Avera

CRE: A Community Emergency

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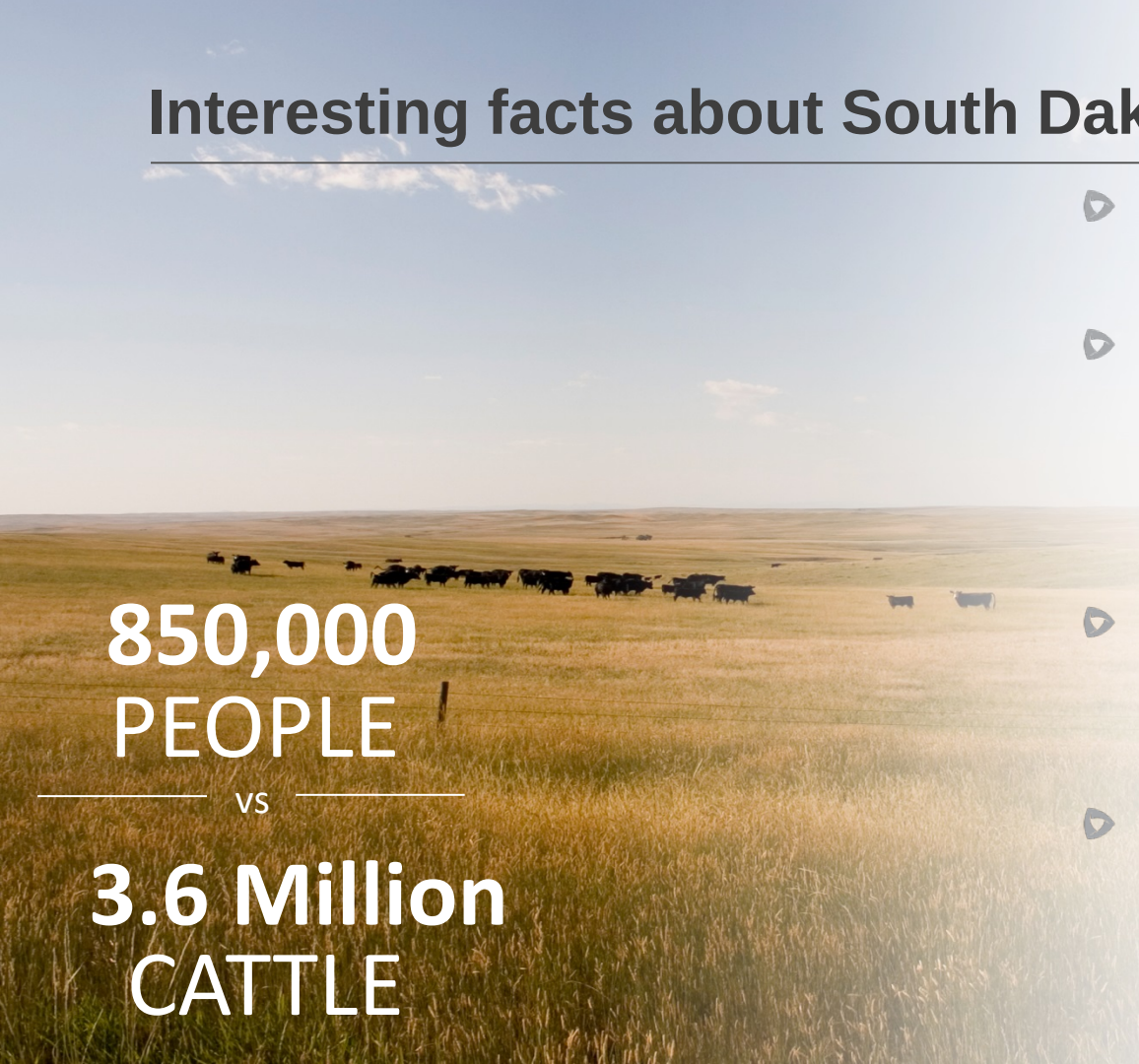
June 23, 2016

Learning Objectives

- Identify methods for early identification of CRE in an at risk population
- Identify three components of a screening tool
- List three components of the transfer tool

Interesting facts about South Dakota



- Population average = 10 per square mile
- Settled by pioneers in the late 1800s
  - Previously inhabited by Native American tribes
- Vast, rolling prairie and grasslands; fertile farmland; and glacial lakes
- Agriculturally based economy: cattle, hay, corn, soybeans, wheat and sunflowers

Avera

AVERA: Who we are

Cover a 72,000-square-mile footprint and 86 counties

Avera

AVERA: Who we are

The world's most robust telemedicine program serving rural health care

250 sites

10% of CAH

Making specialty care more accessible to rural residents through:

- eConsult
- eICU
- eEmergency
- ePharmacy
- eLongTermCare
- eCorrectional Health

Avera

Avera Aberdeen

- Avera St. Luke's Hospital
  - 109 Beds
- Avera Dakota Plains
  - Surgical Center
- Avera Mother Joseph Manor
  - 81 Beds
- Avera Eureka Healthcare Center
  - 56 Beds

CRE

- Carbapenem-resistant Enterobacteriaceae, are a family of germs that are difficult to treat because they have high levels of resistance to antibiotics.
  - Gram negative species: *Escherichia coli, Enterobacter species, Salmonella enterica, Proteus mirabilis* and *Citrobacter freundii, Serratia species, Pseudomonas species* and *Acinetobacter baumannii.*
  - Carbapenemase producing organisms produce an enzyme located on plasmids that inactivates all ß-lactam antibiotics, including penicillins, cephalosporins, monobactams, and carbapenems.

2015 CRE Definition Change

- "In the attempt to simplify:
  - CRE are *Enterobacteriaceae* that are:
    - » Resistant to any carbapenem antimicrobial (i.e., MIC ≥ 4 mcg/ml for doripenem, meropenem, or imipenem OR ≥ 2 mcg/ml for ertapenem)

    OR

    - » Documented to produce carbapenemase
  - In Addition:
    - » For bacteria that have intrinsic imipenem nonsusceptibility (i.e., *Morganella morganii, Proteus spp., Providencia spp.),* resistance to carbapenems other than imipenem is required."

http://www.cdc.gov/hai/pdfs/cre/CRE-guidance-508.pdf

CRE Definition Interpretation

- TheraDoc® alerts clinicians of at risk events

From: TheraDoc.ESP@theradoc.com [mailto:TheraDoc.ESP@theradoc.com]
Sent:
To:

PID:	**Title:** EZ Alert: CRE Any Enterobacteriaciae
Room:	**Alert:**

EZ Alert: CRE Any Enterobacteriaciae Admit Diagnosis: Private

Demographics & renal function

Age: Private	Sex: Private
SCr: 0.98	Height: Private
CrCl: 61 mL/min	Weight: Private

