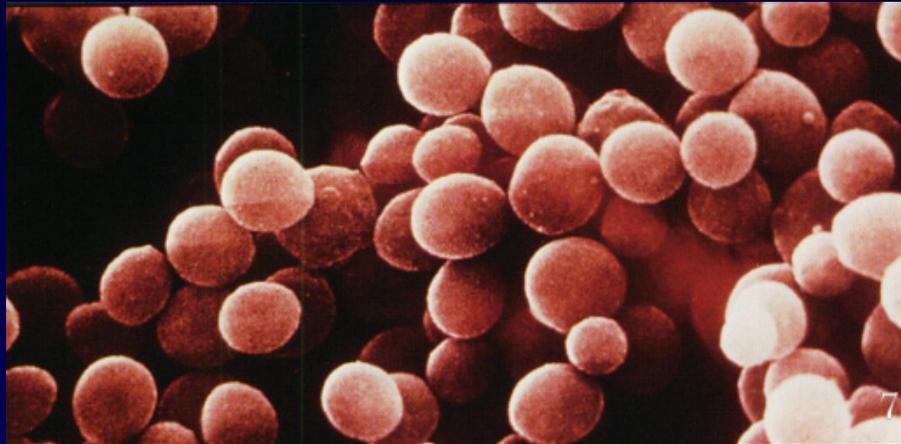


# Community-Associated Methicillin-Resistant *Staphylococcus aureus*



Daniel B. Jernigan, MD MPH

Division of Healthcare Quality Promotion

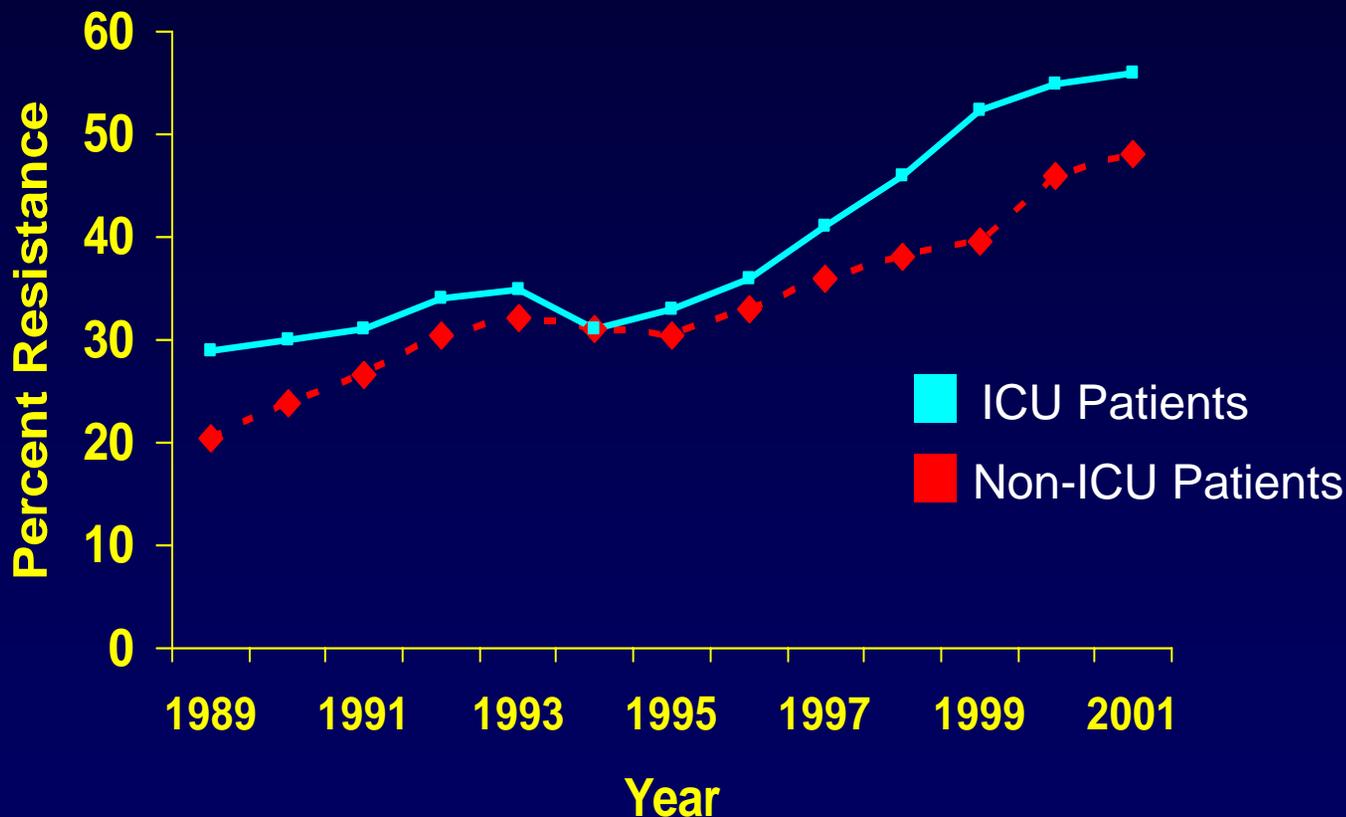
National Center for Infectious Diseases

# Objectives

- Background on data to support reasonable approaches to control and prevention of MRSA in community settings
- Summarize draft statements from a recent meeting of CA-MRSA experts at CDC

