

Institution Specific Overviews and CRE Detection Issues

Stephen G. Jenkins, Ph.D.

**Director, Clinical Microbiology Laboratories
New York/Presbyterian Hospital
Weill Cornell Medical Center
Professor of Pathology and Laboratory
Medicine
Professor of Medicine in Pathology
Weill Cornell Medical College
New York, NY**

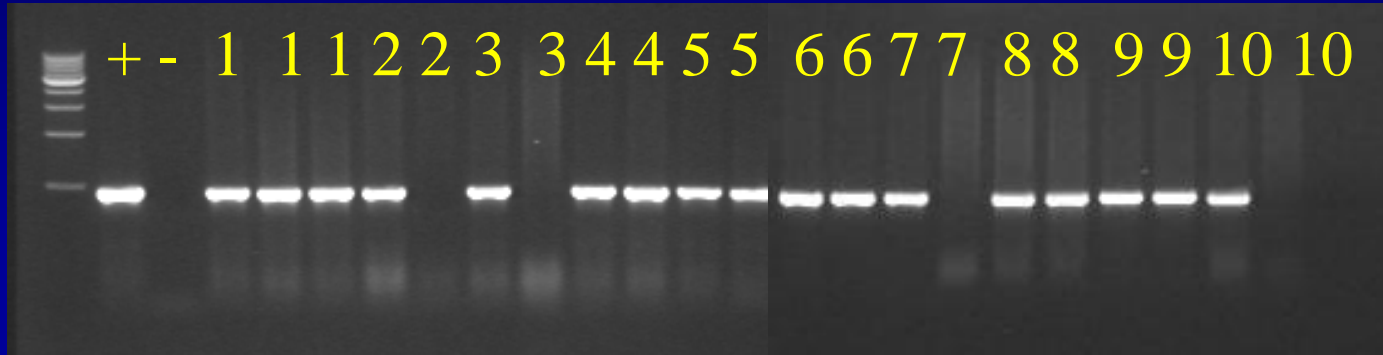
Mount Sinai Hospital: Patients with Carbapenem-Resistant *K. Pneumoniae* by Year

- 1998 – 2
- 1999 – 1
- 2000 – 1
- 2001 – 7
- 2002 – 2
- 2003 – 13
- 2004 – 40
- 2005 – 167
- 2006 – 219
- 2007 – 225
- 2008 – 44 (through 03/21)

Mount Sinai Experience

- 721 patients colonized/infected with carbapenem-resistant *K. pneumoniae* from 1/04 to 4/08
- 97 patients colonized/infected with carbapenem-resistant Enterobacteriaceae other than *Klebsiella pneumoniae* since 2006:
(*Enterobacter* spp. – 73; *Providencia stuartii* – 1; *Morganella morganii* – 1; *Serratia marcescens* – 1; *Klebsiella oxytoca* – 6; *E. coli* – 11; *Citrobacter freundii* – 4)
- 29 in patients concomitantly infected with KPC-producing *K. pneumoniae* (confirmed as KPCs by PCR)

10 Patients: Both *K. pneumoniae* and Another Enteric Bacterial Species



- 6 of 10 patients' pairs possess KPC genes confirmed by PCR (patient 1, 4, 5, 6, 8 and 9)

WCMC Experience

(Patients with Carbapenem-resistant *Klebsiella pneumoniae*)

- *Klebsiella pneumoniae* – 489 patients
 - 2007 – 61 patients
 - 2008 – 77 patients
 - 2009 – 64 patients
 - 2010 – 79 patients
 - 2011 – 64 patients
 - 2012 – 78 patients
 - 2013 (through 6/20/13) – 66 patients
- (NOTE: Recent increase in “outpatient” isolates)

Confirmed Carbapenem-Resistance among *Enterobacteriaceae* other than *K. pneumoniae* (100)

- *Enterobacter cloacae* – 47 patients
- *E. coli* – 32 patients
- *Klebsiella oxytoca* – 7 patients
- *Enterobacter aerogenes* – 5 patients
- *Citrobacter freundii* – 2 patients
- *Serratia marcescens* – 2 patients
- *Enterobacter absuriae* – 1 patient
- *Enterobacter gergoviae* – 1 patient
- *Pantoea* sp. – 1 patient
- *Providencia rettgeri* – 1 patient
- *Proteus mirabilis* – 1 patient

