

# Community Acquired MRSA Infections

(Guess What, its *NOT* a Spider Bite!)

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# CaMRSA Infections

- Epidemiology : U.S., Texas, Central Texas
- The Bug
- How Does It Present?
- Antimicrobial Sensitivity Data
  - Modes of Resistance
  - Appropriate drugs for therapy

# Ca-MRSA Infections

- No identifiable traditional risk factors:
  - known chronic disease
  - chronic care facility residence
  - recent hospitalization
  - previous antibiotic therapy, IV drug use
- If hospitalized, those identified within 48h of admission
- Outpatient setting MRSA diagnosis
- Majority of children hospitalized with CaMRSA infections have no identifiable risk factor.

Layton MC. Infect Control Hosp Epidemiol 1995;16: 12-17

Washanwsky B. Infect Control Hosp Epidemiol 2000;21:724-7

CDC: MRSA Fact Sheet; [www.cdc.gov](http://www.cdc.gov)

# Ca-MRSA Infections: Epidemiology

- Australia: early 1990s, USA late 1990s
- Worldwide. NOT a single clone
- US hospitalization studies: 26 fold increase in Ca-MRSA prevalence in children without risk factors 1993-95 vs. 1988-1990.
- South Texas Children: proportion of Ca-MRSA increased from 12% to 80% over 10 years (1990-2000)
- Houston: Fall 2002; Austin: Fall, 2003
- Estimated 30-50% nasal colonization rates in various populations

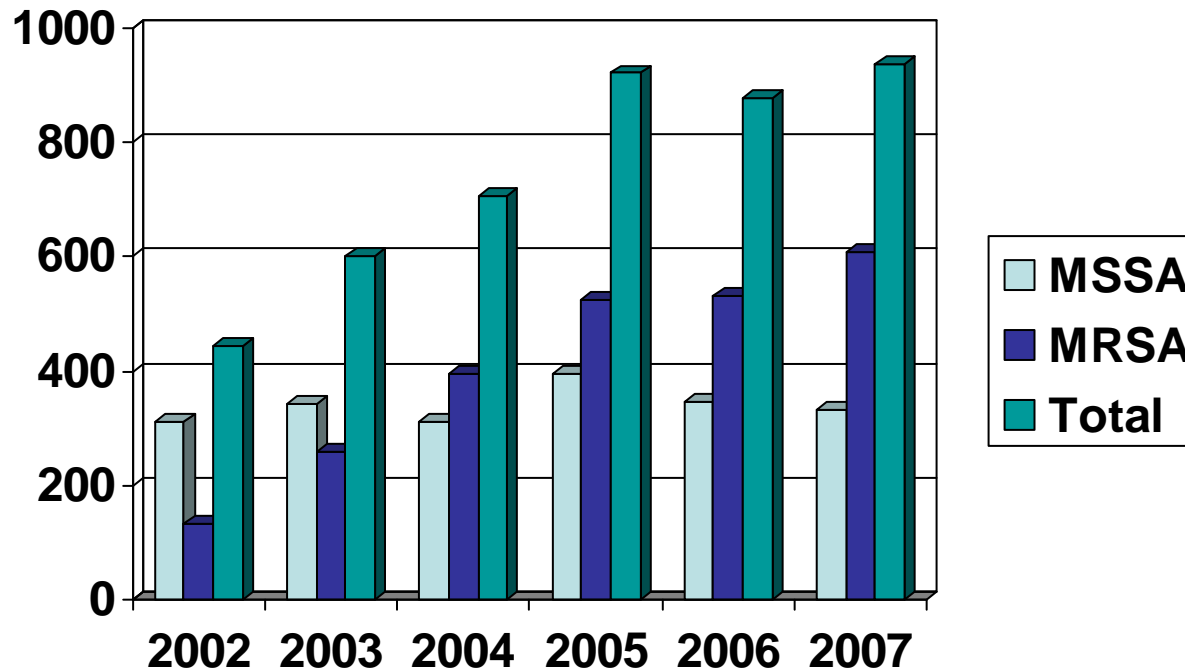
Fergie PIDJ 2002: 21 (10):988

Bratcher D PIDJ 2001:20 (12):