# MRSA is Increasing in Healthcare Settings

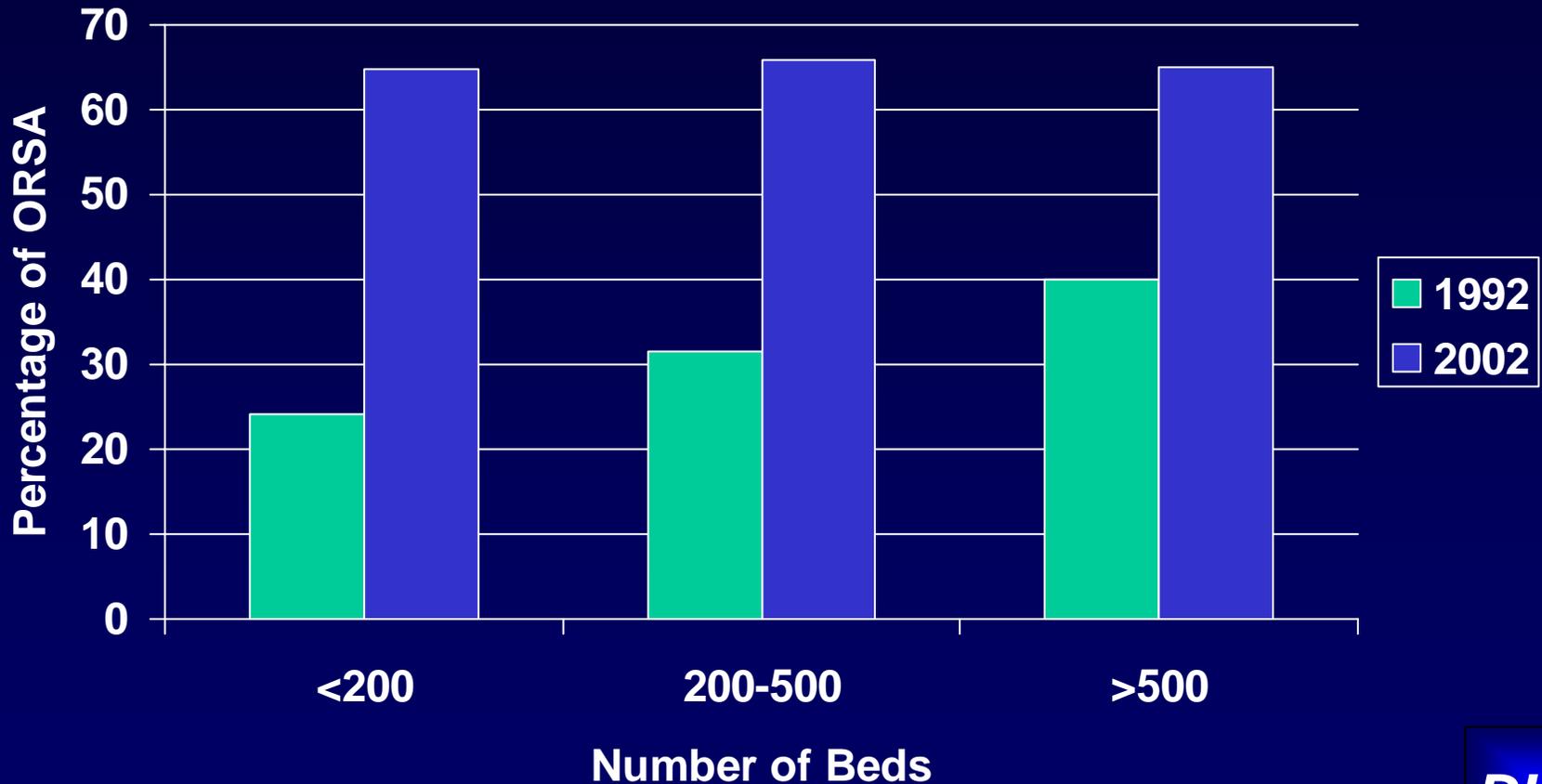
Proportion of *S. aureus* Nosocomial MRSA Infections by ICU Status