Specimen Distribution

June 2008 – September 2011

- *Klebsiella pneumoniae* (surveillance; rectal swabs/stool – 12)
 - Urine – 169
 - Significant wounds and usually sterile fluids – 51
 - Significant respiratory – 47
 - Blood – 29
- *Enterobacter cloacae* (surveillance – 1)
 - Respiratory – 10
 - Wounds/usually sterile body fluids – 8
 - Blood – 7
 - Urine – 6
- *E. coli* (surveillance – 3)
 - Urine – 10
 - Blood – 5
 - Respiratory – 4
 - Wounds - 4



STATE OF NEW YORK DEPARTMENT OF HEALTH

Coming Tower

The Governor Nelson A. Rockefeller Empire State Plaza

Albany, New York 12237

Antonia C. Novello, M.D., M.P.H., Dr.P.H.
Commissioner

Dennis P. Whalen
Executive Deputy Commissioner

Reporting Cases of Klebsiella spp. Infection or Colonization

1. The New York State Sanitary Code mandates prompt reporting of hospital-associated clusters of infectious disease and single cases of emerging pathogens to the NYSDOH and the local health department. Please report using a DOH 4018 form, available on <http://www.health.state.ny.us/nysdoh/infection/infectreport.pdf>:
 - a. Clusters of cases of *Klebsiella* spp. infection or colonization; and/or
 - b. Single cases of carbapenem-resistant *Klebsiella* spp. infection or colonization.
2. The DOH 4018 form should be faxed to the Regional Epidemiology Program at 518-408-1745. Local health departments can be notified by telephone (a confidential case report does not need to be completed).

Advice from the Canadian Medical Association: Beware of US Hospitals



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Elderly Canadians who spend their winters in Florida face and pose the most serious risk because they are more likely to find themselves in United States hospitals, in which carbapenem-resistant *Klebsiella pneumoniae* is rampant.

