	05/14/2018	Urine	Clean Catch	Pseudomonas Aeruginosa	R		R	R				S	R	R	R	R	R	R	R	R	R	R	R	R	R			R	R	R	R		R				R	R				
21	CLASBI	QUEEN	LKE0063	180713 MI 700	07/13/2018	Blood	Blood	Escherichia coli	R	R	R	R				R	R	R	R	R	R	R	R	R	R	R	R	R	R			S	S	R	R		R	R			S	R	R			
22	CLASBI	TRAUMA	OHABAT	180701 MI 629	07/01/2018	Blood	Central Line	Klebsiella pneumoniae	R	R	R	S				I	R	R	R	R	S	S	R	R	R		S	S	S			S	R	R	R		R	R				R	R			
23	CLASBI	QUEEN	LKE0063	180721 MI 749	07/21/2018	Blood	Blood	Staphylococcus aureus	R	R	R		R	R	R			R	R	R				R		R		R		R	R		R		R	I	R	S	S	R	S	S	R	S		S
24	CLASBI	NEW	KAF6167	180709 MI 677	07/09/2018	Blood	Blood	Staphylococcus haemolyticus	R	R	R		R	R	R			R	R	R				R		R		R		R	I		R		R	R	R		R	R	S	S	R			R
25	CNS	BAF5066	LIGHT	180802 MI 818	08/02/2018		Brain	Klebsiella pneumoniae	R	R	R	R				R	R	R	R	R	S	S	I	R	R	R	I	S	S			R	R	R	R		R	R			I	S	R			
26	CNS	BAF5066	LIGHT	180802 MI 818	08/02/2018		Brain	Staphylococcus aureus	S	I	R		R	R	R			S	I	S				S		S		S		R	R		S		R	I	R	S	S	S	S	S	R	S		S
27	dysentery	DAVID	ZIELINSKI	180617 MI 587	06/17/2018	Stool		Morganella Morganii	R	I	R	S				S	S	R	S	S	S	S	S	S	R		S	S	S				R	S	S		S	S				R	R			
28	Invasive Candiasis	GUL	JAN	180908 MI 943	09/08/2018	Fluid		Candida Krusei																																						
29	Invasive Candiasis	GUL	JAN	180908 MI 943	09/08/2018	Fluid		Candida species Kefyr																																						
30	MDRO screen	TWK5018	ollsroyce	180808 MI 850	08/08/2018		Surveillance	Citrobacter amalonaticus	S	S	R	S				S	R	R	R	R	S	S	S	R	R	R	S	S	S			S	S	S	R		R	R			S	R	R			
31	MDRO screen	TWK5018	ollsroyce	180808 MI 850	08/08/2018		Surveillance	Stenotrophomonas maltophilia	R	R	R	R					R	R	R	R	R	R	R	R	R	R	R	R	R			R	R	R	I		S	S			R	I	R			
32	SSI	Kleenex	JAF0209	180503 MI 420	05/03/2018	Wound	Arm	Acinetobacter baumannii/haemolyticus	R	I	R	R					R	R	R	R	R	R	R	R	R	R	R		I			R	R	S	R		R	R			R	S	R			
33	SSTI	LKE0063	QUEEN	180806 MI 830	08/06/2018		Thigh	Escherichia coli	R	S	R	I				S	I	S	I	R	S	I	R	S	R	S	S	R	R			S	S	S	R		R	R			S	S	R			
34	SSTI	KHISRAW	SILKY	180907 MI 941	09/07/2018	Wound		Pseudomonas aeruginosa	R	R	R	R				S	R	R	R	R	R	R	R	R	R	R	R	S	S			S	R	R	S		S				R	R	R			
35	SSTI	BAF0573	HODOR	180728 MI 787	07/28/2018		Chin	Serratia marcescens	R	R	R	S				S	R	R	R	R	S	S	S	R	R	R	S	S	S			S	R	R	S		S	S			I		R			
36	SSTI	MILLAR	MICHAEL	180827 MI 902	08/27/2018	Swab		Staphylococcus aureus	R	R	R		S	R	R			R	R	R				R		R		R		R	R		S		S	S	S	S	S	S	S	S	S	S	S	S
37	SSTI	LKE0063	QUEEN	180806 MI 830	08/06/2018		Thigh	Escherichia coli	R	R	R	R				R	R	R	R	R	R	R	R	R	R	R	R	R	R			S	R	R	R		R	R			S	R	R			
38	SSTI Cellulitis	MILLAR	MICHAEL	180827 MI 902	Swab		Arm	Staphylococcus aureus	R	R	R		S	R	R			R	R	R				R		R		R		R	R		S		S	S	S	S	S	S	S	S	S	S	S	S
39	SSTI Deep infx	QUEEN	LKE0063	180709 MI 676	07/09/2018	Wound	Buttock	Citrobacter freundii	R	R	R	R				I	R	R	R	R	S	R	R	R	R	R	S	S	S			S	S	R	R		R	R			S	R	R			
40	SSTI Deep infx	QUEEN	LKE0063	180709 MI 675	07/09/2018	Wound	Thigh	Enterococcus faecalis	S	S	I		S	R	I	S		R	R	R				R		R		S			S				S	S	S	S	S	R	S	S	S	S		S
41	SSTI Deep infx	QUEEN	LKE0063	180709 MI 676	07/09/2018	Wound	Buttock	Escherichia coli	R	R	R	R				R	R	R	R	R	S	S		R	R	R	S	S	S			I	I	R	R		R	R			S	R	R			
42	SSTI Deep infx	QUEEN	LKE0063	180710 MI 689	07/10/2018	Wound	Thigh	Escherichia coli	R	R	R	R				S	I	R	R	R	S	S	I	R	R	R	S	S	S			S	S	S	S		S	S			S	R	R			
43	SSTI Deep infx	QUEEN	LKE0063	180710 MI 689	07/10/2018	Wound	Thigh	Escherichia coli	R	R	R	R				S	I	R	R	R	S	S	I	R	R	R	S	S	S			S	I	R	R		R	R			S	R	R			
44	SSTI Deep infx	QUEEN	LKE0063	180709 MI 676	07/09/2018	Wound	Buttock	Pseudomonas aeruginosa	R	R	R	S				S	S	R	S	R	R	R	S	R	R	R	R	S	S			S	S	S	S		S				R	R	R			
45	SSTI stump	TWK5018	ollsroyce	180810 MI 860	08/10/2018		Wound	Acinetobacter baumannii/haemoly	R	R	R	R					R	R	R	R	R	R	R	R	R	R	R		R			R	R	R	R		R	R			R	R	R			
46	SSTI Stump	LKE0063	QUEEN	180728 MI 783	07/28/2018		Amputation Site	Escherichia coli	R	R	R	R				R	R	R	R	R	S	S	R	R	R	R	S	S	S			S	R	R	R		R	R			S	R	R			
47	SSTI Stump	LKE0063	QUEEN	180728 MI 783	07/28/2018		Amputation Site	Staphylococcus aureus	R	I	R		R	R	R			R	R	R				R		R		R		R	R		R		R	I	R	S	S	R	S	S	R	S		S
48	SSTI Stump	TWK5018	ollsroyce	180810 MI 859	08/10/2018		Wound	Stenotrophomonas maltophilia	R	R	R	R					R	R	R	R	R	R	R	R	R	R	R	R	R			R	R	R	I		S	S			R	I	S			
49	Stump infx	Indian	JAF0207	180504 MI 429	05/04/2018	Wound	Amputation Site	Acinetobacter baumannii/haemolyticus	R	R	R	R					R	R	R	R	R	R	R	R	R	R	R		R			R	R	S	R		R	R			R	R	R			
50	Stump infx	DASHER	CHA0213	180617 MI 588	06/17/2018	Wound	Leg	Leclercia adecarboxylata	S	S	R	S				S	I	R	R	R	S	S	S	R	R		S	S	S			S	S	S	S		S	S				S	S			