Source: NNIS DATA, Clinics Chest Med: 20:303-315

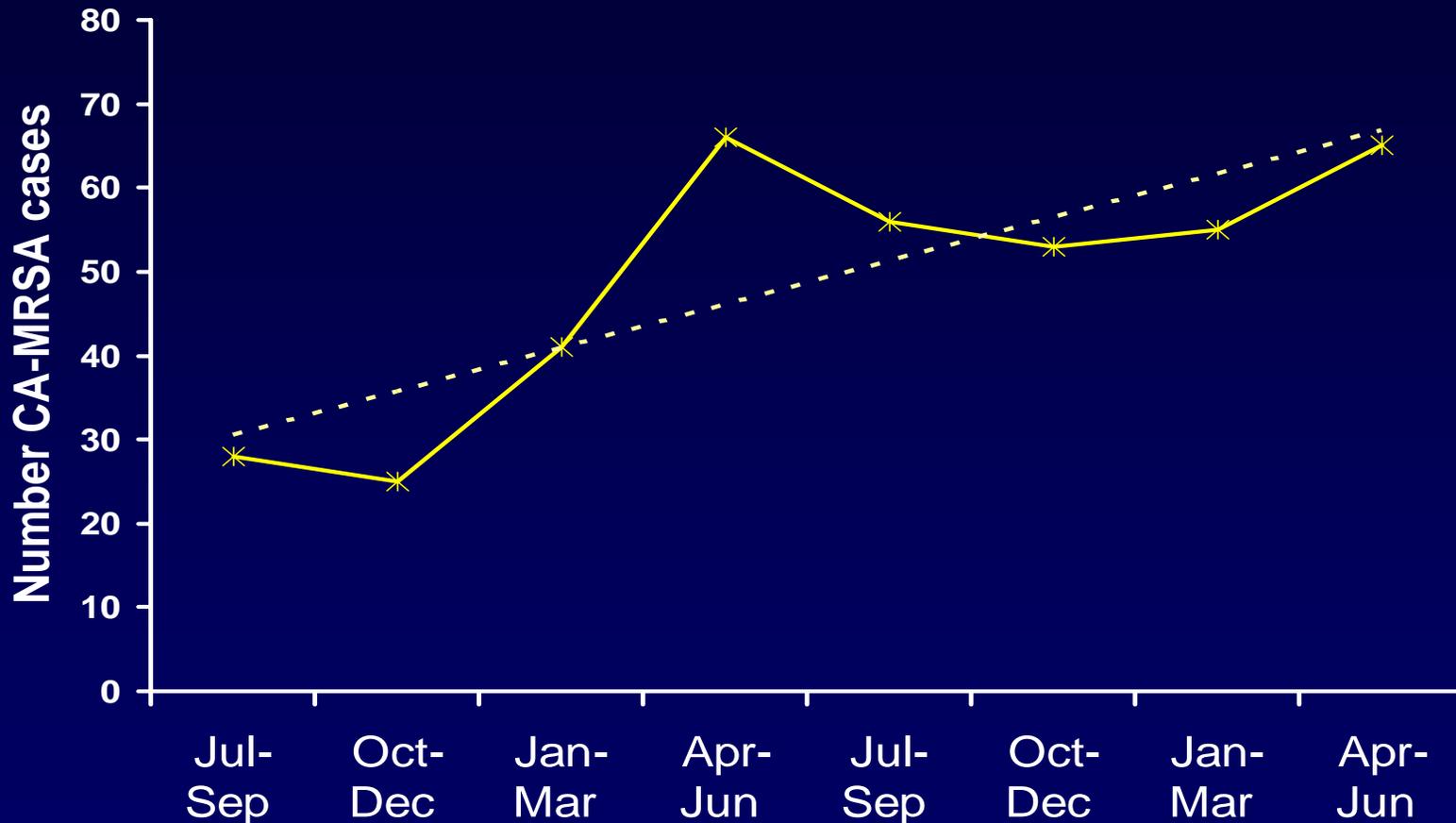
# MRSA is Increasing in Healthcare Settings

Percentage of *S. aureus* Nosocomial MRSA Infections by Hospital Bedsize in 1992 and 2002, NNIS



# MRSA is Emerging in the Community

Estivariz EIS '03

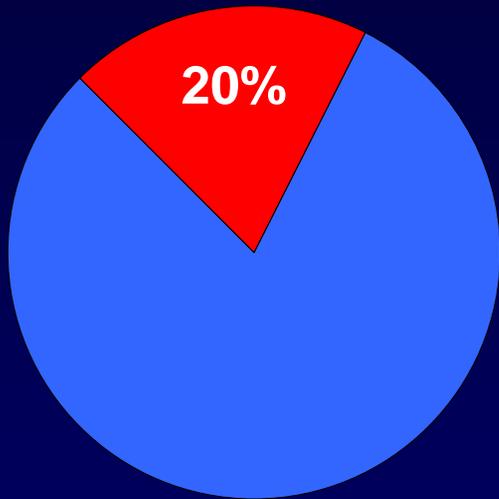


CA-MRSA is Increasing in Four Facilities in Hawaii, 2001-2003

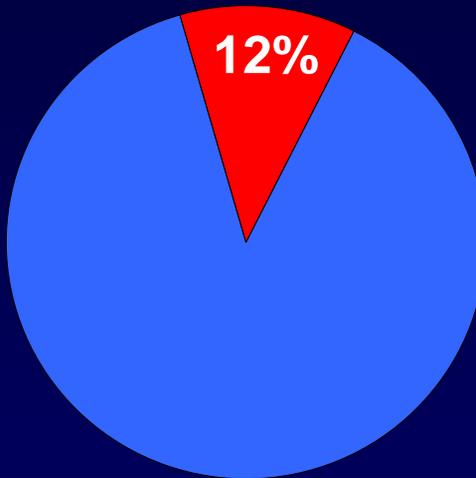


# CA-MRSA Prevalence Varies by Region

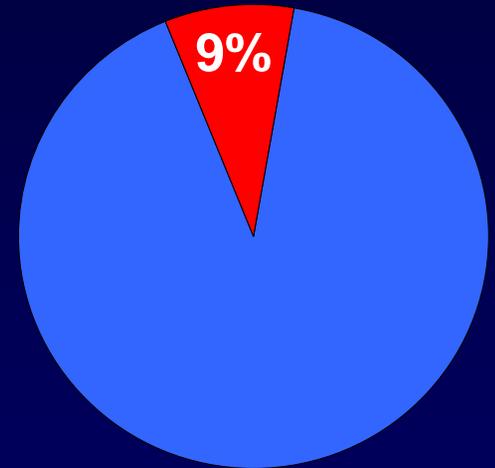
■ Healthcare-Associated MRSA   ■ Community-Associated MRSA