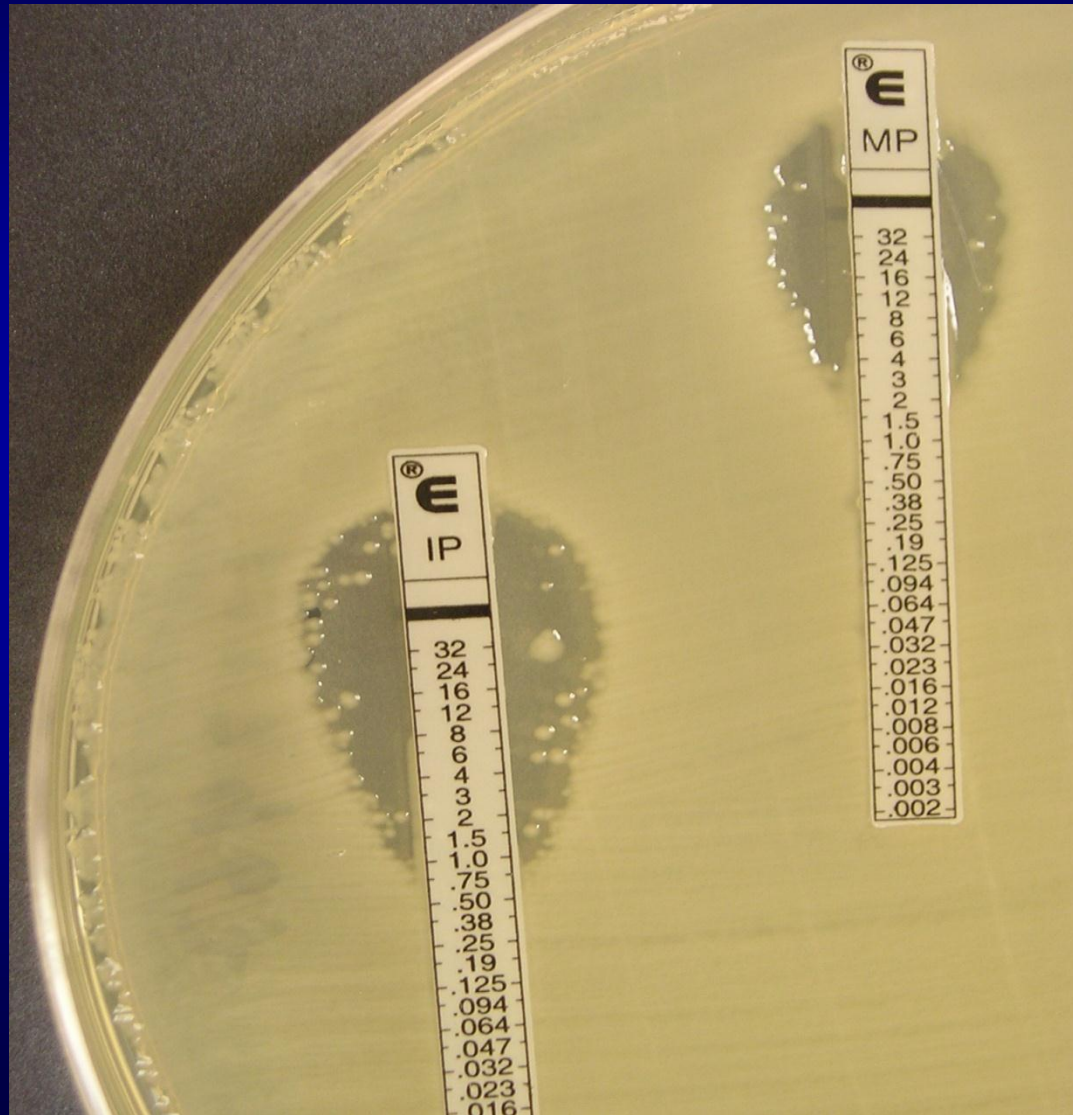
Question 1

Is AST sufficiently sensitive to detect clinically and epidemiologically important KPC-mediated carbapenem-resistance in Enterobacteriaceae?

Question 2

Will molecular methods be required to supplement (or replace) AST methods for detection of such resistance?

Resistant Subpopulations



IPM
10

ETP
10

Susceptibility Testing

Frequency of Very Major, Major, and Minor Errors

Testing Method	Number (%) of Isolates with Indicated Result		
	<u>Very Major</u>	<u>Major</u>	<u>Minor</u>
	<u>2010 CLSI Meropenem Interpretive Criteria</u>		
Etest	1 (2.2)	0 (0)	1 (2.2)
Vitek 2	11 (23.9)	0 (0)	18 (39.1)
Sensititre	3 (6.5)	0 (0)	12 (26.1)
Microscan	0 (0)	0 (0)	1 (2.2)
<u>FDA Meropenem Interpretive Criteria</u>			
Etest	1 (2.2)	0 (0)	7 (15.2)
Vitek 2	27 (58.7)	0 (0)	8 (17.4)
Sensititre	27 (58.7)	0 (0)	12 (26.1)
Microscan	0 (0)	0 (0)	2 (4.3)

Susceptibility Testing

Meropenem MIC agreement between Selected Testing Method and BMD (48 isolates)

No. (%)

Etest 41 (85)

Vitek-2 11 (23)

(MIC within 1 2-fold dilution of MIC obtained)

Susceptibility Testing Issues

Incidence of meropenem errors for selected testing methods - No. (%) of isolates with the indicated errors

	<u>Very major</u>	<u>Major</u>	<u>Minor</u>
Etest	(0) 0	(0) 0	(1) 2
Vitek- 2	13 (27)	0 (0)	13 (27)

Performance of Phenotypic Tests for Characterization of Carbapenem Resistance in *Enterobacteriaceae*

Performance of the Rosco MBL/KPC Kit for Detection of KPCs

<u>Isolate ID</u>	<u>Mero Etest</u>	<u>Molecular Panel</u>	<u>KPC PCR</u>	<u>Rosco MBL/KPC</u>
<i>E. cloacae</i>	>32	TEM-1, KPC-3, ACT	Pos	Indeterm
<i>E. cloacae</i>	8	TEM-1, KPC-3, ACT	Pos	Indeterm
<i>E. cloacae</i>	16	TEM-1, KPC-3, ACT	Pos	Pos for KPC
<i>E. cloacae</i>	>32	TEM-1, KPC-3, ACT	Pos	Pos for KPC
<i>E. cloacae</i>	>32	TEM-1, KPC-2	Pos	Pos for KPC
<i>E. cloacae</i>	3	TEM-1, KPC-2, SHV-12, ACT	Pos	Pos for KPC

Two of the six isolates positive by molecular methods for KPCs were indeterminate on the Rosco MBL/KPC kit