How Did We Get Here?

Background

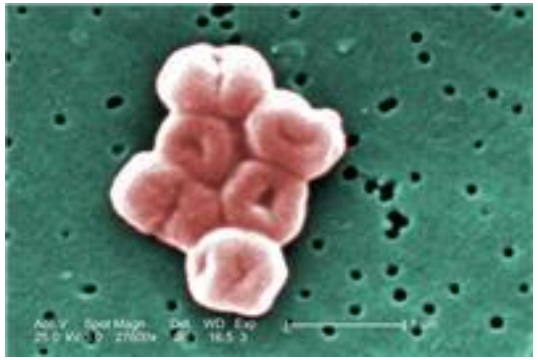


- **US Forces in SW Asia/Middle East, 2002-present**
- **Improved survival = increase complications, infections**
- **Trauma Infectious Disease Outcomes Study (TIDOS)**
  - **June-Aug 2009, Military Hospitals in Germany and US**
  - **27% infected overall, 50% if ICU**
    - **SSTI, Bacteremia, Osteo, PNA, Intraabdominal, Sepsis, CNS**

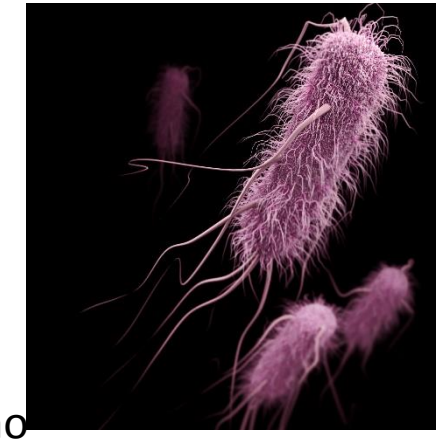
Background

- **Isolates:**
  - **Acinetobacter Baumanii Complex (ABC)**
  - **Escherichia Coli (E. Coli)**
  - **Klebsiella Pneumonia (K. Pneumo)**
  - **Pseudomonas Aeruginosa**
  - **Coag-neg Staph**
  - **Enterobacter**
  - **Staph Aureus**
  - **Candida**
  - **Bacteroides**