**Georgia**  
n=7819



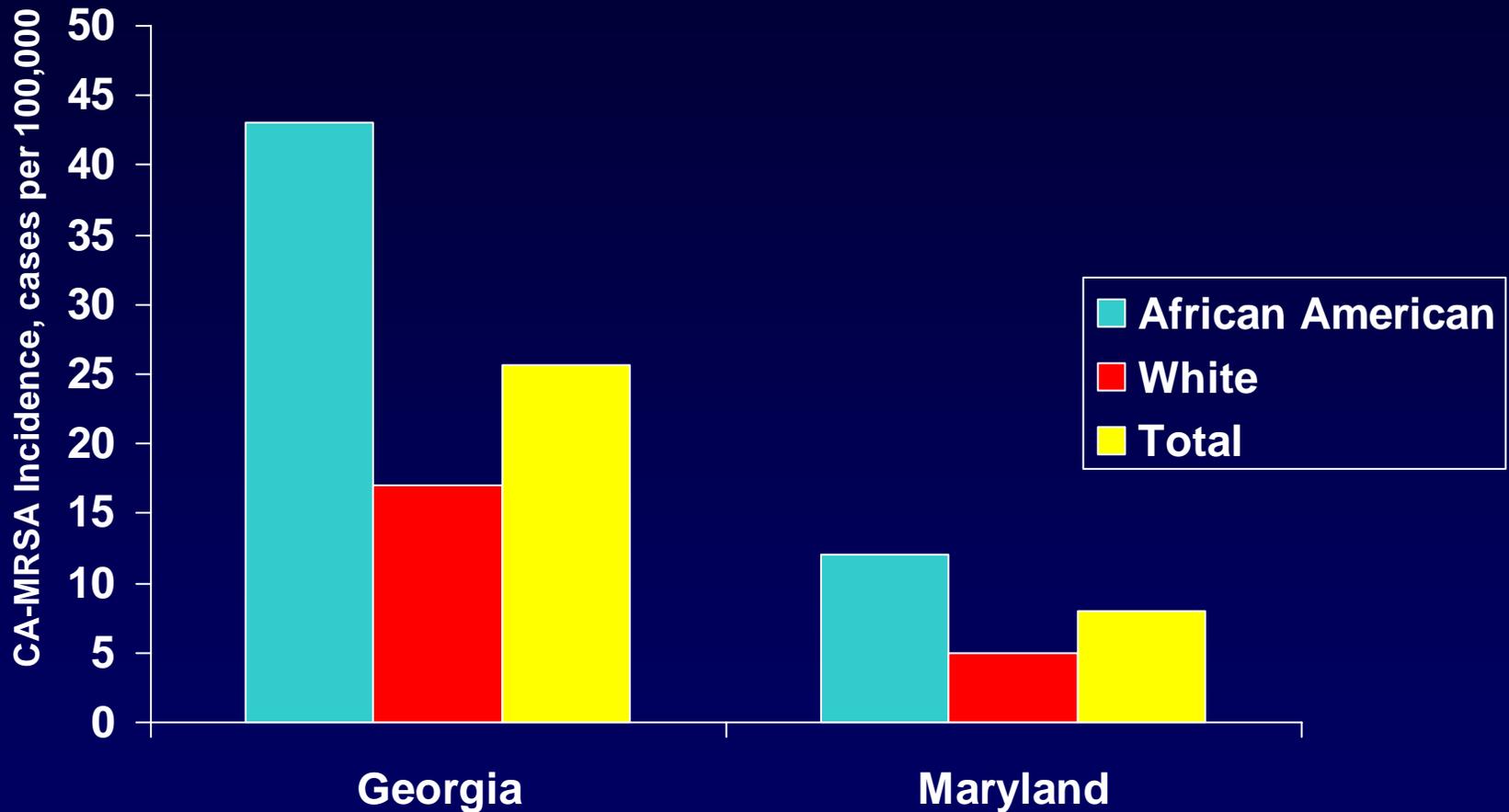
**Minnesota**  
n=3014



**Maryland**  
n=1720

CA-MRSA Prevalence in Three States – ABCS/EIP

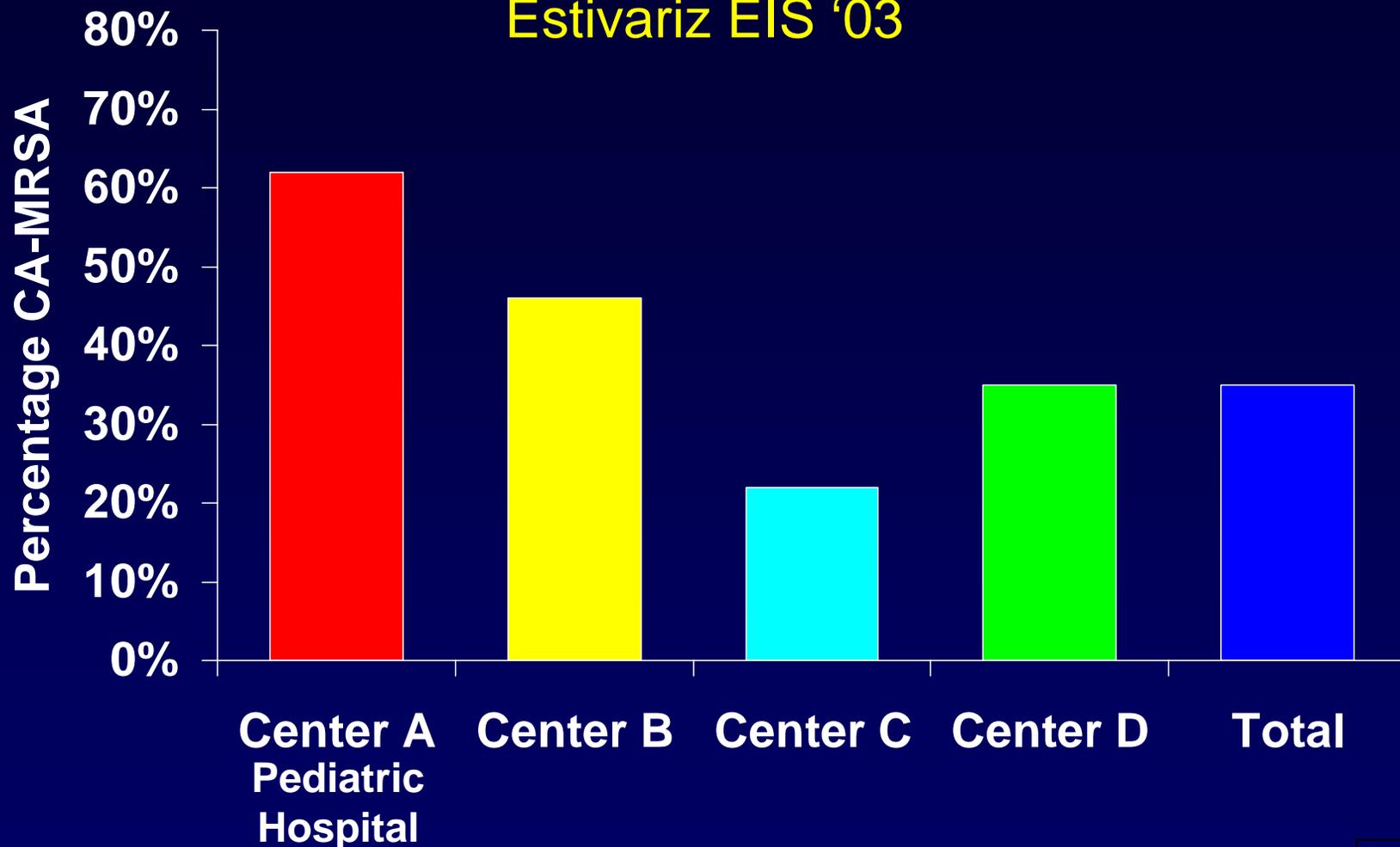
# CA-MRSA Incidence Varies by Race



**Incidence of CA-MRSA by Race, ABCS/EIP**

# CA-MRSA Prevalence Varies by Age

Estivariz EIS '03



CA-MRSA Prevalence at Four Facilities in Hawaii, 2001-3

# CA-MRSA Predominantly Causes Skin Disease

Disease Syndrome	(%)
Skin/soft tissue	1,266 (77%)
Wound (Traumatic)	157 (10%)
Urinary Tract Infection	64 (4%)
Sinusitis	61 (4%)
Bacteremia	43 (3%)
Pneumonia	31 (2%)

