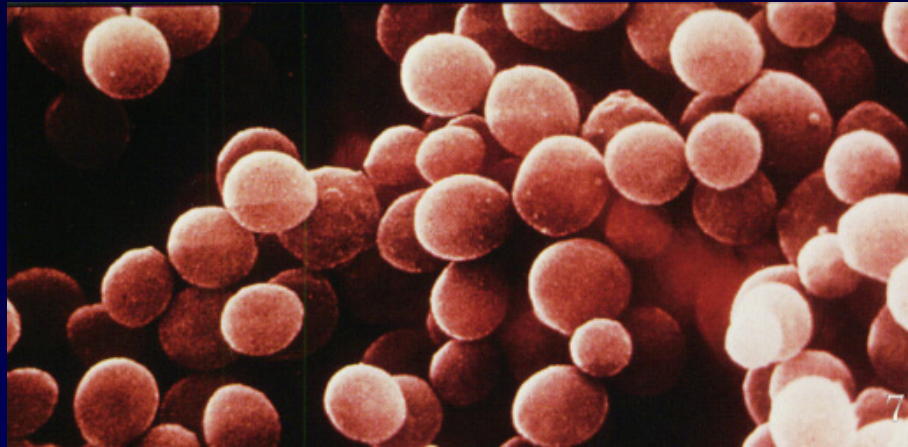


Community-Associated Methicillin-Resistant *Staphylococcus aureus*



Daniel B. Jernigan, MD MPH

Division of Healthcare Quality Promotion

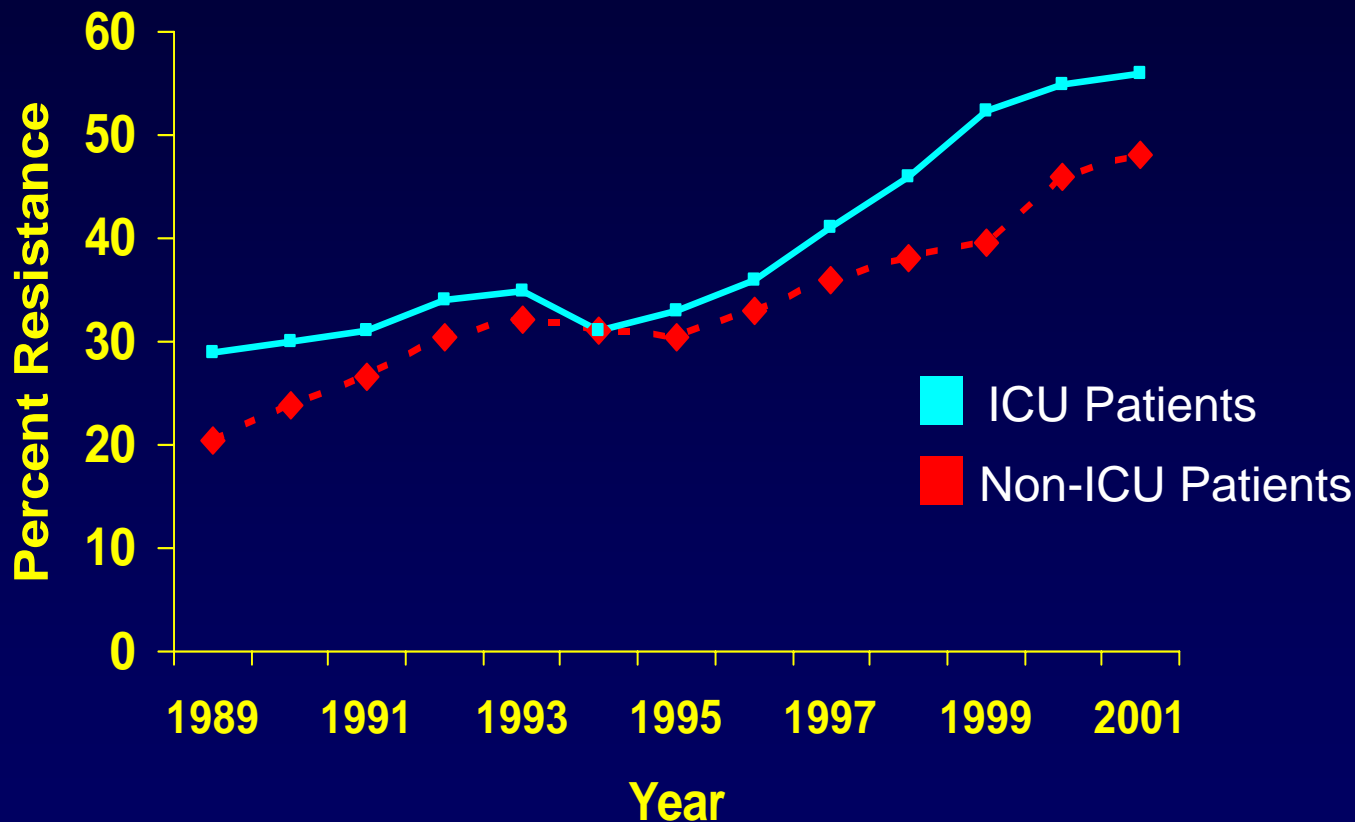