ABC

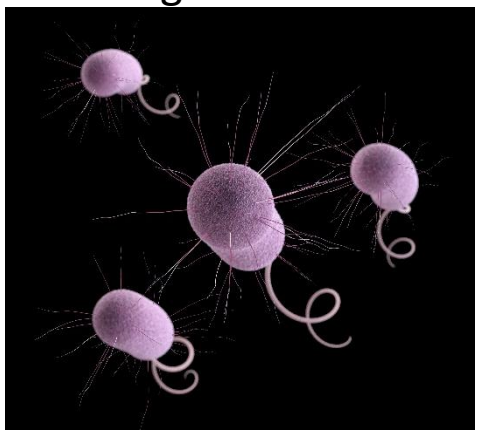


E. Coli



K. Pneumo

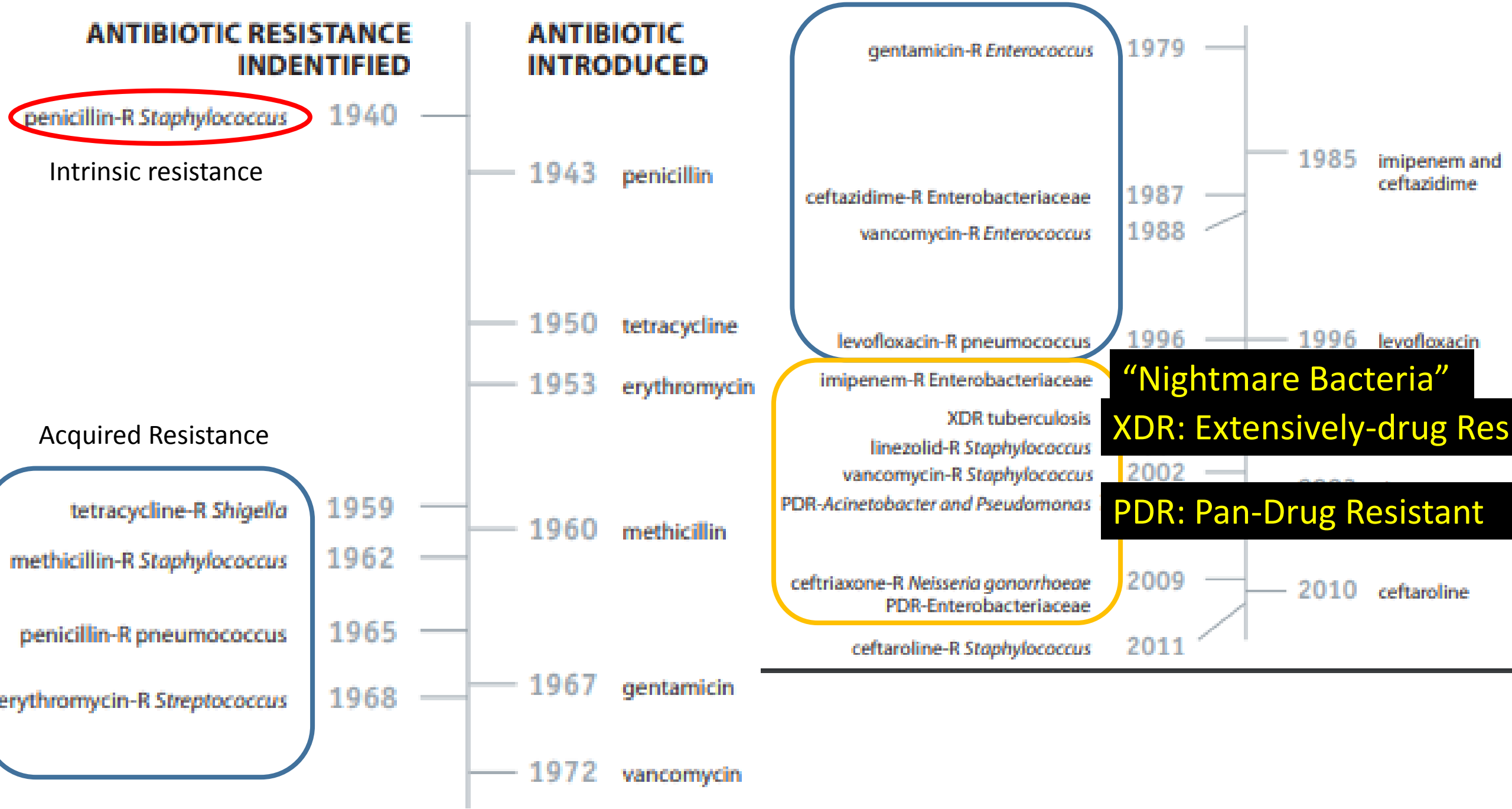
P. Aeruginosa



Biggest Threats and Data. Center for Disease Control and Prevention. Updated Nov 2018. Accessed 24 Feb 2019. https://www.cdc.gov/drugresistance/biggest_threats.html#cre

Micro Review

- Classification: Gram Negative Bacilli (GNBs)
  - Enterobacteriacea: E. coli, K. pneumo, Enterobacter
  - Pseudomonas aeruginosa
  - Acinetobacter baumanii: “Iraqibacter”
- Syndromes:
  - Pneumonia (VAP)
  - UTI (CAUTI)
  - Bacteremia (CLASBI)
  - Wound infection (SSI)
  - Meningitis


ANTIBIOTIC RESISTANCE INDENTIFIED
ANTIBIOTIC INTRODUCED
penicillin-R Staphylococcus
1940
Intrinsic resistance
1943
penicillin
1950
tetracycline
1953
erythromycin
Acquired Resistance
tetracycline-R Shigella
1959
1960
methicillin
methicillin-R Staphylococcus
1962
penicillin-R pneumococcus
1965
erythromycin-R Streptococcus
1968
1967
gentamicin
1972
vancomycin
gentamicin-R Enterococcus
1979
1985
imipenem and ceftazidime
ceftazidime-R Enterobacteriaceae
1987
vancomycin-R Enterococcus
1988
levofloxacin-R pneumococcus
1996
1996
levofloxacin
imipenem-R Enterobacteriaceae
XDR tuberculosis
linezolid-R Staphylococcus
vancomycin-R Staphylococcus
2002
PDR-Acinetobacter and Pseudomonas
ceftriaxone-R Neisseria gonorrhoeae
PDR-Enterobacteriaceae
2009
2010
ceftaroline
ceftaroline-R Staphylococcus
2011
“Nightmare Bacteria”
XDR: Extensively-drug Res
PDR: Pan-Drug Resistant

Micro Review:Definitions

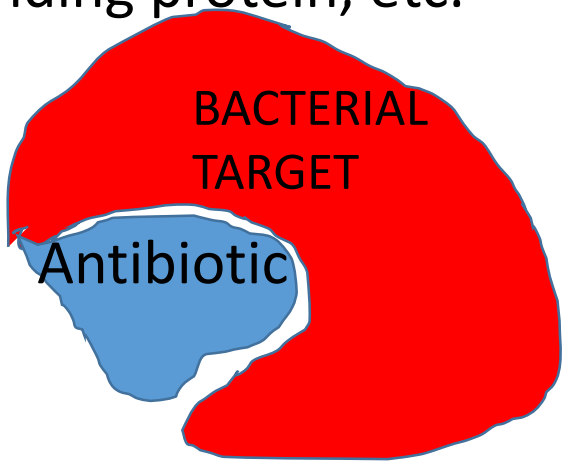
- Multidrug resistant organism (MDRO):
  - Resistance to >=3 classes of antibiotics or
  - Extended Spectrum B-lactamase (ESBL) or
  - Klebsiella Pneumonia Carbapenemase (KPC) or
  - Vancomycin Resistant Enterococcus (VRE) or
  - Methicillin Resistant Staph Aureus (MRSA)
- Extensively Drug Resistant (XDR):
  - Resistant to 1 agent in ALL but 2 or fewer categories of antibiotics
- Pan Drug Resistant (PDR):
  - Resistant to ALL antibiotics in ALL classes

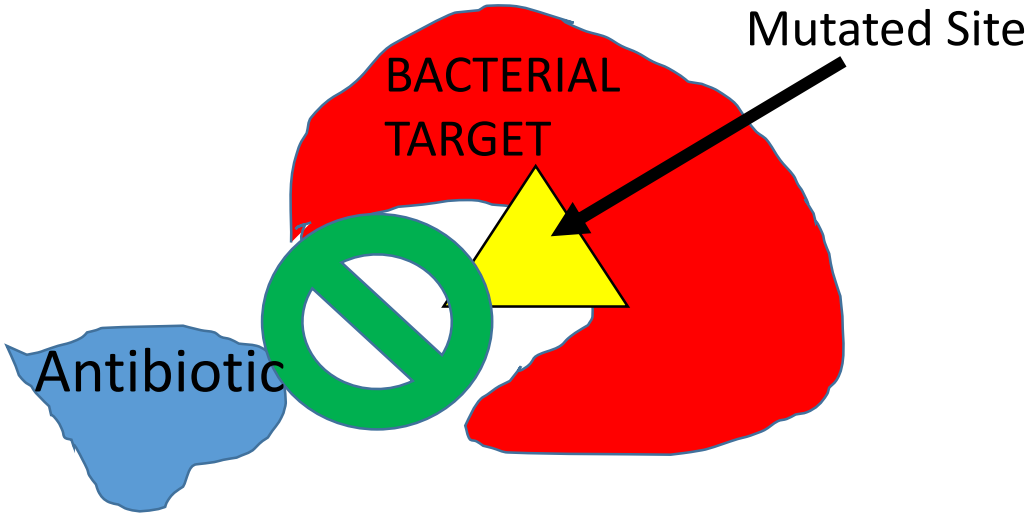
Magiorakos AP, et al. Clin Microbiol Infect. 2012 Mar;18(3):268-81

Antimicrobial Resistance

- **Loss of drug target**
- Prevented access to target
- Efflux of antibiotic
- Inactivation of antibiotic with enzyme

Target: DNA, RNA, penicillin-binding protein, etc.