EID 2003;9 (8):962

# MRSA Infections: Epidemiology Central Texas

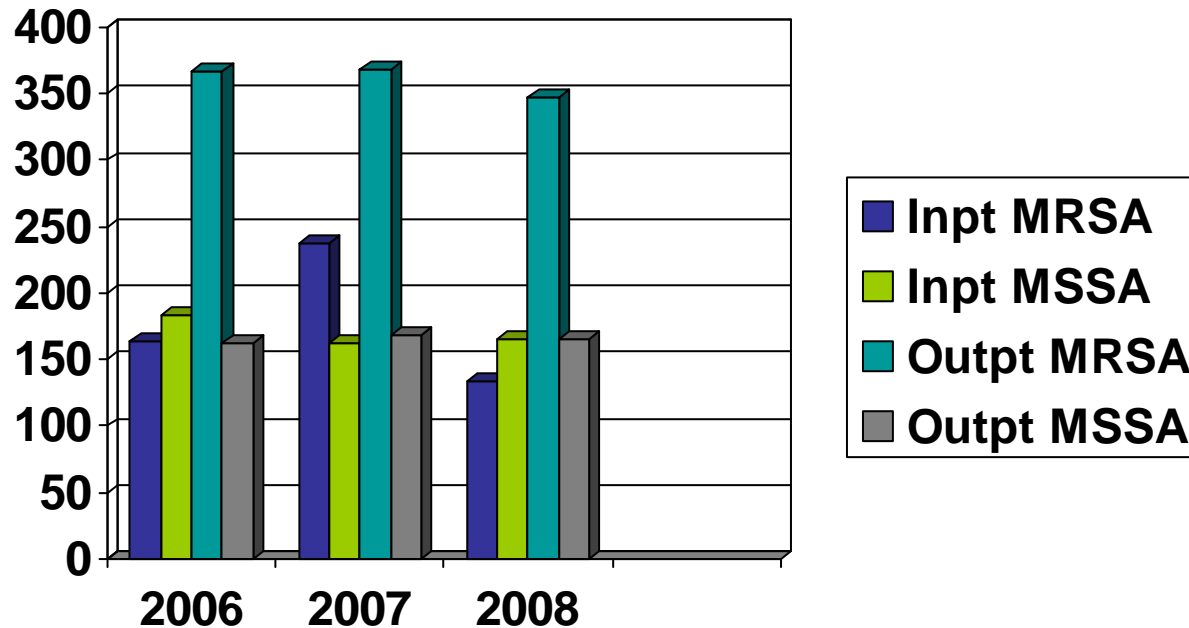
mrsa isolates choa/dcmc 2001-2007



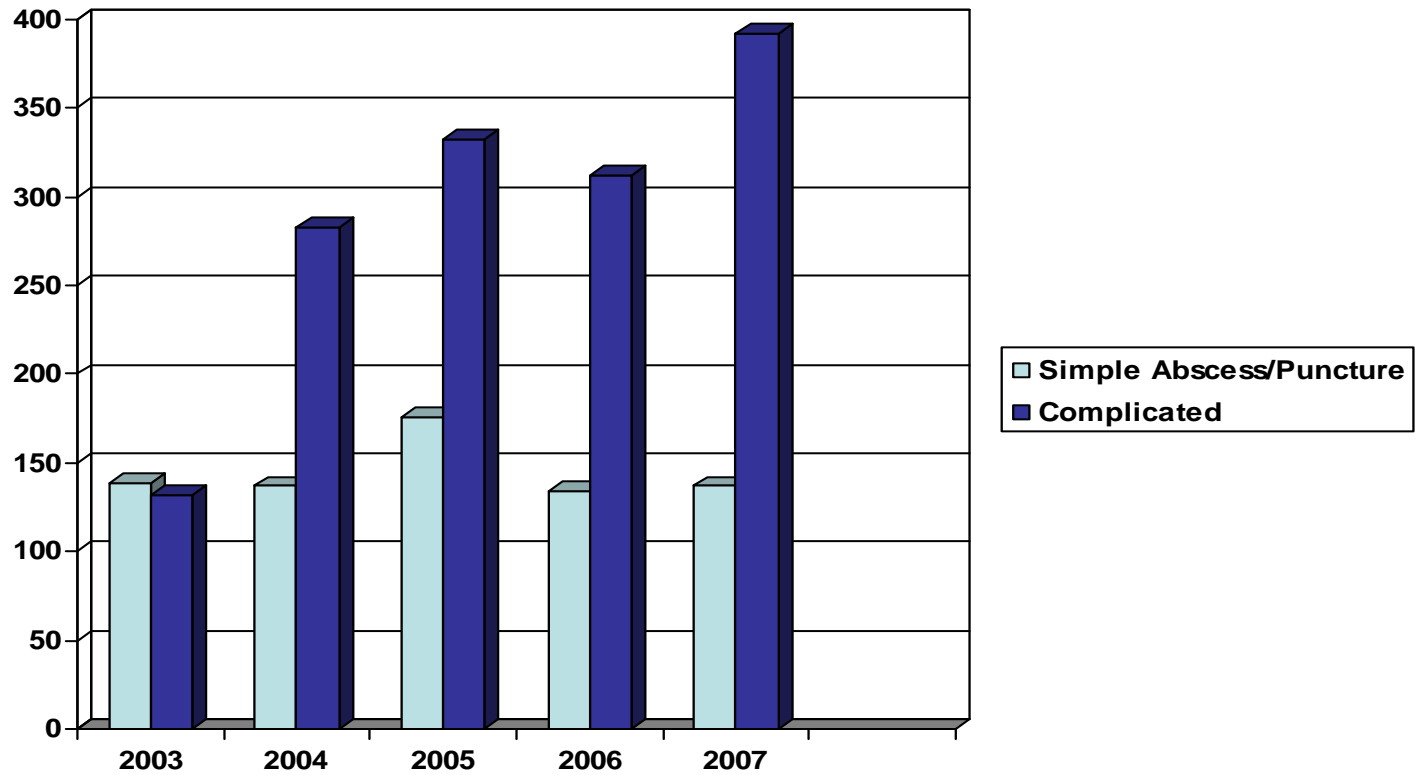