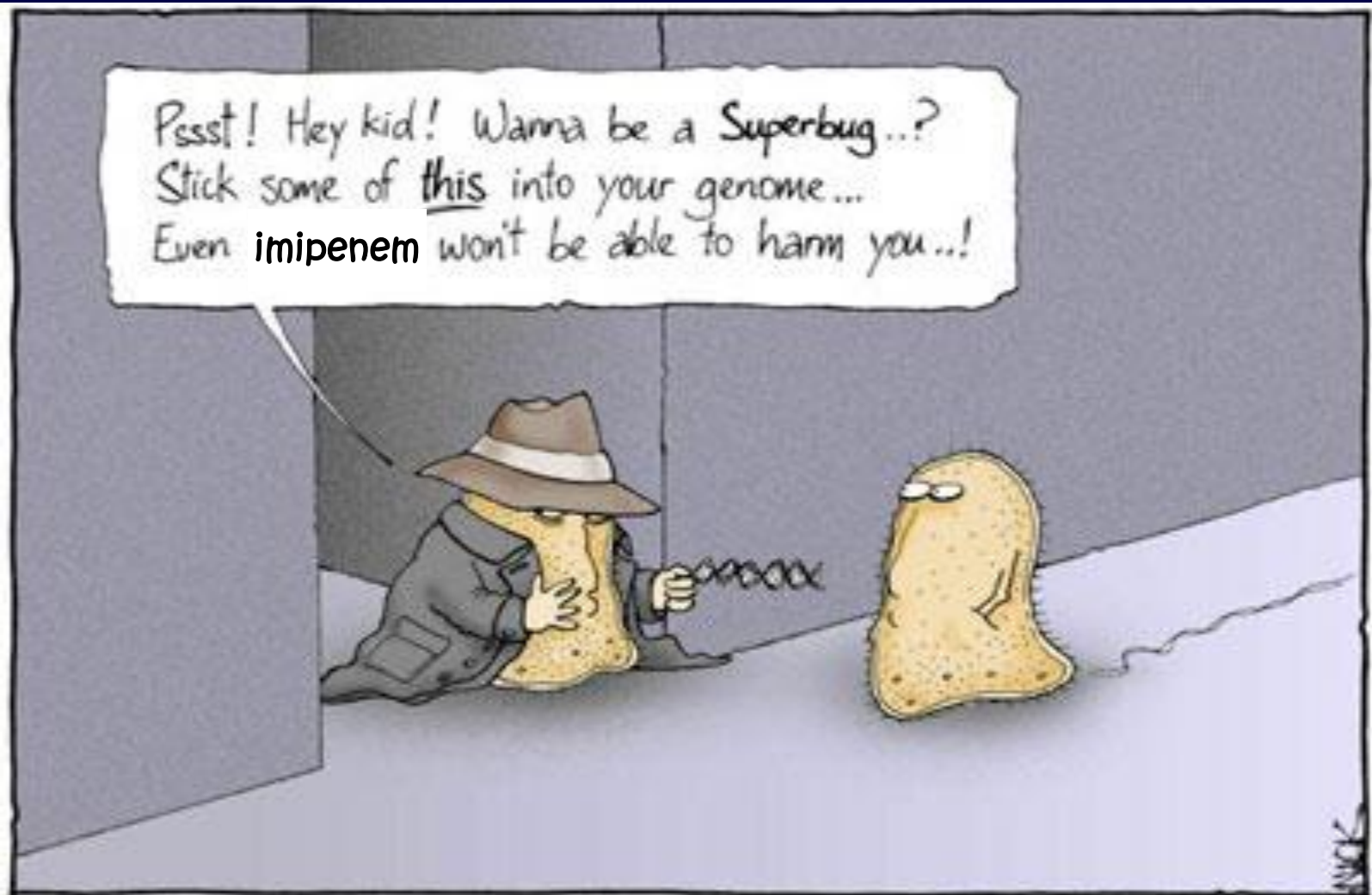
Concerns raised in letter from German Francisco Esparza Sanchez - associated with clinical failures on meropenem

“Silent” Dissemination of KPC-Producing *Klebsiella* spp. With ESBL Phenotype

- Study performed by Colombian collaborative group
- *K. pneumoniae* (3) and *K. oxytoca* (3) tested + for ESBL phenotypically
- All positive for *bla*_{KPC} by PCR
- Meropenem MICs by BMD were all S/I (0.25 – 2 µg/mL)

Failure of Revised CLSI Breakpoints to Detect KPC

- Colombian collaborative study of 272 *bla*_{KPC}-producing strains of *Enterobacteriaceae*
- 21 (7.7%) were susceptible to imipenem by BMD (0.25 – 1 µg/mL)
- 3 (1.1%) additional strains tested intermediate to imipenem (2 µg/mL)
- 7 also tested as susceptible to ertapenem (MIC 0.125 – 0.5 µg/mL)
- All MHT-positive



It was on a short-cut through the **Surgical ICU** that Albert was first approached by a member of the Antibiotic Resistance.