Munita JM, Arias CA. Microbiol Spectr. 2016 April; 4(2): doi:10.1128

Antimicrobial Resistance

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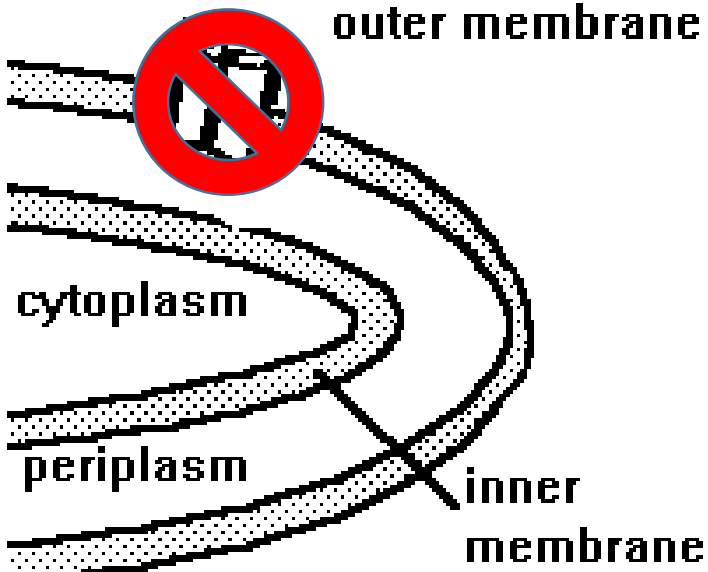

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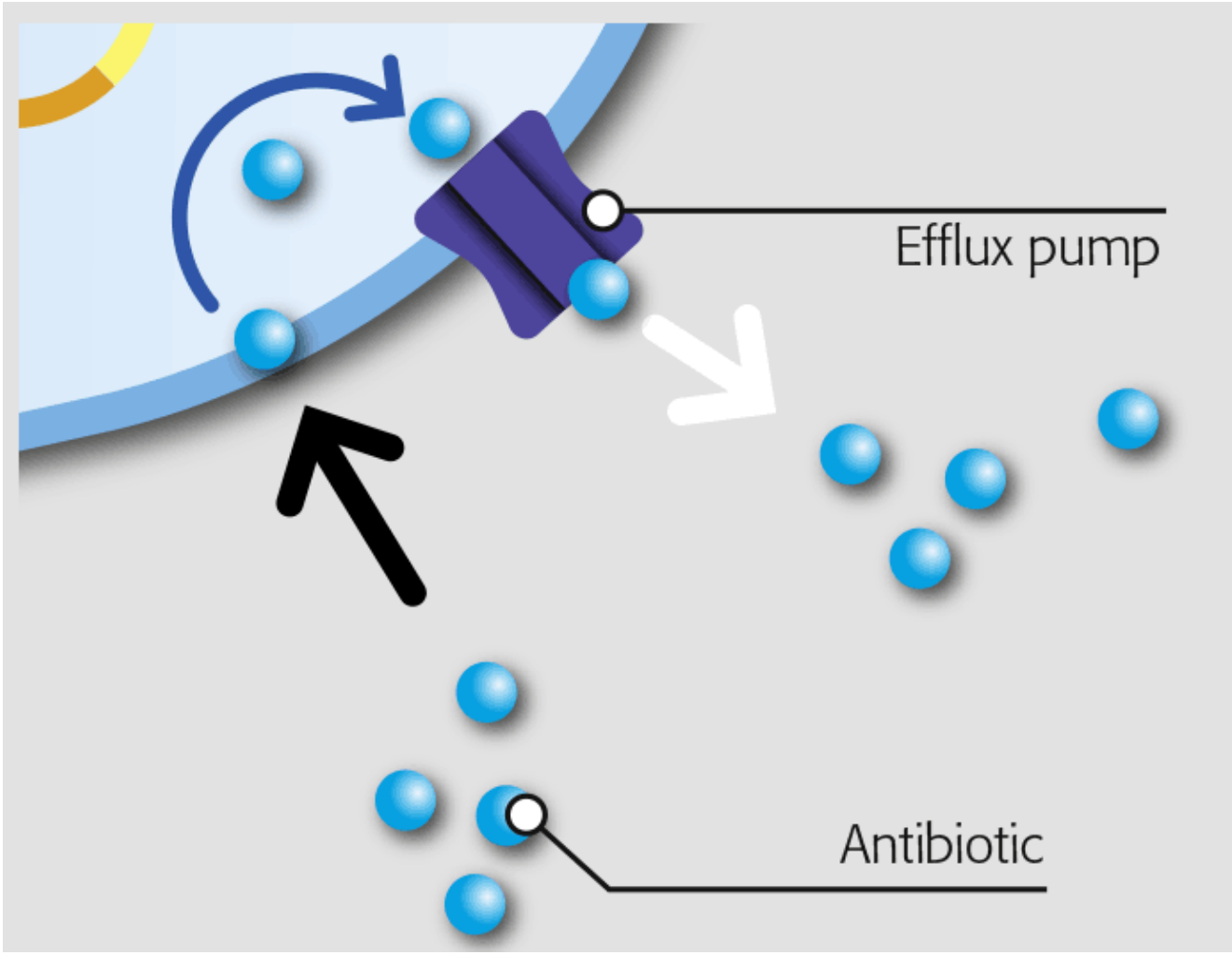