***By 2007 64% of all *S. aureus* strains were MRSA***

# MRSA Infections: Epidemiology Central Texas

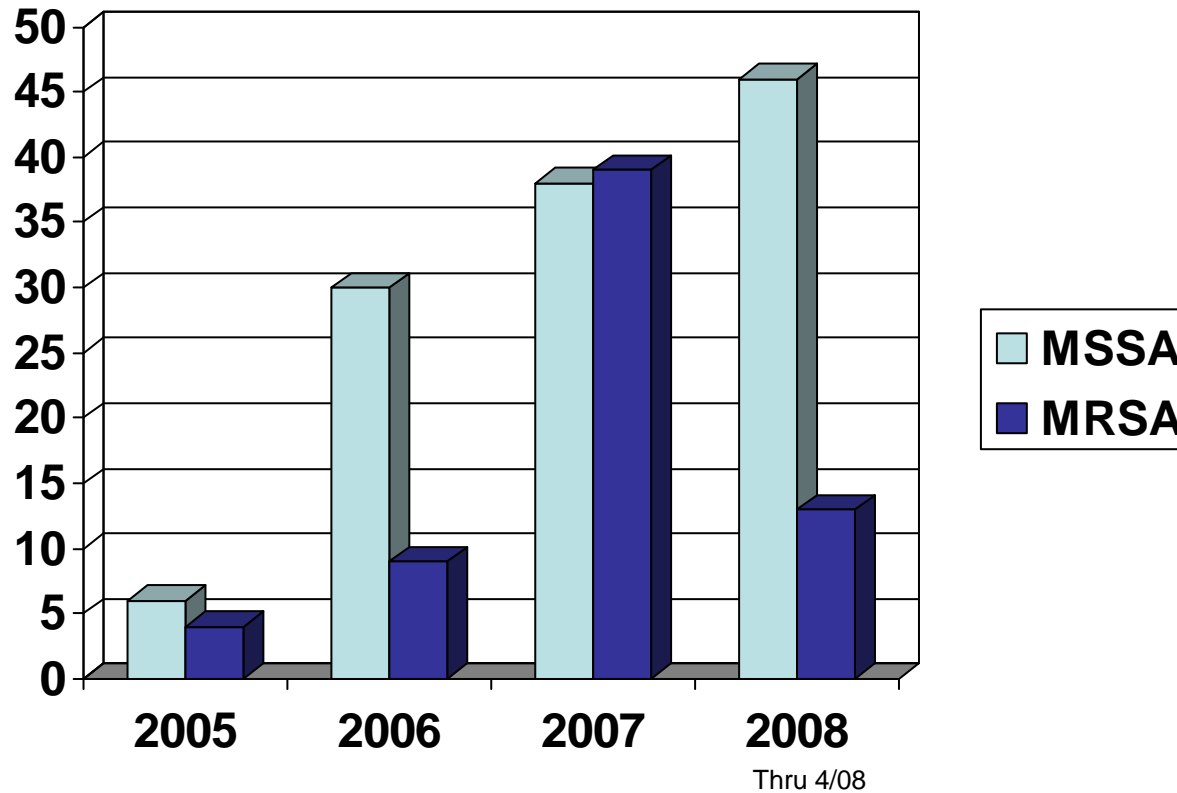
## Inpatient vs Outpatient MRSA Isolates