This patient matches the EZ Alert criteria: 'EZ Alert: CRE Any Enterobacteriaciae'

CRE CULTURE: (Acc#:)
Alert organism: KLEBSIELLA PNEUMONIAE CRE
Specimen source: RECTAL SWAB (Collected:)
Relevant susceptibility results

Tested	Interpretation	Result
* Trimethoprim/Sulfamethoxazole	R	>=320
* Ampicillin	R	>=32
* Cefazolin	R	>=64
* Cefoxitin	R	>=64
* Ceftazidime	R	>=64
* Ceftriaxone	R	>=64
* Cefepime	R	8
* Ciprofloxacin	R	>=4
Gentamicin	S	4
* Imipenem	R	>=16
* Piperacillin/Tazobactam	R	>=128
* Levofloxacin	R	>=8

* Drug susceptibility results reported as Intermediate or Resistant

Launch TheraDoc web application

CRE Definition Interpretation

From: TheraDoc.ESP@theradoc.com [mailto:TheraDoc.ESP@theradoc.com]
Sent: Friday,
To:
Subject: EZ Alert: CRE Any Enterobacteraciae

PID: **Title:** EZ Alert: CRE Any Enterobacteraciae
Room: **Alert:**

EZ Alert: CRE Any Enterobacteraciae Admit Diagnosis: Private

Demographics & renal function

Age: Private
SCr: N/A (Assumed 1 for CrCl)
CrCl: 51 mL/min/1.73m^2

Sex: Private
Height: Private
Weight: Private

This patient matches the EZ Alert criteria: 'EZ Alert: CRE Any Enterobacteraciae'

ID &/OR SUSC (FROM CLIENT): (Acc#:)
Alert organism: PROTEUS MIRABILIS Colony Count: >100,000 CFU/mL
Specimen source: URINE, CLEAN CATCH (Collected:)
Relevant susceptibility results

	Tested	Interpretation	Result
*	Trimethoprim/Sulfamethoxazole	R	>=320
	Ampicillin	S	4
	Ampicillin/Sulbactam	S	4
	Cefazolin	S	8
	Cefoxitin	S	<=4
	Ceftazidime	S	<=1
	Ceftriaxone	S	<=1
	Cefepime	S	<=1
*	Ciprofloxacin	I	2
	Gentamicin	S	<=1
*	Imipenem	I	2
*	Nitrofurantoin	R	128
	Tobramycin	S	<=1
	Piperacillin/Tazobactam	S	<=4
	Ertapenem (Invanz)	S	<=0.5
*	Levofloxacin	I	4

* Drug susceptibility results reported as Intermediate or Resistant

CRE Definition Interpretation

From: TheraDoc.ESP@theradoc.com [mailto:TheraDoc.ESP@theradoc.com]
Sent: Thursday,
To:
Subject: EZ Alert: CRE Any Enterobacteraciae ID:

PID: **Title:** EZ Alert: CRE Any Enterobacteraciae
Room: **Alert:**

EZ Alert: CRE Any Enterobacteraciae Admit Diagnosis: Private

Demographics & renal function

Age: Private Sex: Private
SCr: 0.4 Height: Private
CrCl: 62 mL/min(; weight used=59.5 kg) Weight: Private

This patient matches the EZ Alert criteria: 'EZ Alert: CRE Any Enterobacteraciae'

AEROBIC CULTURE: (Acc#:)
Alert organism: PROTEUS MIRABILIS: Few
Specimen source: SACRUM (Collected:)
Relevant susceptibility results

Tested	Interpretation	Result
Trimethoprim/Sulfamethoxazole	S	<=20
Ampicillin	S	<=2
Ampicillin/Sulbactam	S	<=2
Cefazolin	S	8
Cefoxitin	S	8
Ceftazidime	S	<=1
Ceftriaxone	S	<=1
Cefepime	S	<=1
Ciprofloxacin	S	<=0.25
Gentamicin	S	<=1
* Imipenem	R	4
Tobramycin	S	<=1
Piperacillin/Tazobactam	S	<=4
Ertapenem (Invanz)	S	<=0.5
Levofloxacin	S	<=0.12

Meropenem

PID: **Title:** EZ Alert: CRE Any Enterobacteriaciae
Room: **Alert:**

EZ Alert: CRE Any Enterobacteriaciae Admit Diagnosis: Private

Demographics & renal function

Age: Private
SCr: 0.84
CrCl: 35 mL/min(Cockcroft-Gault; weight used=65 kg)
Sex: Private
Height: Private
Weight: Private

This patient matches the EZ Alert criteria: 'EZ Alert: CRE Any Enterobacteriaciae'

URINE CULTURE:

Alert organism: PROTEUS MIRABILIS Colony Count: >100,000: **PRESUMPTIVE CRE**

Specimen source: URINE, CLEAN CATCH

Relevant susceptibility results

	Tested	Interpretation	Result
	Trimethoprim/Sulfamethoxazole	S	<=20
*	Ampicillin	R	<=2
*	Ampicillin/Sulbactam	R	<=2
*	Cefazolin	R	8
*	Cefoxitin	R	8
*	Ceftazidime	R	<=1
*	Ceftriaxone	R	<=1
*	Cefepime	R	<=1
	Ciprofloxacin	S	<=0.25
	Gentamicin	S	<=1
*	Meropenem	R	4
*	Nitrofurantoin	R	128
	Tobramycin	S	<=1
	Amikacin	S	<=2
*	Piperacillin/Tazobactam	R	<=4
	Levofloxacin	S	0.5

* Drug susceptibility results reported as Intermediate or Resistant

Meropenem Resistance

PID: **Title:** EZ Alert: CRE Klebsiella pneu or E.coli or Enterobacter
Room: **Alert:**

EZ Alert: CRE Klebsiella pneu or E.coli or Enterobacter Admit Diagnosis: Private

Demographics & renal function

Age: Private Sex: Private
SCr: 6 Height: Private
CrCl: 13 mL/min(Cockcroft-Gault; weight used=69.4 kg) Weight: Private

This patient matches the EZ Alert criteria: 'EZ Alert: CRE Klebsiella pneu or E.coli or Enterobacter'

RESPIRATORY CULTURE & GS:

Alert organism: KLEBSIELLA PNEUMONIAE CRE

Specimen source: BRONCHIAL WASHINGS

Relevant susceptibility results

	Tested	Interpretation	Result
*	Trimethoprim/Sulfamethoxazole	R	>=320
*	Ampicillin	R	>=32
*	Ampicillin/Sulbactam	R	>=32
*	Cefazolin	R	>=64
*	Ceftazidime	R	>=64
*	Ceftriaxone	R	>=64
*	Cefepime	R	8
*	Ciprofloxacin	R	>=4
	Gentamicin	S	4
*	Meropenem	R	>=16
*	Tobramycin	R	>=16
*	Piperacillin/Tazobactam	R	>=128
*	Levofloxacin	R	>=8

* Drug susceptibility results reported as Intermediate or Resistant

Launch TheraDoc web application

The Beginning

- 2/25/09 – the day it all began
  - Primary case had been a Long Term Care resident since July 2008
  - Hospitalized 4 times since December of 2008 with pneumonia
  - Positive Sputum and Urine in February 2009 – confirmed at Minnesota Department of Health
  - First positive results in all of the surrounding states followed by Minnesota
  - Followed by positive in south east part of South Dakota

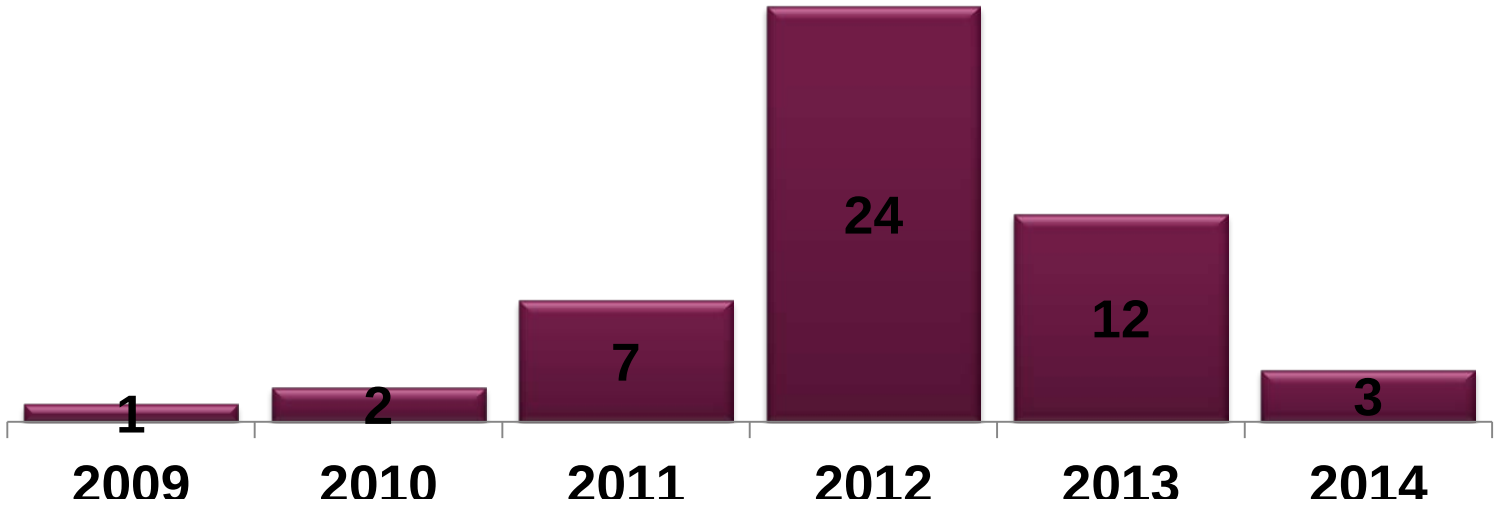
Culture Results – Carbapenamase Producer

```
URINE CULTURE  Final
      CULTURE COMMENTS              SEE TEXT FOR EXPLANATION

      2/12/09 KLEB.PNEUMONIAE SSP PNEUMONIAE
      ********************************************************
       Note: This organism may be an extended spectrum beta
       lactamase producer (ESBL).  Susceptibility results may
       not reflect invivo response to antibiotic treatment.
       An infectious disease consult is recommended to advise
       in treatment of these types of organisms.
       ********************************************************
      SUSCEPTIBILITY RESULTS WERE RECHECKED.
      ISOLATE IS DEMONSTRATING INCREASED RESISTANCE, WILL HOLD
      PLATES FOR 1 WEEK IF ADDITIONAL TESTING REQUESTED.

   Organism 1                       KLEB.PNEUMONIAE SSP PNEUMONIAE
      Colony Count/Growth           >100,000 CC/ML

                                        KLE PNEUMO
                                        M.I.C.     RX      ABN
   Trimethoprim/Sulfamethoxazole        >=320      R
   Ampicillin                           >=32       R
   Ampicillin/Sulbactam                 >=32       R
   Cefazolin                            >=64       R
   Ceftazidime                          >=64       R
   Ceftriaxone                          16         R
   Cefepime                             2          R
   Ciprofloxacin                        >=4        R
   Gentamicin                           4          S
   Imipenem                             <=1        S
   Nitrofurantoin                       256        R
   Tobramycin                           >=16       R
   Piperacillin/Tazobactam              >=128      R
   Levofloxacin                         >=8        R
```

CRE by the numbers

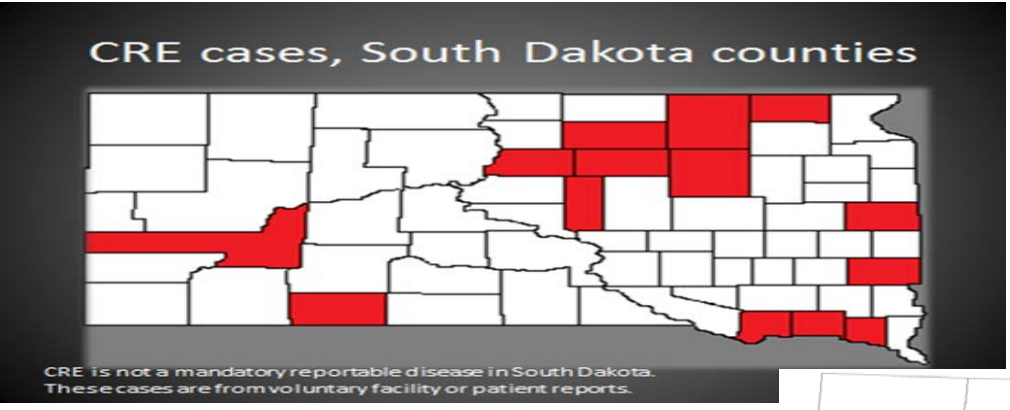
- 2010 = 3
- 2011 = 6
- 2012 = 25
- 2013 = 7
- 2014 = 9
- 2015 = 7
  - 14 additional cultures were reported throughout the state to SDDOH