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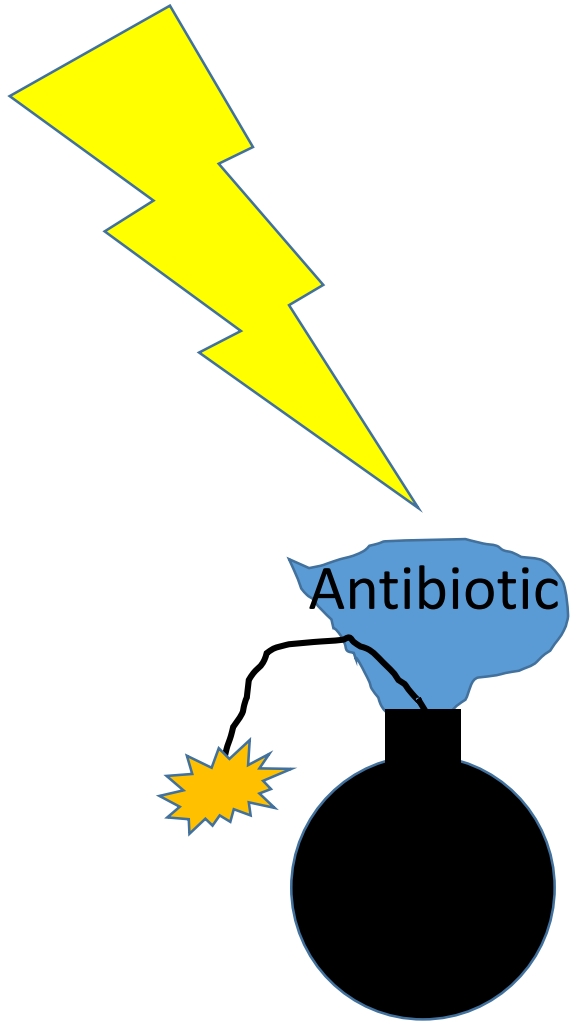
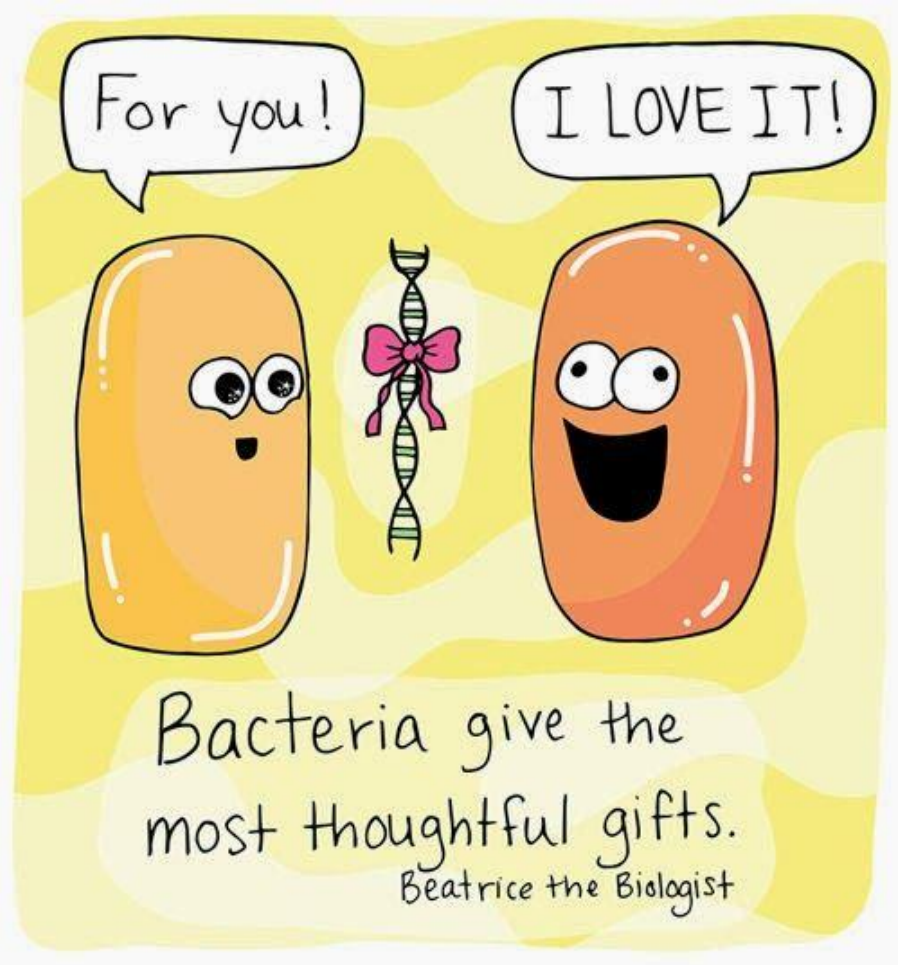


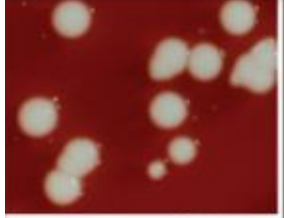
Antibiotic Resistance: ESBL

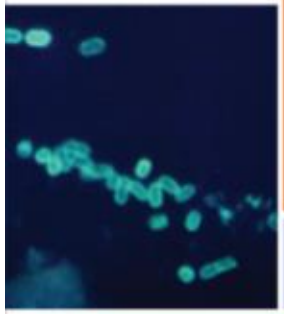
- Extended-spectrum β-lactamase
  - Inactivates 3rd Gen cephalosporins & aztreonam
  - Chromosomal and plasmid mediated

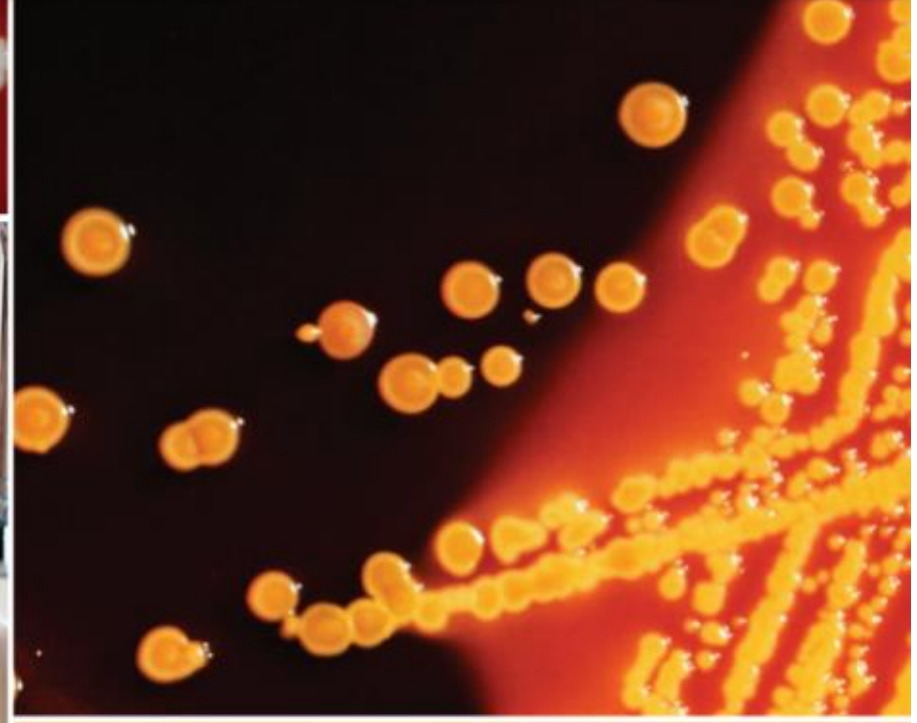
Antimicrobial Resistance: Carbapenem-Resistant