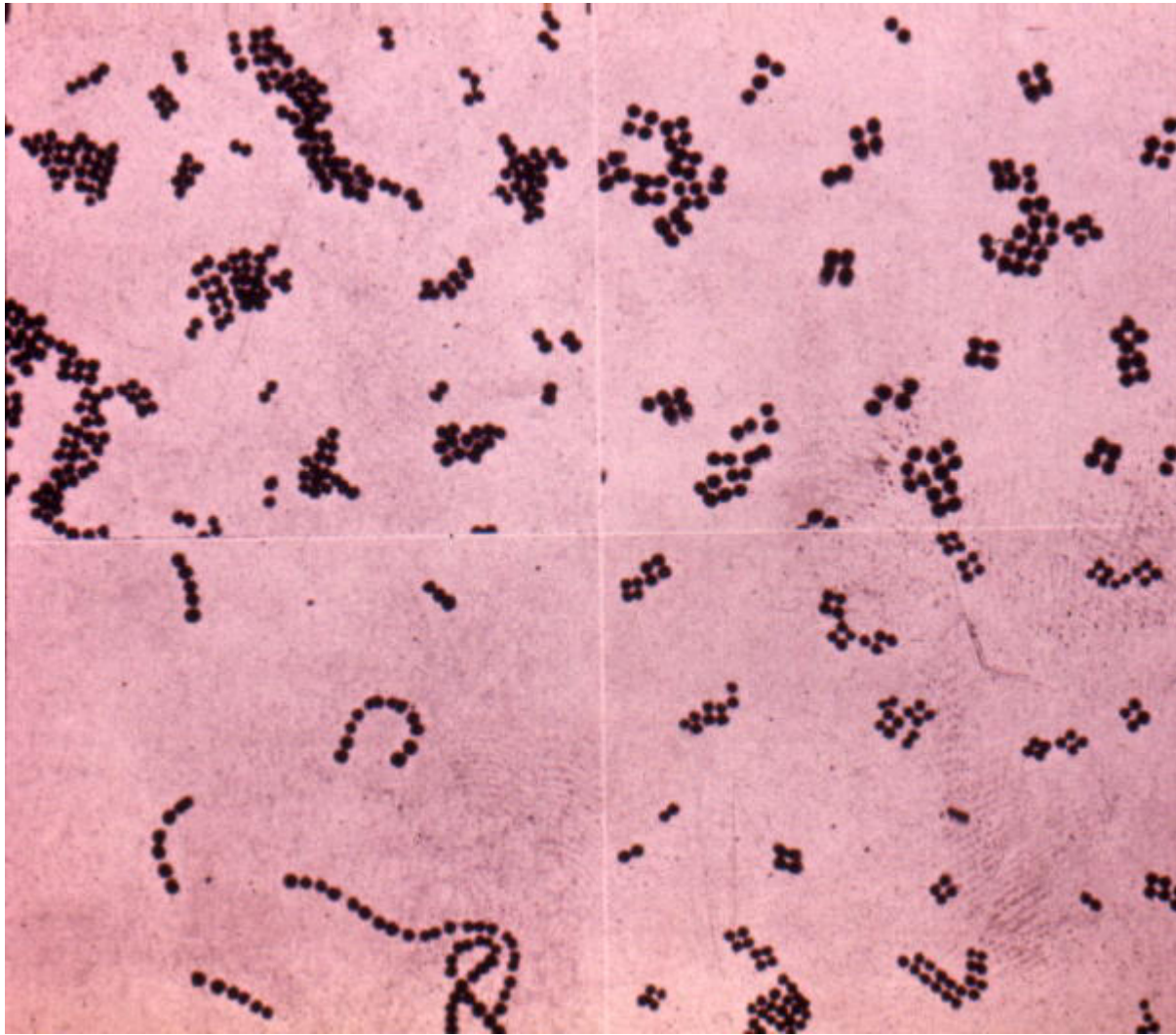
# CHOA/DCMC Outpatient Abscess I/D Data (Annual Jan - Dec)