CRE South Dakota

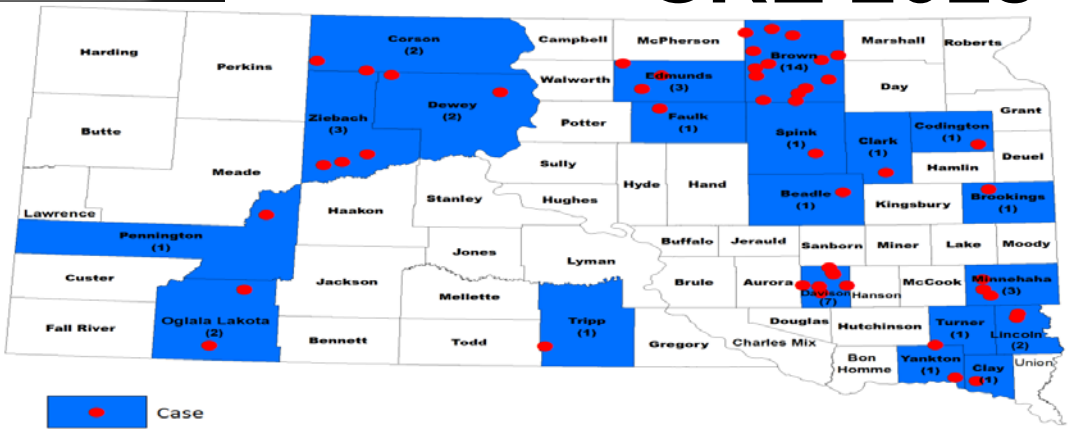


CRE does not stay in one place

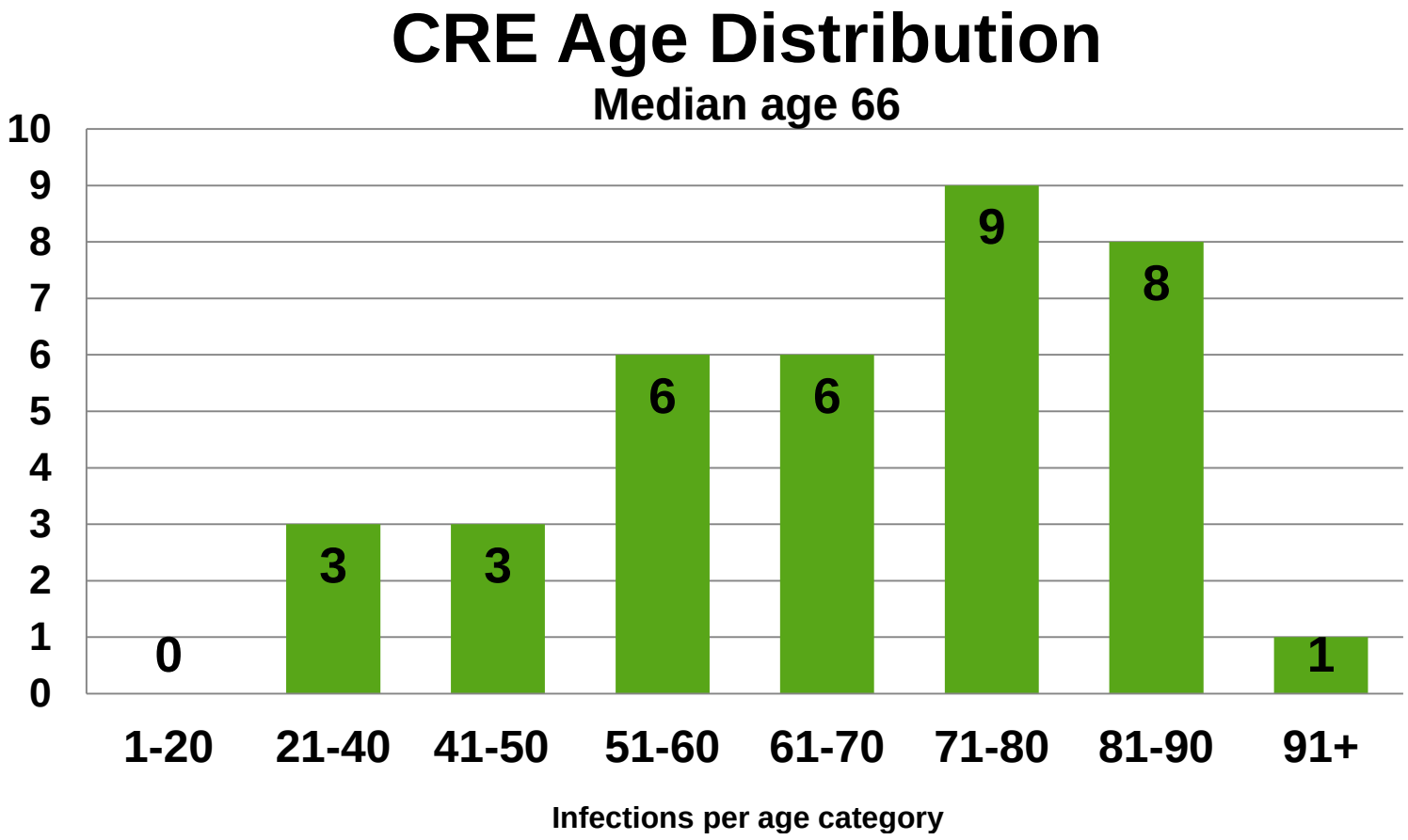
CRE 2013



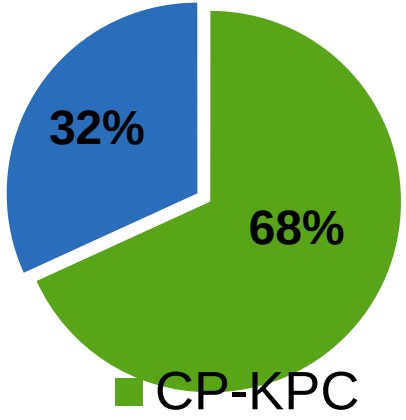
CRE 2015

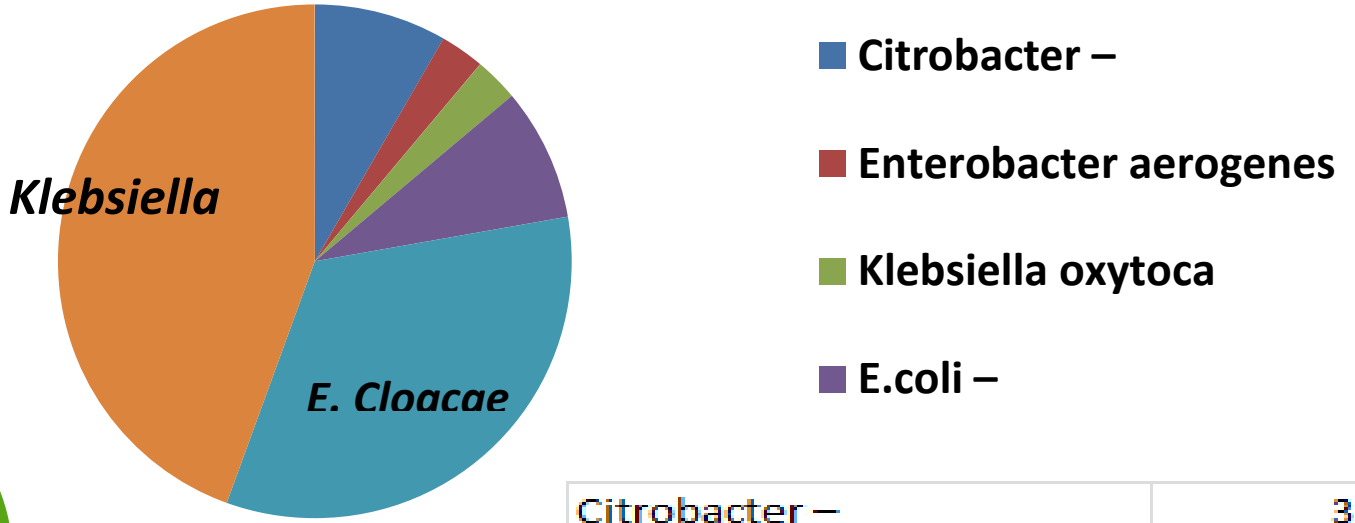


Characteristics of case patients



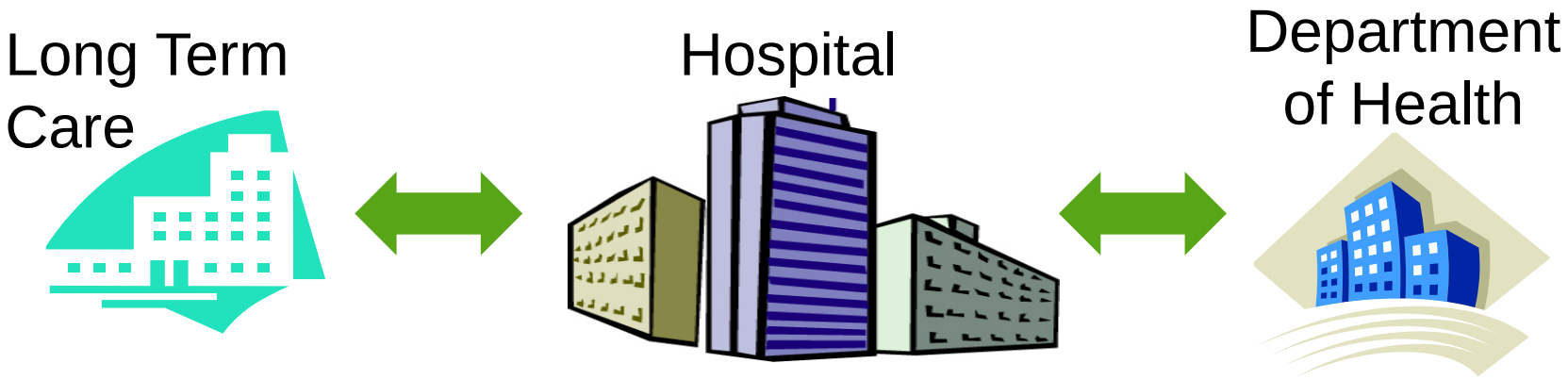
2015 South Dakota Enterobacteriaceae





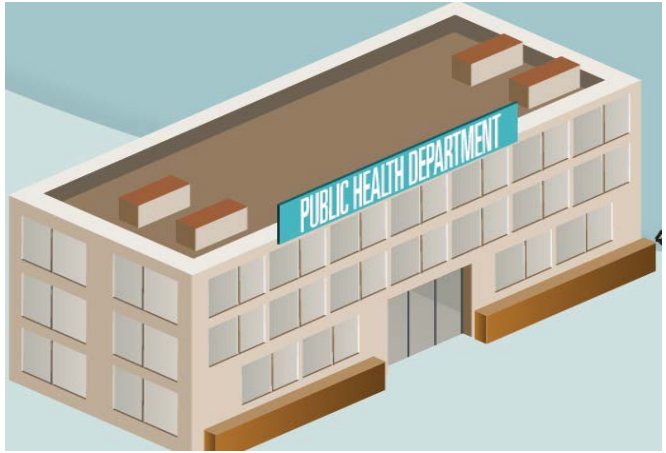
Citrobacter –	3
Enterobacter aerogenes	1
Klebsiella oxytoca	1
E.coli –	3
Enterobacter Cloacae	12
Kleb Pneumo	16

Widespread effects of infections and antibiotic use



Taking steps to stop the spread of CRE

- Request for CRE be added as a notifiable disease
- Reporting mandated July 1, 2013
- Reports are electronically submitted to public health
- Provide line lists of patients who were culture positive
  - Reports include the patient's location of residence



Taking Steps to Stop the Spread - Leadership Commitment

- Joined State Department of Health CRE Taskforce
- Joined State Antibiotic Stewardship Workgroup
- Chief Medical Officers for system and facility were key to initiating change management
- Hosted CDC conference in area affected
- Attendees:
  - Physicians
  - Long Term Care facilities
  - Pharmacists

Taking steps to stop the spread of CRE

- Policies and documentation developed to identify patients
  - Documented in physician problem list
  - Added organism to admit assessment
  - Admission screening protocols
  - Developed policy for patients across the continuum

Changes to stop the spread of CRE – Patient Problem

Pcs, Ann
DOB: 3/16/65 51 F

Multiple / SL00000180 / SSDTVIG0002493
Multiple

Allergy/AdvReac: Milk Containing Products, Sulfa (Sulfonamide Antibiotics), peanut

Summary

Summary List | Diagnoses | Indicators | Risk/Legal | Demographics
Providers | Visit | Contacts | Insurances | Abstract

Patient Summary

Visit History

Inpatient	2/22/16	318/1S	Kidwai,Fatima Z MD	Training

Patient Problems

Medical	Chest pain as manifestation of blood transfusion... Carbapenem resistant bacteria carrier MRSA (methicillin resistant Staphylococcus aureus)

Medications

Active	Alteplase, Recombinant 65 mg/Non-Formulary Medication Lidocaine HCl (Lidocaine 1% For Iv Start) Sodium Chloride