- Nonsusceptible to carbapenems, many mechanisms
- Carbapenem Resistant Enterobacteriacea (CRE) particularly important
  - Inactivating enzymes: Klebsiella Pneumonia Carbapenemase (KPC) or metallo-B-lactamases (NDM, VIM)
  - Plasmid mediated (shared)
  - Rising prevalence in US hospitals
  - Twice as lethal as CSE (RR 2.2)









Facility Guidance for Control of Carbapenem-resistant *Enterobacteriaceae* (CRE)

November 2015 Update - CRE Toolkit

National Center for Emerging and Zoonotic Infectious Diseases
Division of Healthcare Quality Promotion

CDC

Back to Afghanistan: Increasing Resistance

- **High percentage of Pan-drug resistant bacteria at Craig Joint Theater Hospital (CJTH) in Afghanistan—**
  - **CJTH isolates: 75% Carbapenem-resistant (CR) or pan-drug resistant (PDR)**
  - **CONUS and OCONUS MTFs report <0.01% rate**

Back to Afghanistan: Transmission

- **May 2018, Acinetobacter nosocomial transmission**
- **Transmission:**
  - **“T.P.” bacteremia = “T.T.” trach aspirate**
  - **“T.I.” stump = “T.W.” stump**
  - **“T.K.” arm = “T.O.” UTI**
    - **Clusters w 2011 isolate**

And spreading:
Landstuhl Regional Army Medical Center, Germany

- **Increased incidence of carbapenemase-producing bacteria at LRMC**
  - **June – Sept 2017**
  - **Increase in carbapenem-resistant GNRs**
  - **Multiple isolates with Class B metallo-B-lactamase (MBL) genes**
  - **Previously only 1 isolate/yr**

These infections could be coming to a hospital near YOU…

CNN:

2019: Superbugs ‘as big a global threat as climate change and warfare’

2017: US Military defeated superbugs in Kabul, but locals still suffering

Lest we think this is inevitable…

- **Where did these infections come from?**
  - **Not normal flora (at least not ABC)[1]**
  - **Not the soil (at least not ABC)[2]**
  - **Not present cultures on admission from POI[3]**
  - **Present in the hospitals in Kuwait and Iraq[4]**
  - **Present in many local nationals at same facility[5]**

- **These are healthcare associated infections…**
- **They can be prevented**

1. Griffith ME, et al. Infect Control Hosp Epidemiol. 2007;28:720-722
2. Keen EF, et al. Infect Control Hosp Epidemiol. 2012;33:905-911
3. Murray CK, et al. Mil Med. 2006;171:826-829
4. Scott P, et al. Clin Infect Dis. 2007;44:1577-1584
5. Yun HC, et al. Mil Med. 2006;171:821-825

Interventions

- **Trivia!**
  - **Write down as many Infection Control interventions as you can think of**

Interventions

- **Hand Hygiene Policy**
- **Contact Precautions**
- **Environmental Cleaning, including terminal cleans, etc**
- **Leadership Support**
- **Microbiology / Lab, including MDRO screens, ID and sens, etc**
- **Antimicrobial Stewardship Program, (CPGs, abx time outs, Protocols)**

Interventions

Leadership Support
-Professional IC team site visit/deployment
-ID doc on rotation (q2y or so)
-IC chief accountability for reporting to ECOMs
-Codified policies on IC practices
-IC preventionist who's gone to EPIC course
-Named IC team for each rotation (physician chief, preventionist, Lab, pharmacist at minimum)

Hand Hygiene Policy
-Continue campaign
-Empower all, esp IC team, to do spot corrections
-QC tracking, esp for first ½ of deployment
-Sink located near doors

Contact Precautions
-Policy on empiric contact precautions for all ICU, transfers
-Enforced contact precautions w spot corrections
-Standard location for isolation carts and signs
-Standard indications for Contact precautions, can be ordered by RN
-Assign tables, carts in ICU/afghan Bay…no sharing!
-Terminal clean
  --QC terminal cleaning?
-Tracking use of contact precautions

Environment of Care
-Policy to use scrubs (tops, bottoms, weapon, shoes)
-QC washing of scrubs/linens
-Lab doesn't have sinks for handwashing…

Lab
-QC MDRO screening (MDRO plates, correct swabbing technique)
-Policy on appropriate MDRO screening
-Policy on empiric contact precautions while awaiting MDRO results
-Continue excellent communication with MDs
-Ceftaz/Avibactam plates
-Continue MRSN QC, communication
-Standardize process for lower airway specimen collection

Antimicrobial Stewardship
-Daily Abx timeout, tracked, recorded
-Track if following CPGs for ppx
-Develop local CPG for VAP, CLASBI, CAUTI, stump infx
-Continue telemedicine ID consultation
-Continue Pharmacy involvement
-Ceftaz/Avibactam on formulary
-Clear tracking and reporting system for preventable infx (VAP, CLASBI, CAUTI)

But…

- Don’t the SUPERBUGS need SUPER-IC efforts?

Do routine IC efforts work?

- **Dr Yun (ID), Jun-Dec 2011 at Bagram**
  - **June VAP rate: 40/1000 vent days**
  - ***Implemented VAP bundles***
    - ***1: Elevated Head of Bed***
    - ***2: Daily sedation break***
    - ***3: Daily oral CHG wash***
    - ***4: Gastric ulcer prophylaxis***
    - ***5: DVT prophylaxis***
  - ***Renew emphasis on Hand Hygiene tracking and compliance***
  - **December VAP rate→13/1000 vent days**

In a tent?

- **US Army CSH in Afghanistan**
- **EMEDS status (Tent hospital)**
  - **No running water**
  - **No formal isolation capability**
- **2004: VAP rate 42%**
- **2006: Intensivist initiated ICU protocols, esp VAP bundles**
  - **Elevated head of bed with boxes under cots**
- **2007: VAP rate 8%**

Lettieri JK et al, Crit Care Med, 2009.