# CHOA/DCMC S. aureus Blood Culture Data Annual July-June



For 2007 and 2008, + BC for S. aureus = 1% of total drawn



Staph vs strep gram stain

# Is Ca-MRSA a “Badder” Bug?

- Methicillin resistance carried by *mecA* gene in a family of mobile genetic elements (Staphylococcal cassette chromosome): implications for community spread
- Appears to have faster doubling times
- Panton-Valentine Leukocidin (PVL)
  - Toxic effects on human WBC
  - Associated with necrotic lesions of tissues/necrotizing pneumonia

***S. Aureus* Buttock Carbuncle with cellulitis**



**Cohen & Powderly: Infectious Diseases, 2nd ed**

# Staphylococcal pyoderma

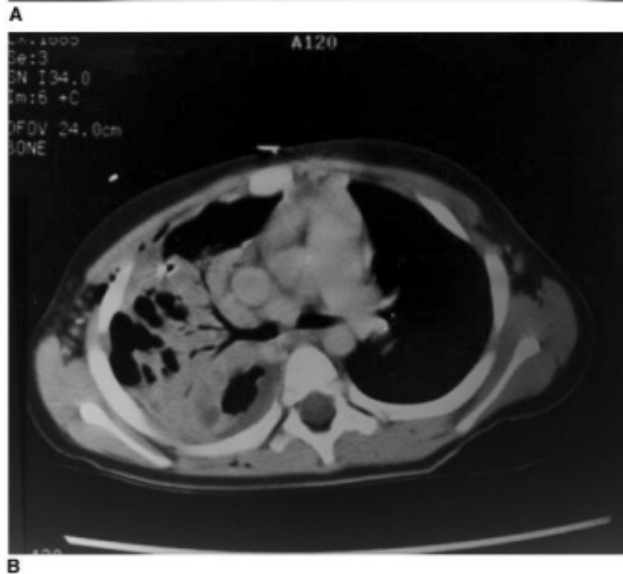






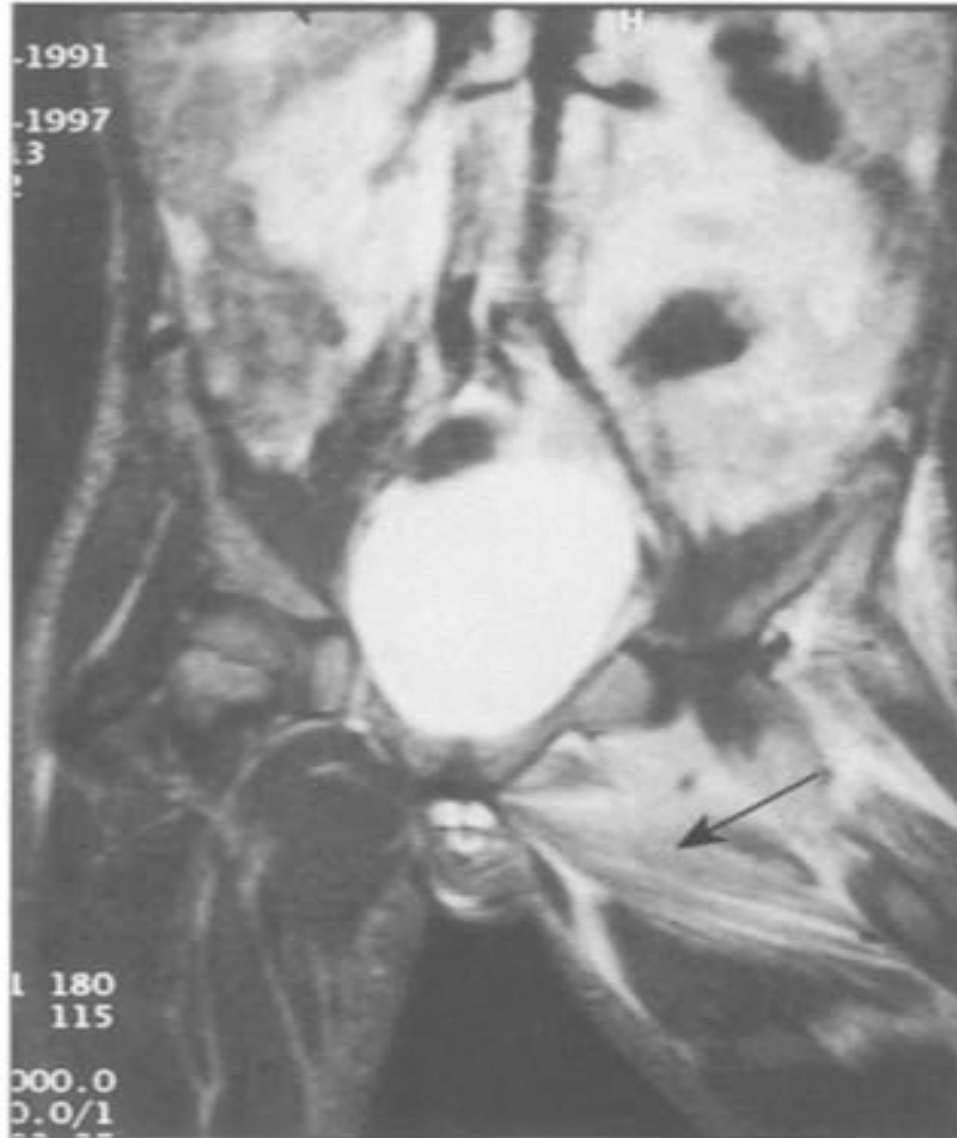
**Cohen & Powderly: Infectious Diseases, 2nd ed.**

# Staphylococcal Empyema and Necrotizing Pneumonia



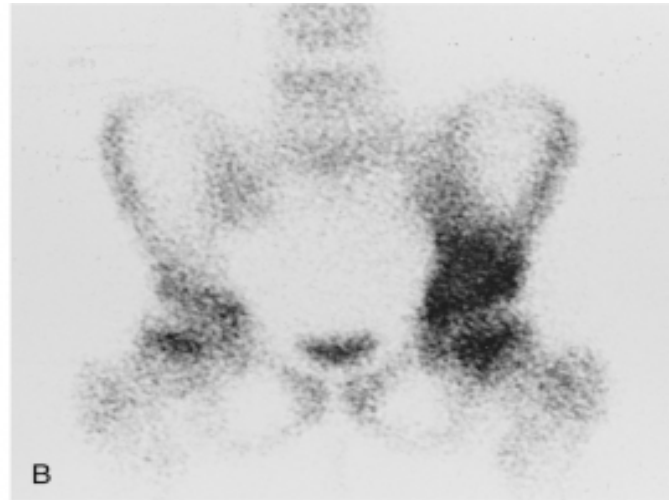
**Gershon: Krugman's Infectious Diseases of Children, 11th ed.**

# Myositis, adductor muscle



Cohen & Powderly: Infectious Diseases, 2nd ed.