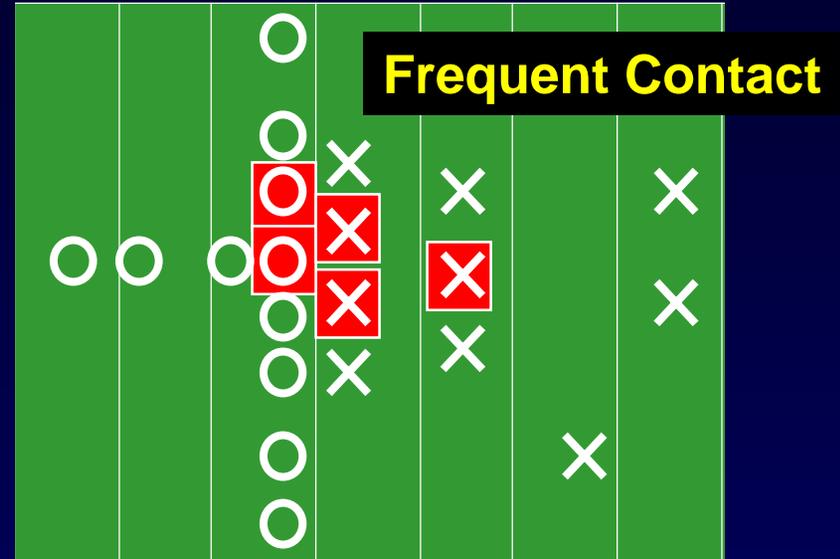


# CA-MRSA: Factors for Transmission

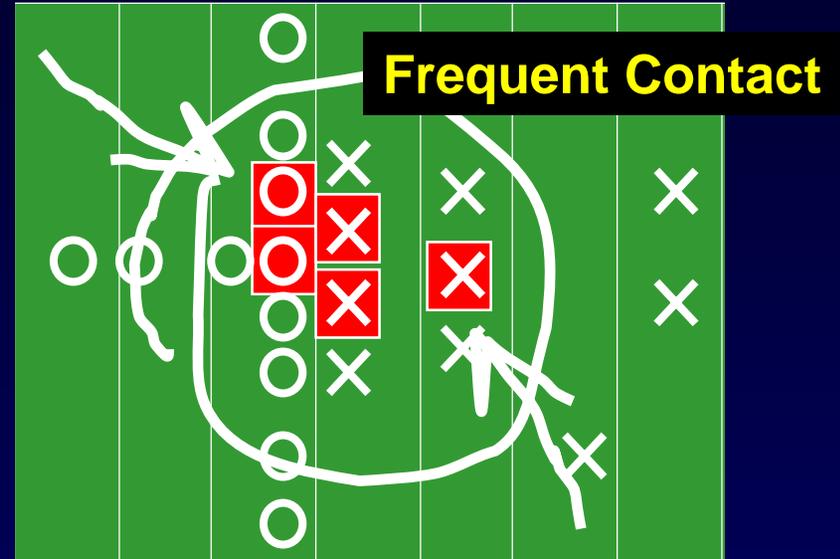
# CA-MRSA: Factors for Transmission



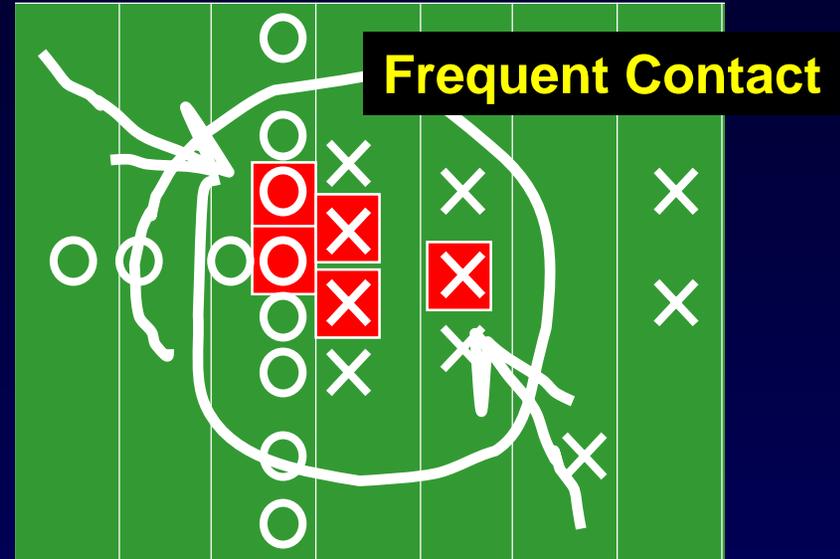
# CA-MRSA: Factors for Transmission



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# CA-MRSA: Factors for Transmission