In Modern Hospitals?

Carbapenem-resistant Acinetobacter VAP outbreak
Korean Hospital, 2010
Successfully controlled by…

- **1st: Team: ID doc, IC nurse, senior nursing staff in ICUs**
- **2nd: Hand hygiene**
- **3rd: Terminal cleans of all of ward, incl equipment**
- **4th: Closed suctioning unit for tracheal suction equipment**
- **5th: Contact precautions reinforced**
- **6th: Cohorting patients AND nurses**
- **7th: After terminal clean, room not used until cultures negative for ROOM**

J Korean Med Sci, 2010 Jul; 25(7): 999-1004

So….to review

- **Microbes are becoming more resistant, BUT**
- **Standard IC efforts are still best**

- **Resist fatalism…you can make a difference**

- **It takes a village…and a chief**

What YOU can do about it

SET THE EXAMPLE

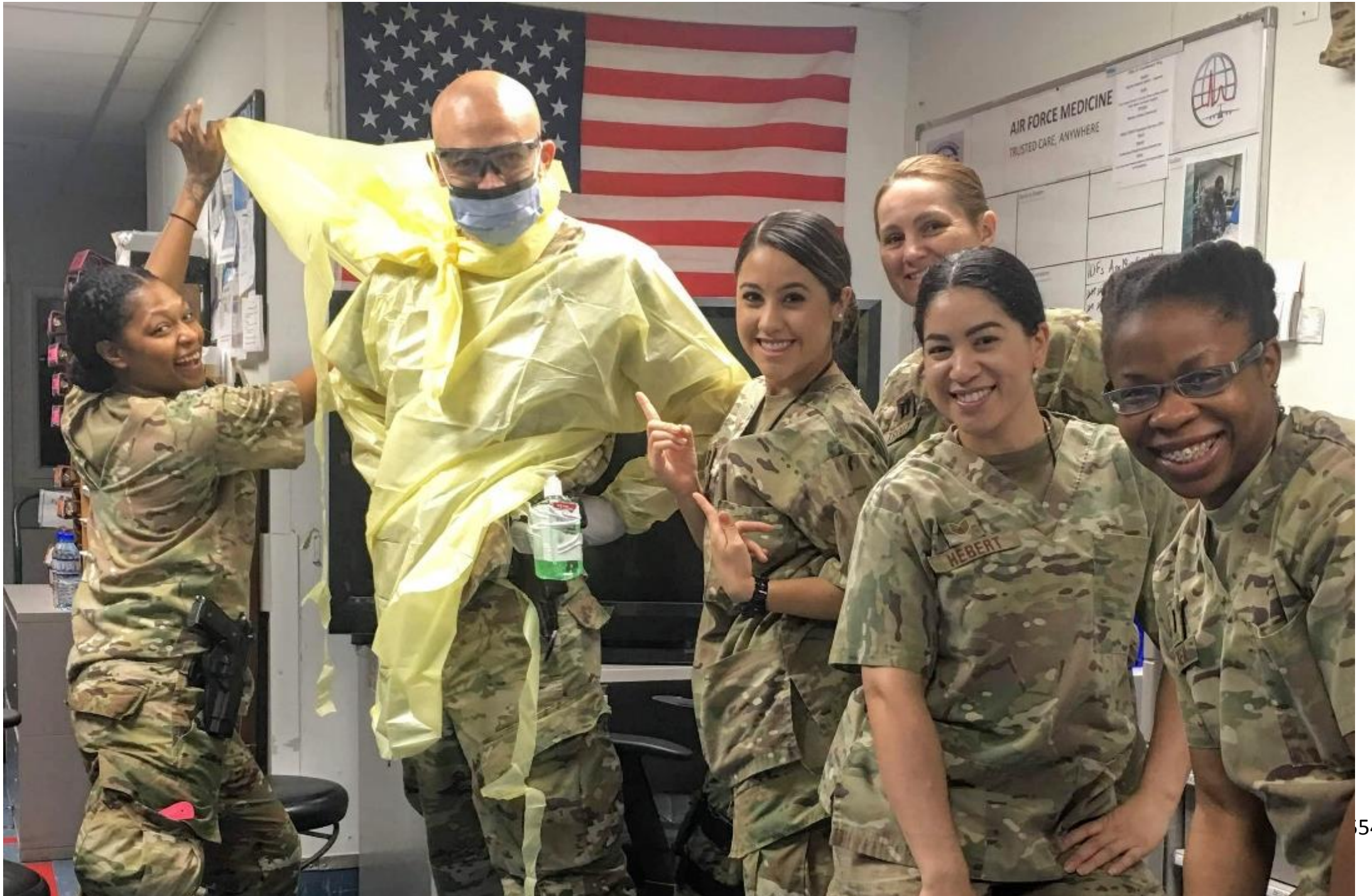
- **Hand Hygiene**
- **Hand Hygiene**
- **Hand Hygiene**
- **Hand Hygiene**
- **Wash your hands before and after…and make sure everyone else does too**
- **Order and follow correct contact precautions**
  - **MDR GNRs…indefinite duration**

FOLLOW PROTOCOLS

- **Ensure VAP bundles followed**
- **Use CVC placement precautions and actively manage**
- **Actively manage urinary catheters**

BE A GOOD STEWARD

- **Follow CPGs for antimicrobial stewardship**
  - **The RIGHT med at the RIGHT dose for the RIGHT duration**
- **Daily Antibiotic Timeout**
  - **Diagnosis confirmed?**
  - **Antibiotic dose and frequency correct?**
  - **Sensitivies back? Possible to narrow?**
  - **Duration?**
- **Be aware of local antibiograms when prescribing**