*Pelvic osteomyelitis of the left iliac bone*



**Kliegman: Nelson Textbook of Pediatrics, 18th ed.  
Figure 683-1**

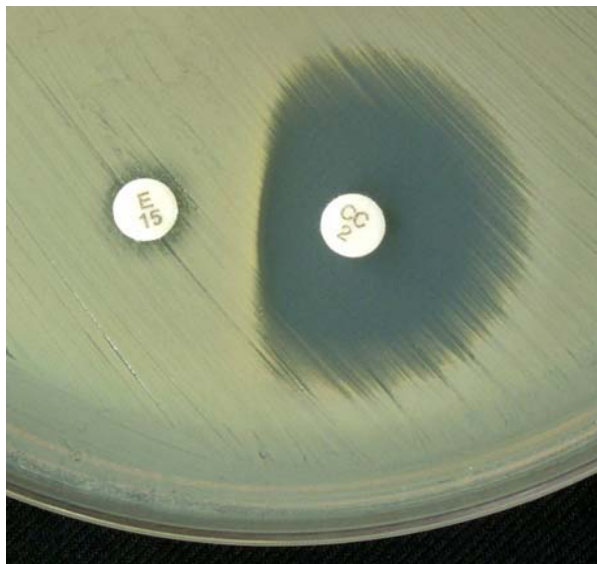
# Ca-MRSA Strains: Why Are They Different from MRSA strains?

- ***NOT*** multi drug resistant:
  - Usually susceptible to multiple antibiotics, ***except*** B-lactam drugs, erythromycin.
  - Usually maintain susceptibility to Clindamycin, Trimethoprim-sulfamethoxazole, tetracyclines, quinolones, vancomycin, linezolid, daptomycin.

## DCMC S. aureus Antibiogram (% Susceptible)

<u>S. aureus</u> isolates 2007	n	oxa cilli n	Vanc omyc in	eryth romy cin	clind amyci n	D – test (% +)	Trim/ Sulfa	Cipro floxacin	Tetra cyclin e	Mino cycli ne	Rifa mpi n	Linezoli d
MRSA	607	0	100	11	82	2	100	94	96	97	96	100
MSSA	333	100	100	64	92	19	99	49	96	97	99	100

### D test



D test: test for Inducible resistance to Clindamycin; use in discordant strains; Recommended to perform by NCCLS since 2004

Two discs, on L, Erythromycin, on R, clindamycin on lawn on S. aureus: Blunting of the zone forming a "D" shaped zone around clindamycin indicates inducible resistance to clindamycin. Reported as Positive for inducible clindamycin resistance.

# Ca-MRSA Therapy

## “ The Right Drug For The Right Bug ”

- When you think of S. aureus, now think MRSA
- Oral penicillins, cephalosporins, and erythromycins are *NOT* good choices
- Clindamycin is an effective agent: caveat D test
- Trimethoprim-Sulfamethoxazole, Tetracyclines are good choices
- Double drug therapy: in special scenarios: NEVER use Rifampin alone
- Newer drugs

# Ca-MRSA

## References

- Bratcher D. MRSA in the Community PIDJ 2001;20 (12)
- CDC: MRSA Fact Sheet; [www.cdc.gov](http://www.cdc.gov)
- CID 1999;29-1131
- EID 2003;9 (8):962
- Fergie et al. Ca-MRSA Infections in South Texas Children PIDJ 2001: 20 (9):860-863
- Gorak EJ CID 1999;29-797
- Herold BC et al. Ca-MRSA in Children with no identifying risk factors JAMA 1998: 279(8): 593-598
- Layton MC. Infect Control Hosp Epidemiol 1995;16: 12-17
- Lancet 2002;359:1820
- Infect Med 2003;20 (1):8
- Purcell K et al. Exponential increase in Ca-MRSA in South Texas children 2002 PIDJ 21(10)988-989
- Washanwsky B. Infect Control Hosp Epidemiol 2000;21:724-7