Ambulatory Medications

RXM - ASL Region last updated 2/11/2016 1002 at ASL

Acetaminophen (Tylenol Extra Strength) 500 Mg... (2 Tab PO 6H #30 1) Reported
Acetaminophen (Tylenol) 325 Mg Tablet (650 Mg PO 4XD #100) Reported
Albuterol (Albuterol Neb) 1.25 Mg/3 Ml Vial.... (1 Vial NEB 6H #150) Reported
Albuterol (ProAir HFA) 90 Mcg Hfa.aer.ad (2 Puff INH 6H PRN #8.5) Reported
Atorvastatin Calcium (Lipitor) 10 Mg Tablet (10 Mg PO HS #90) Reported
Digoxin 0.125 Mg Tablet (125 Mcg PO DAILY #90) Reported
Diltiazem HCl (Diltiazem CD 24 Hour) 180 Mg Cap... (180 Mg PO DAILY) Reported
Ergocalciferol (Drisdol) 50,000 Uni... (50,000 Int.unit PO WEEKLY Th... Reported
Furosemide (Lasix) 20 Mg Tablet (20 Mg PO DAILY #90) Reported
Methylcellulose (Isopto Tears) 0.5 % Dr... (2 Drop EACH EYE PRN #15) Reported
Metoprolol Tartrate 25 Mg Tab (0.5 Tab PO BID #180 1) Reported
Prednisone (predniSONE) 10 Mg Tablet (1 Tab PO DAILY 3 days) Reported
Prednisone (predniSONE) 10 Mg Tablet (2 Tab PO DAILY 3 days) Reported
Prednisone (predniSONE) 10 Mg Tablet (3 Tab PO DAILY 3 days) Reported
Warfarin (Coumadin) 1 Mg Tablet (1 Mg PO DAILY #90) Reported

Preferred Pharmacy

STATE STREET PHARMACY	Phone:	(605)225-1945	Specialty:	N	Mail Order: N
105 S STATE STREET	Fax:	(605)725-0037	LTC:	N	24 Hrs: N
ABERDEEN, SD 57401			eRx:	Y	EPCS: N

RXM.ASL Last updated by MKRAMER1 12/14/15 @ 13:53 in ASL

Care Team

Immunizations

None

Health Maintenance

Growth Charts

Substance Use

Procedures

Record List
Other Visit
Special Panels
24 Hour
Vital Signs
I & O
Notes
Medications
Order History
Laboratory
Microbiology
Blood Bank
Pathology
Imaging
Other Reports
Care Trends
Care Activity
History
Summary
Encounters
Referrals
Problem List
Discharge
Orders
Document
Reconcile Meds
Sign
Refresh

All data is fictional and for demonstration purposes only.

Assessment screen for resistant organisms

View Infection Prevention Update

Infection Prevention-Resistant Organisms

Hx of Infection Prevention Needs	○ Yes ○ No Comment If Yes Continue Assessment
Hx Multiple Drug Resistant Organisms	○ Yes ○ No Comment
Hx CRE	○ Yes ○ No Comment Carbapenem Resistant Enterobacteriaceae or Klebsiella Pneumoniae
Hx ESBL	○ Yes ○ No Comment Extended Spectrum Beta Lactamase
Hx MRSA	○ Yes ○ No Comment Methicillin Resistant Staph Aureus
Hx VISA	○ Yes ○ No Comment Vancomycin Intermediate Staph
Hx VRE	○ Yes ○ No Comment Vancomycin Resistant Enterococcus
Hx VRSA	○ Yes ○ No Comment Vancomycin Resistant Staph Aureus
Infection Prevention History Comment	

Notifying staff of risk

- Critical Lab Value
- TheraDoc EZ Alerts

EZ Alert: CRE Klebsiella pneu or E.coli or Enterobacter Admit Diagnosis: Private

Demographics & renal function

Age: Private
SCr: 6
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Sex: Private
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RESPIRATORY CULTURE & GS: (Acc#:)
Alert organism: KLEBSIELLA PNEUMONIAE CRE
Specimen source: BRONCHIAL WASHINGS (Collected:)
Relevant susceptibility results

Tested	Interpretation	Result
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* Ampicillin	R	>=32
* Ampicillin/Sulbactam	R	>=32
* Cefazolin	R	>=64
* Ceftazidime	R	>=64
* Ceftriaxone	R	>=64
* Cefepime	R	8
* Ciprofloxacin	R	>=4
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* Tobramycin	R	>=16
* Piperacillin/Tazobactam	R	>=128
* Levofloxacin	R	>=8

* Drug susceptibility results reported as Intermediate or Resistant

Launch TheraDoc web application

Taking Steps to Stop Spread - Screening

CRE History	
Hx CRE	○ Yes ○ No Comment Carbapenem Resistant Enterobacteriaceae **No additional screening needed. Isolate patient.**
CRE Screening	
Hospitalized outside of United States in last 6 months	○ Yes ○ No Comment A Yes answer indicates a positive screen.
LTC, LTAC Counties in Past 6 Months	
Name of LTC Facility	
Chronic Device or Chronic Wound	☐ No Chronic Device/Wound ☐ Ostomy ☐ Dialysis Access ☐ PEG Tube ☐ Venous Access Device ☐ Trach ☐ Indwelling Catheter ☐ Wound ☐ Other Chronic Device Indwelling devices include, but are not limited to the following: urinary catheter, tracheostomy, peg tube, ostomy, bile drainage tube, venous access device. Chronic wounds are defined as wounds, which have failed to proceed through an orderly and timely reparative process to produce anatomic and functional integrity over a period of 3 months. Consult your local infection prevention practitioner if you are unsure if a device is considered indwelling or a wound is chronic.
Other Chronic Device	
Screening Results	
CRE Screening Results	Review CRE Screening Results and Follow Facility Policy for Required Actions

Yes - Completes Assessment

Yes - Completes Assessment

CRE active surveillance screening policy

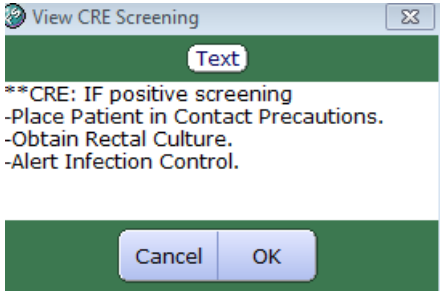
- History of hospitalization outside the US in last 6 months
- History of admission to long term care or long term acute care in last 6 months in certain counties in North and South Dakota