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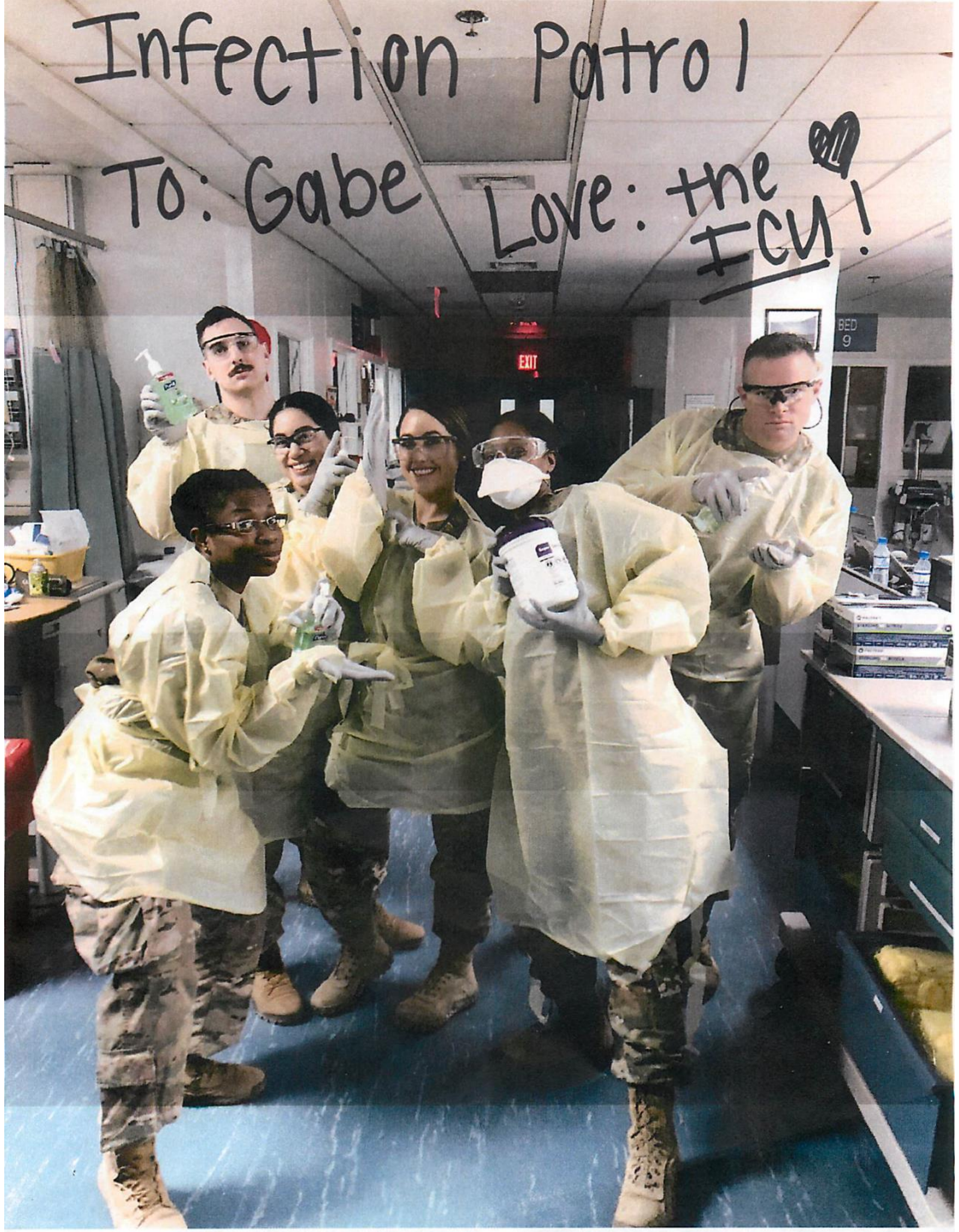
What We Did

We got SERIOUS about infection control



What We Did

- Started a TEAM
  - IC nurse, Lab officer, Pharmacy officer, 3 docs
  - Weekly meetings
- Identified areas of focus:
  - Hand Hygiene and contact precautions COMPLIANCE and TRACKING
  - Leadership support and formal IC evaluation
  - VAP CPG
  - Local Antibiograms
  - Environmental cleaning
  - New Antibiotic options (Avibactam/Ceftazidime) and criteria for use
  - Ensuring excellent hand-off to next set of deployers

Remember…

- **The problem isn’t going away**
- **It affects your patients**
- **You are LEADERS in your clinics and hospitals**
- **What you take seriously, they take seriously**

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8. Murray CK, et al. Mil Med. 2006;171:826-829.
9. Scott P, et al. Clin Infect Dis. 2007;44:1577-1584.
10. Yun HC, et al. Mil Med. 2006;171:821-825.
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13. Won SK, et al. J Korean Med Sci. 2010:25(7):999-1004
14. Simor AE, et al. Infect Control Hosp Epidimeol 2002,23(5):261-7

Diagnosis	Organism ID	PENICILLINS								Cephalosporins (Extended Spectrum Beta-lactamase producers)										Carbapenem			Azithromycin	Erythromycin	Aminoglycoside			Quinolones				Chloramphenicol	Clindamycin	Nitrofurantoin	Tetracycline	Trimethorprim/sulfa	Linezolid	Vancomycin	Rifampin
Bacteremia	Acinetobacter	R	I	R	R					R	R	R	R	R	R	I	R	R	R	R		R			S	R	S	R		I	R			R	S	R			
Bacteremia	Enterobacter cloacae	R	R	R	R				[illegible]	R	R	R	R	R	R	R	R	R	R	R	R	R			R	R	R	R		R	R			R	R	R			
Bacteremia	Escherichia coli	S	I	R	S				[illegible]	R	R	R	R	S	S	R	R	R	R	S	S	S			S	S	S	S		S	S			S	S	S			
Bacteremia	Klebsiella pneumoniae	R	R	R	R				[illegible]	R	R	R	R	S	S	R	R	R	R	I	S	S			R	R	R	R		R	R			S	S	R			
Bacteremia	Klebsiella pneumoniae	R	R	R	R				[illegible]	R	R	R	R	S	S	I	R	R	R	I	S	S			R	R	R	R		R	R			I	S	R			
Bacteremia	Klebsiella pneumoniae	R	R	R	R				[illegible]	R	R	R	R	S	S	I	R	R	R	I	S	S			R	R	R	R		R	R			S	S	R			
Bacteremia	Klebsiella pneumoniae	R	R	R	R				[illegible]	R	R	R	R	S	S	R	R	R	R	I	S	S			R	R	R	R		R	R			S	S	R			
Bacteremia	Klebsiella pneumoniae	R	R	R	R				[illegible]	R	R	R	R	S	S	I	R	R	R	I	S	S			R	R	R	R		R	R			S	I	R			
bacteremia	Klebsiella pnuemoniae	S	R	R	S				[illegible]	R	R	R	R	S	S	R	R	R		S	S	S			S	S	S	S		S	S				S	S			
bacteremia	Klebsiella pnuemoniae	R	R	R	R				[illegible]	R	R	R	R	R	R	R	R	R		R	R	R			S	R	R	R		R	R				S	R			
Bacteremia	Staph haemolyticus	R	R	R		R	R	R			R	R	R				R		R		R		R	[illegible]		R		R	R	R		R	R	S	S	R	R		R