National Center for Infectious Diseases

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

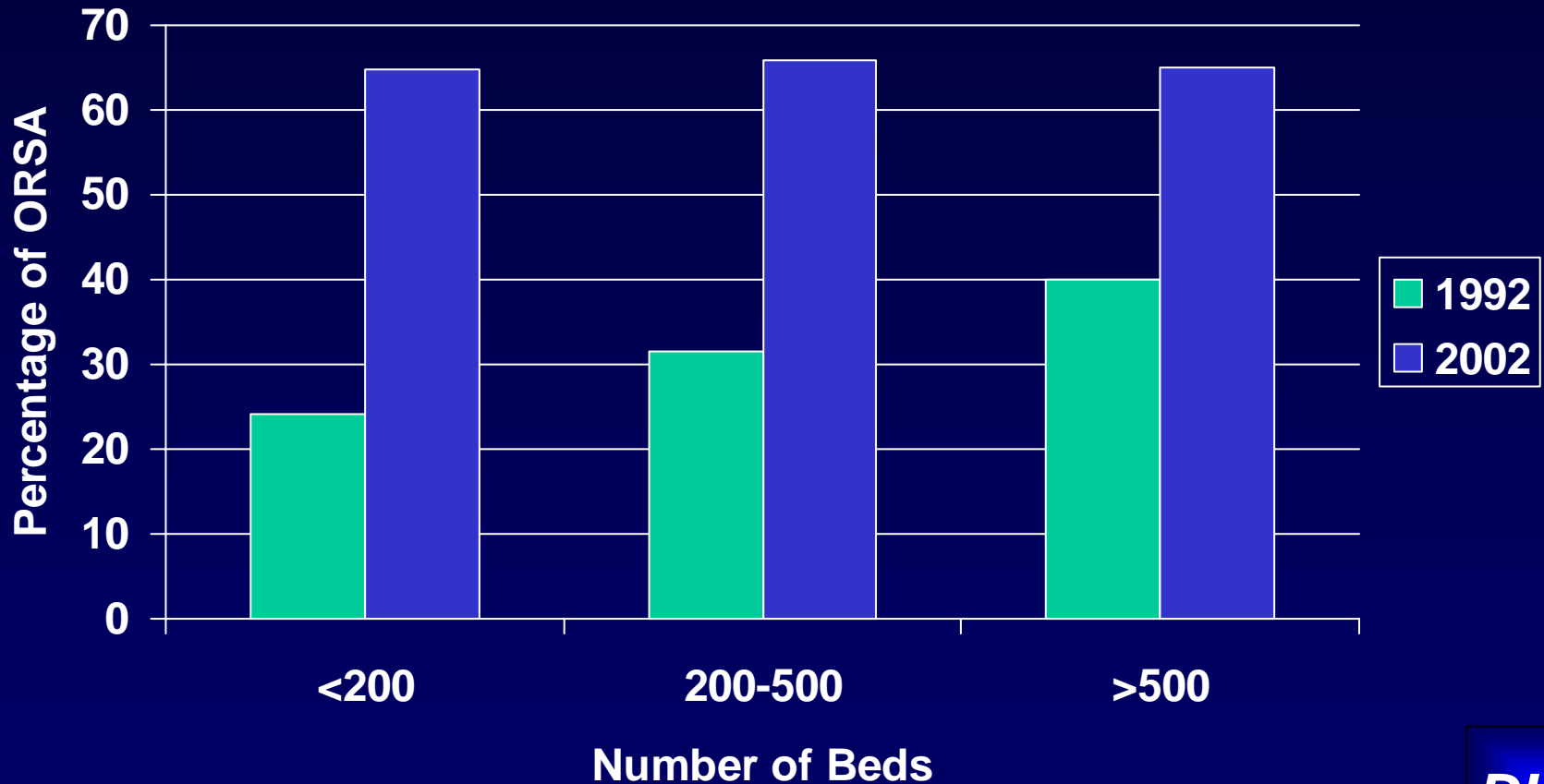
Proportion of *S. aureus* Nosocomial MRSA Infections by ICU Status