  AND

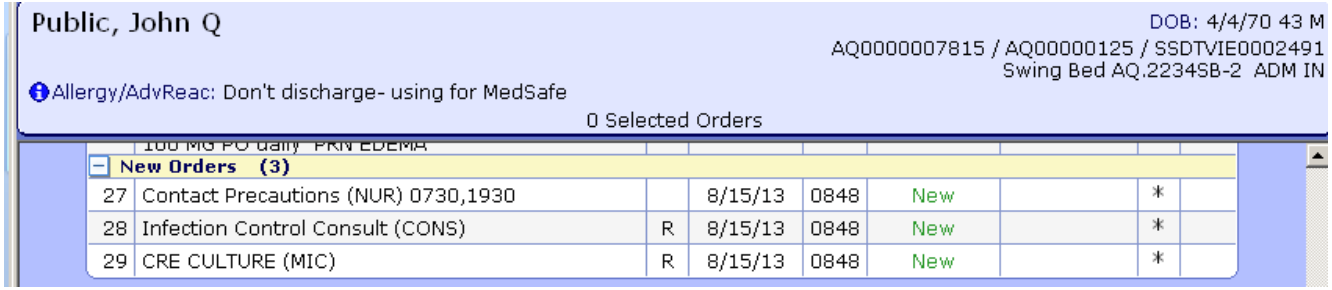
- Patient has an indwelling device or chronic wound
- Positive screen result reflexes to a rectal culture collection and the patient is placed in isolation

Taking Steps to Stop Spread - Screening

- Screening instructions

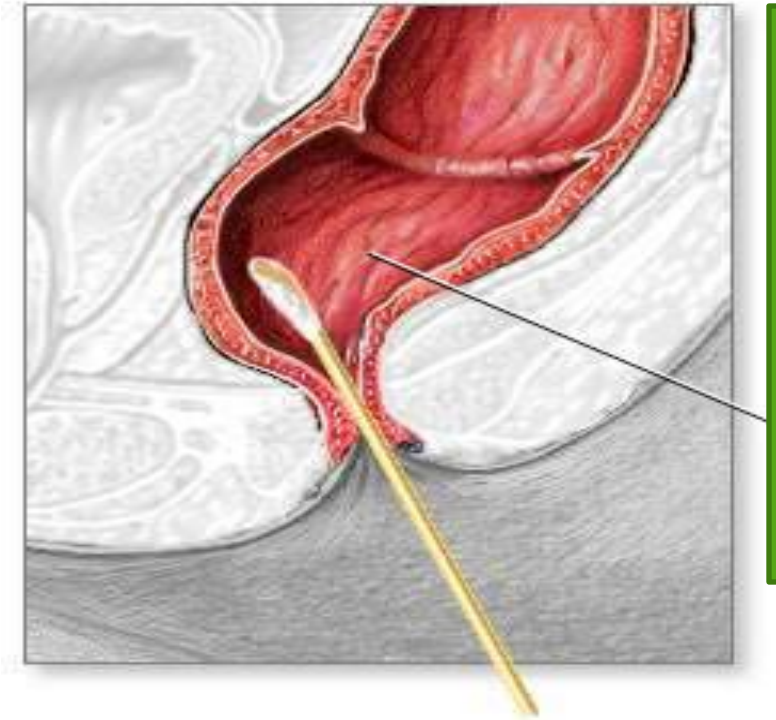


- Orders initiated in the medical record



All data is fictional and for demonstration purposes only.

Screening Procedure – How to guide



- Obtain cotton-tipped swab culturette.
- Insert cotton swab into the rectum (or into ostomy), rotate it gently and remove.
- Place swab in transport media and send to lab.
- Specimens are sent to lab immediately after collection.

Screening Procedure – Training the staff

Active Surveillance in Long Term Care Facilities

- The same screen is completed in Long Term Care (LTC)
- Residents with Active or Colonized CRE:
  - Utilize Contact Precautions (adapted to fit the setting) for:
    - » Direct Care of Resident:
      - Toileting
      - Bathing
      - Preparing for bed
    - » When handling body fluids
    - » If secretions are contained, residents can participate in activities as directed by Infection Prevention

LTC - MDRO Precautions

- Requirements for contact precautions are relaxed for residents who:
  - can perform hand hygiene
  - are continent of stool
  - are less dependent on staff for activities of daily living (ADLs)
  - are without draining wounds
- Standard precautions should be practiced for all patients
  - includes the use of gowns and gloves when contact with colonized/infected sites or body fluids is possible
- Residents transferred to an acute care facility will be isolated if they are colonized or actively infected

LTC - Precautions for therapies

- For residents with uncontrolled secretions/excretions (including those who are incontinent) all therapy and other rehabilitation treatments and activities should be provided in the room of the resident if feasible and if resident safety is not jeopardized
  - Therapists must follow infection prevention measures:
    - » Hand hygiene before entering and prior to leaving the room
    - » Wear gloves with all contact and perform hand hygiene after removal of gloves
    - » Wear a gown if contact with the resident or their environment is anticipated
    - » Dedicate therapy equipment, instruments and devices when possible
      - ▪ If not possible clean equipment immediately after use

LTC - Precautions for social activities

- Individualized to the resident and the least restrictive possible
  - For residents whose secretions can be controlled
  - Determined based off resident ability to perform hand hygiene and other recommended practices for containing secretions
  - Resident should perform hand hygiene and have clean clothing on prior to leaving room
  - Clean and disinfect items between resident use

Notifications

- Use of Transfer form http://www.cdc.gov/hai/pdfs/toolkits/InfectionControlTransferFormExample1.pdf (graphic next slide)
- Called affected facilities
- Educated affected facilities

Inter-facility Infection Control Transfer Form

This form must be filled out for transfer to accepting facility with information communicated prior to or with transfer

Please attach copies of latest culture reports with susceptibilities if available

Sending Healthcare Facility:

Patient/Resident Last Name	First Name	Date of Birth	Medical Record Number
		___/____/_____	

Name/Address of Sending Facility	Sending Unit	Sending Facility phone

Sending Facility Contacts	NAME	PHONE	E-mail
Case Manager/Admin/SW			
Infection Prevention			