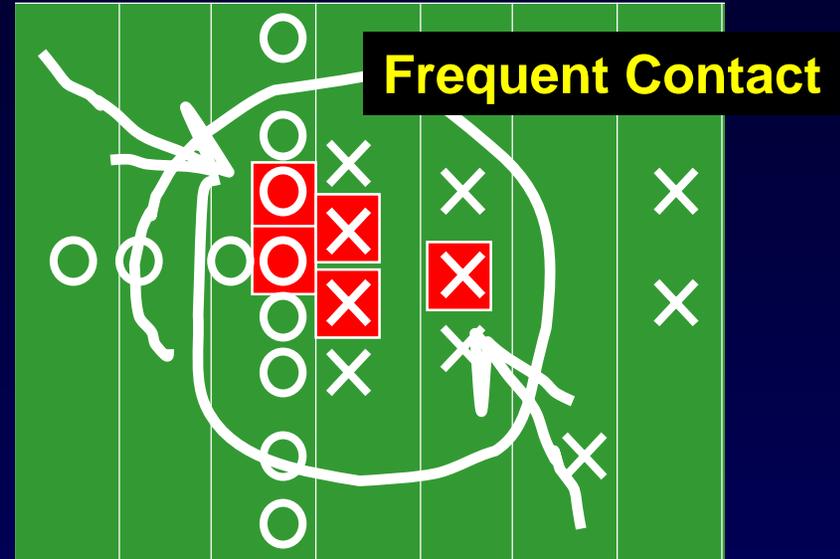


**Compromised Skin**

# CA-MRSA: Factors for Transmission



**Crowding**



**Frequent Contact**



**Compromised Skin**

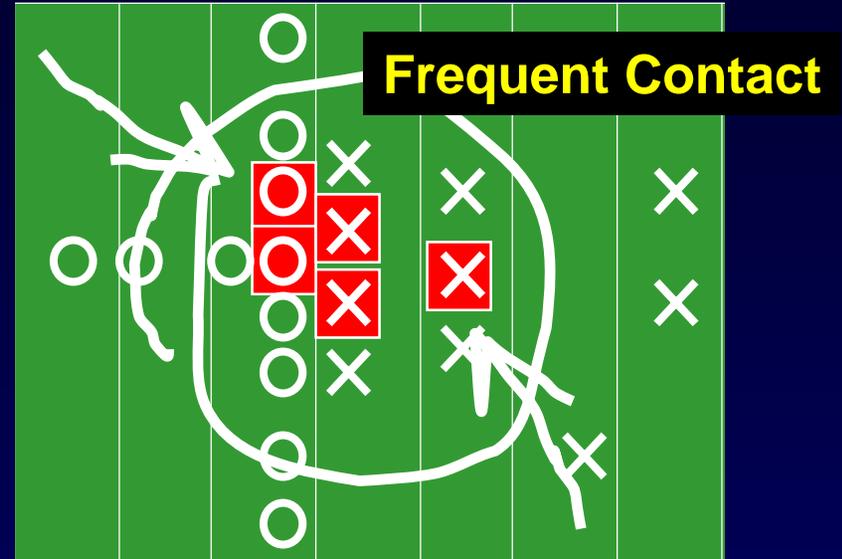


**Contaminated Surfaces  
and Shared Items**

# CA-MRSA: Factors for Transmission



**Crowding**



**Frequent Contact**



**Compromised Skin**



**Contaminated Surfaces  
and Shared Items**



**Cleanliness**

# Approaches to Control of MRSA

- Epidemiologic and microbiological differences between HA-MRSA and CA-MRSA
- Approach to control of MRSA must now include community interventions as well

# Key Prevention Strategies



- **Prevent infection**
- **Diagnose and treat infection effectively**
- **Use antimicrobials wisely**
- **Prevent transmission**

# Development of Reasonable Approaches for CA-MRSA

- Data are lacking for many aspects of CA-MRSA prevention and control
- Numerous strategies have been reported to be successful; however, little is known about the independent benefit of components of the strategies
- Given these limitations, what is a reasonable approach to CA-MRSA prevention and control

# Clinical Considerations

# Clinical Considerations - Evaluation

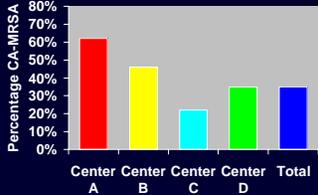
## *Increase Awareness*

- MRSA belongs in the differential diagnosis of skin and soft tissue infections (SSTI's) compatible with SA



- Abscesses, carbuncles, furuncles
- “Spider Bite”
- Impetigo not common
- Erysipelas, least common

# Clinical Considerations - Evaluation



## *Use Local Data for Treatment*

- Prevalence of CA-MRSA varies from region to region
- When available, use local data on proportion of CA-MRSA in selecting agents
- Use local epidemiologic risk factors when available to guide therapy



# Clinical Considerations - Evaluation

## ***Collect Diagnostic Specimens***

- Collect specimens for gram stain and culture
- Collect from abscess cavities, from center of complicated cellulitis, blood, sputum and normally sterile sites
- Collect for management and for surveillance
- Educate providers on appropriate technique
- Address reimbursement for collection and testing



# Clinical Considerations - Management

## *Incision and Drainage Should Be Routine*

- For patients with no systemic signs, data suggest I&D alone may be adequate
- Send for cx and susceptibilities, failure to improve can direct subsequent therapy



# Clinical Considerations - Management

## ***Adequate Follow-Up Must be Maintained***

- Develop follow-up plan for all non-hospitalized patients
- Detailed discharge plans to return if:
  - Develop systemic symptoms
  - Worsening local symptoms
  - No improvement in 48-72 hours



# Clinical Considerations - Management

## *Empiric Antimicrobial Therapy May Be Needed*

- Severely Ill Patients
  - Broad coverage for multi-drug-resistant organisms
- Certain patients with SSTI's, e.g.,
  - Those with significant associated cellulitis
  - Those with systemic signs of illness
  - Those with associated co-morbidities



# Clinical Considerations - Management

## *Empiric Antimicrobial Therapy May Be Needed*

- Clinicians choosing to treat empirically should consider CA-MRSA coverage:
  - Based on local prevalence if available
  - Patient severity
  - Patient co-morbidities

# Clinical Considerations - Management

## *Empiric Beta-Lactam Therapy*

- Beta-lactams may still be appropriate for mild SSTI's in geographic areas where the prevalence is not high, because:
  - Historically a low rate of complications with cutaneous abscesses
  - Incremental benefit of adding antimicrobial therapy to I&D not clearly documented
  - Response seen in some patients
  - Alternatives have limited efficacy data, may not cover other skin pathogens, and may have unwanted side effects

# Clinical Considerations - Management

## *Empiric Beta-Lactam Therapy*

- If MRSA is subsequently found in a patient on empiric beta-lactam therapy, change in drug may not be required if patient is improving



# Clinical Considerations - Management

## *Target Therapy with Alternative Antimicrobials*

- Various agents proposed for SSTI Tx, more data are needed to establish efficacy and effectiveness of these agents
  - Clindamycin
  - Trimethoprim/Sulfamethoxazole
  - Tetracyclines
  - Linezolid
- Agents that are not effective
  - Fluoroquinolones
  - Azithromycin

# Clinical Considerations

## *Additional Issues*

- Provide prevention and health promotion materials to clinicians, parents, patients, teams, etc.
- Delineate the desired role of healthcare provider in managing intra-familial transmission
- Laboratory diagnostic issues need to be addressed as well

# Public Health Interventions



# Public Health Intervention

## *When to Investigate*

- Consider investigation when culture-proven MRSA cases have been detected in a cluster among epidemiologically-linked individuals in the community

# Public Health Intervention

## *When to Investigate*

- Decision to investigate should take into account various factors
  - Number of cases and temporal proximity of the cluster
  - Setting in which transmission is occurring
  - Severity of illness among cases
  - Presence of ongoing transmission or recurrent illness among cohort members
  - Host factors of those likely to be infected
  - Likelihood that an intervention could be successfully implemented