Is the patient currently in isolation? ☐ **NO** ☐ **YES**

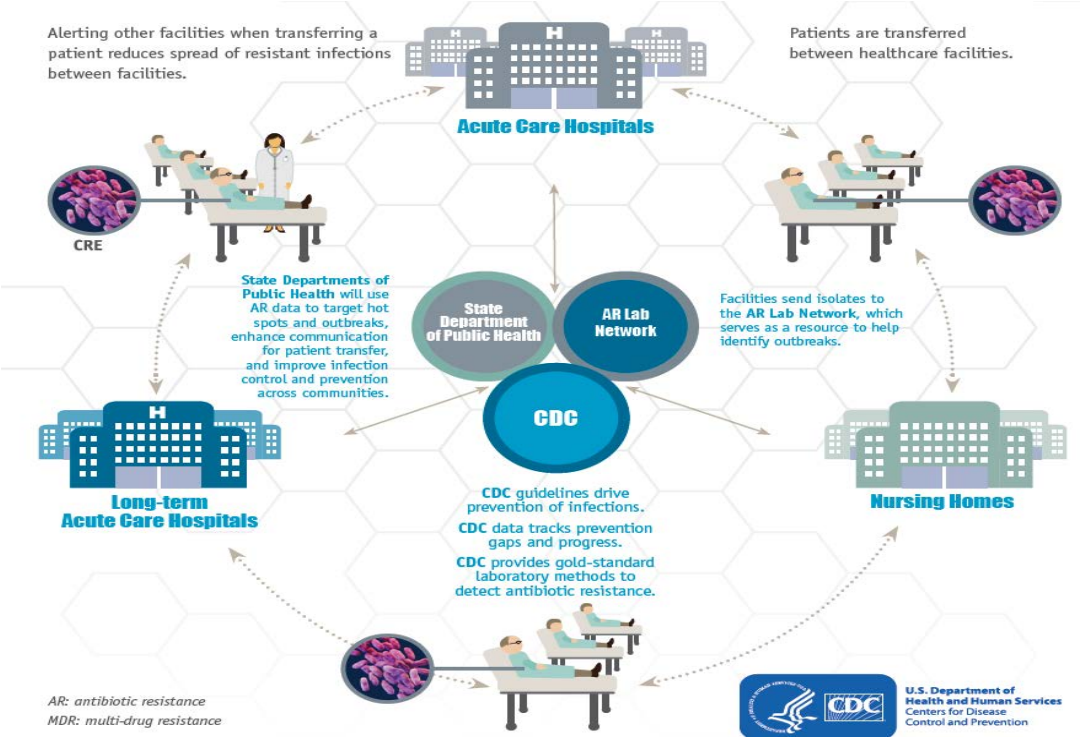
Type of Isolation (check all that apply) ☐ **Contact** ☐ **Droplet** ☐ **Airborne** ☐ **Other:**

Does patient currently have an infection, colonization OR a history of positive culture of a multidrug-resistant organism (MDRO) or other organism of epidemiological significance?	**Colonization or history** *Check if YES*	**Active infection on Treatment** *Check if YES*
Methicillin-resistant Staphylococcus aureus (MRSA)		
Vancomycin-resistant Enterococcus (VRE)		
Clostridium difficile		
Acinetobacter, multidrug-resistant*		
E coli, Klebsiella, Proteus etc. w/Extended Spectrum B-Lactamase (ESBL)*		
Carbapenemase resistant Enterobacteriaceae (CRE)*		
Other:		

Does the patient/resident currently have any of the following?

- ☐ Cough or requires suctioning
- ☐ Diarrhea
- ☐ Vomiting
- ☐ Incontinent of urine or stool
- ☐ Open wounds or wounds requiring dressing change
- ☐ Drainage (source)_____
- ☐ Central line/PICC (Approx. date inserted ___/___/_____)
- ☐ Hemodialysis catheter
- ☐ Urinary catheter (Approx. date inserted ___/___/_____)
- ☐ Suprapubic catheter
- ☐ Percutaneous gastrostomy tube
- ☐ Tracheostomy

CDC's Antibiotic Resistance Solutions Initiative



http://www.cdc.gov/drugresistance/pdf/state-ar-prevention-protect-programs.pdf

CRE Prevention Progress

- 2013 Bugs and Drugs: CRE and Antimicrobial Stewardship Symposium presented by the CDC took place in Aberdeen
- 2013 CRE became a Reportable Disease in South Dakota
- South Dakota CRE Workgroup was developed
  - Members from Avera, Sanford, South Dakota Department of Health, South Dakota Infection Control Council and the CDC were members

Taking Steps to Stop the Spread - Leadership Commitment

- Joined State Department of Health CRE Taskforce
- Joined State Antibiotic Stewardship Workgroup
- Chief Medical Officers for system and facility were key to initiating change management
- Hosted CDC conference in area affected
- Attendees:
  - Physicians
  - Long Term Care facilities
  - Pharmacists

Actions That Reduced Spread

- Leadership Support
- Antibiotic Stewardship Program
- CRE screening protocols
- Lobbied for CRE to be a reportable disease
- Improved notification of receiving and source facilities
- Developed alerting systems

Actions that reduced spread - control antibiotic use

- Initiated system wide antibiotic monitoring
  - Reduced the use of fluoroquinolones by 50%
- Standardized order sets
- Educated physicians
- Pharmacy commitment
- Infectious Disease consult available via telemedicine

Current State of CRE

From: TheraDoc.ESP@theradoc.com [mailto:TheraDoc.ESP@theradoc.com]
Sent: Wednesday,
To:
Subject: Pan-resistant Organism ID:

PID:	**Title:** Pan-resistant Organism
Room:	**Alert:**

Pan-resistant Organism Admit Diagnosis: Private

Demographics & renal function

Age: Private	Sex: Private
SCr: N/A (Assumed 1 for CrCl)	Height: Private
CrCl: 63 mL/min/1.73m^2	Weight: Private

A possible resistant Enterobacter cloacae has been detected. More than 5.0 intermediate or resistant results have been reported, and no susceptible results.

WOUND CULTURE: (Acc#:)
Alert organism: ENTEROBACTER CLOACAE CMPLX-CRE
Specimen source: LEG,RIGHT (Collected:)
Relevant susceptibility results

	Tested	Interpretation	Result
*	Trimethoprim/Sulfamethoxazole	R	>=320
*	Cefazolin	R	>=64
*	Cefepime	R	16
*	Ciprofloxacin	R	>=4
*	Gentamicin	R	>=16
*	Meropenem	R	>=16
*	Tobramycin	R	>=16
*	Piperacillin/Tazobactam	R	>=128
*	Levofloxacin	R	>=8

* Drug susceptibility results reported as Intermediate or Resistant

Executive Summary

- Challenges addressed
- Changing Resistance Patterns
- Community problem of CRE in Long Term Care
- Process/Steps
  - Initiated active screening program
  - Cooperated with State Department of Health
  - Educated frontline staff
  - Inter-facility Transfer Form developed
- Antibiotic Stewardship focus

Executive Summary

- Leadership Engagement
  - Engaged leaders (system and hospital level)
  - Department of Health Commitment
- Results
  - 70% reduction in cases
- Success factors/pre-requisites
  - Communication, Communication, Communication

Thank You!