# Public Health Intervention

## *Components of an Intervention*

- Disclaimer
  - Various strategies have been employed to control CA-MRSA outbreaks
  - Some combination strategies report success
  - Relative benefit of many of the components of combined interventions often is not known
  - Given limitations, a reasonable approach to control of MRSA case clusters can be considered



# Components of a Public Health Intervention

## *Enhance Surveillance*

- Initiate prospective surveillance to detect possible cases in the cohort
- Perform retrospective review to identify probable cases associated with the outbreak
- Educate members of the cohort on signs/symptoms
- Collect isolates for typing if needed



# Components of a Public Health Intervention

## *Use Appropriate Treatment*

- Educate clinicians and medical staff
- Insure that abscesses are being drained
- Insure that antimicrobial treatment is concordant with the susceptibility pattern of the MRSA
- Use the same regimen for empiric treatment of new potential cases



# Components of a Public Health Intervention

## *Care For and Contain Wounds*

- Educate case-patients and parents on appropriate care of wounds
- Cover and contain wounds with clean, dry dressings
- Insure the infected individual complies with appropriate hand and personal hygiene



# Components of a Public Health Intervention

## *Exclude from Routine Activities*

- If appropriate hand and personal hygiene can not be assured, then the individual should be excluded from activities that may lead to transmission in the cohort



# Components of a Public Health Intervention

## *Promote Enhanced Personal Hygiene*

- Encourage appropriate hand hygiene:
  - Alcohol-based hand gels when possible
  - Have antimicrobial-containing soap/regular soap available at sinks
  - Where possible, use liquid soap
- Encourage regular bathing, use antimicrobial-containing soaps
- Limit sharing of personal items likely to transmit infections



# Components of a Public Health Intervention

## ***Maintain a Clean Environment***

- While the role of the environment in transmission of *S. aureus* is possible, the attributable risk of infection from the environment is not clear; however, practical measures to prevent transmission from high contact surfaces and items is reasonable

# Components of a Public Health Intervention

## *Maintain a Clean Environment*

- Insure that cleaning is consistent with manufacturer recommendations for high touch surfaces, communal areas or equipment
- Perform targeted cleaning directed to areas/equipment where known cases had recent contact

# Components of a Public Health Intervention

## *Notify Contacts and Parents*

- Notification will provide
  - Education opportunities
  - Enhance detection of cases
  - Insure that appropriate therapy is being provided



# Components of a Public Health Intervention

## *Colonization Swab Surveys*

- Swab surveys have been used in many published investigations; however, insufficient data are available to recommend their routine use
- May be useful to:
  - Assist in public health investigations to identify risk factors or to determine extent of transmission
  - To contribute to the understanding of CA-MRSA epidemiology

# Components of a Public Health Intervention

## *Decolonization*

- Data on use of decolonizing regimens among household contacts and in community settings is limited
- Trials to determine the effectiveness of decolonization in preventing transmission during outbreak settings are needed

# Components of a Public Health Intervention

## *Decolonization*

- Decolonization regimens are reasonable:
  - Along with other measures, in a setting with ongoing transmission among members of a closely-associated, well-defined cohort
  - Along with other measures, in an individual with recurrent infections

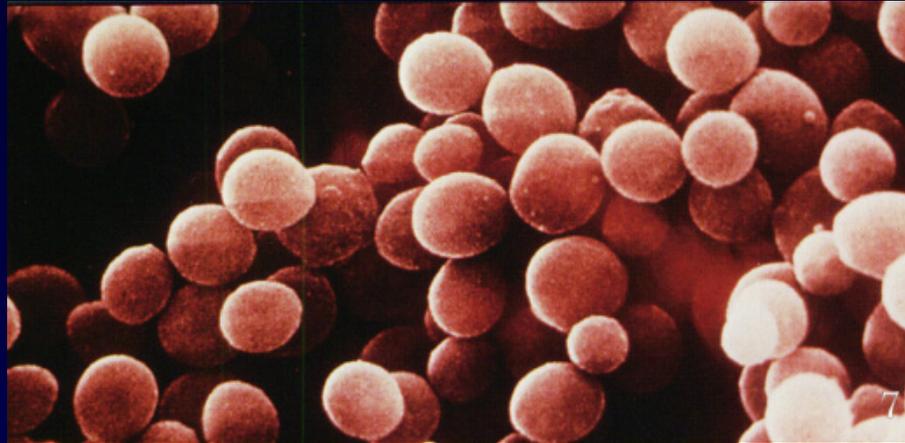
# Components of a Public Health Intervention

## *Decolonization*

- Decolonization regimens may include:
  - In non-infected persons
    - Nasal decolonization (e.g., mupirocin)
    - And/or body antiseptics (e.g., chlorhexidine)
  - In infected persons
    - Targeted Abx + rifampin and/or body antiseptics
    - Targeted Abx + nasal decolonization and/or body antiseptics

# Conclusions

- More data are needed to determine best methods for control and prevention of CA-MRSA
- Reasonable approach would focus on:
  - Increased awareness, detection, and diagnosis
  - Targeted surgical and antimicrobial therapy
  - Appropriate wound management
  - Enhanced hand and personal hygiene
  - Maintaining a clean environment
  - Decolonization in certain settings for interrupting ongoing transmission



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