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

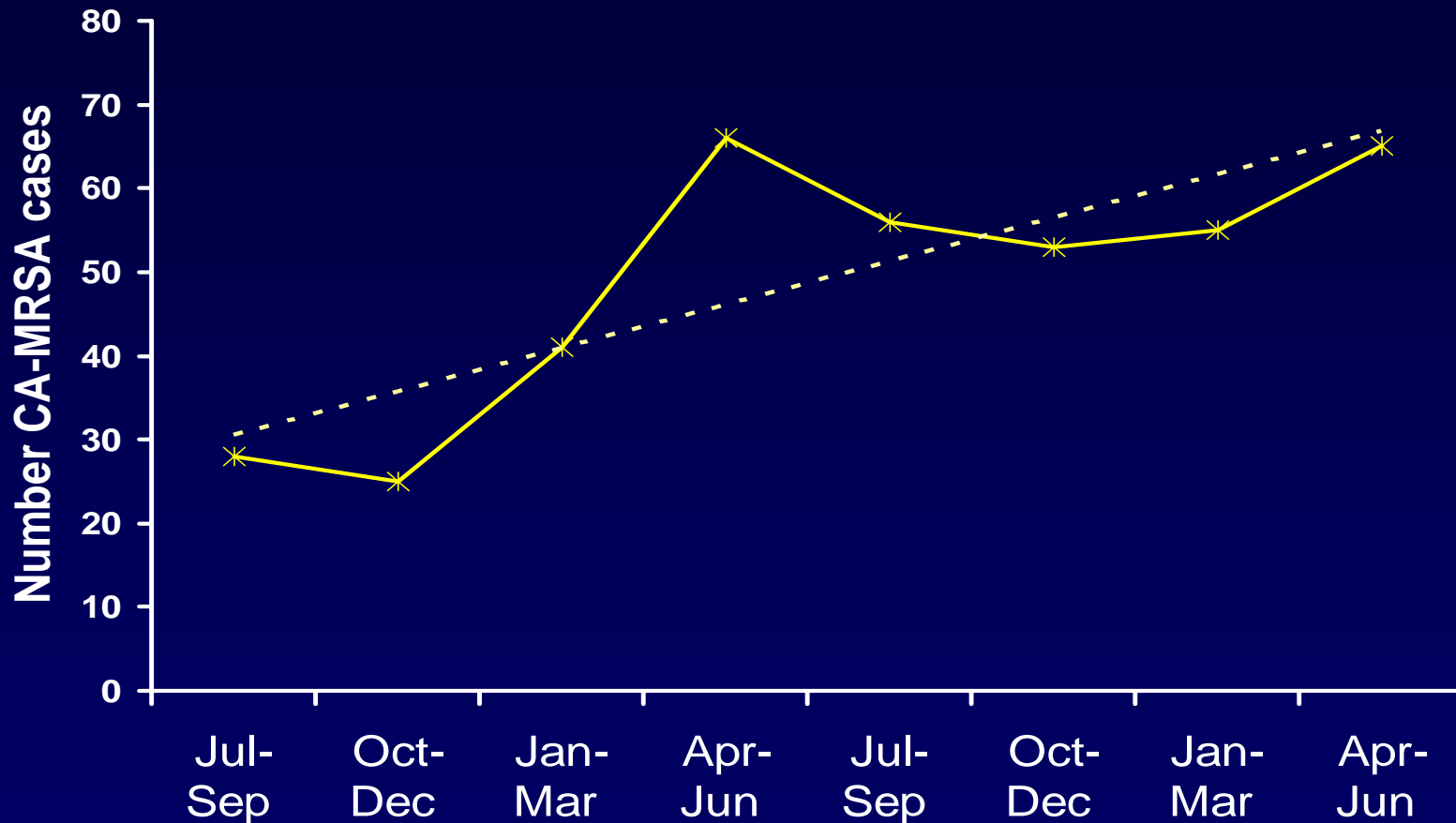
MRSA is Increasing in Healthcare Settings

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



MRSA is Emerging in the Community

Estivariz EIS '03

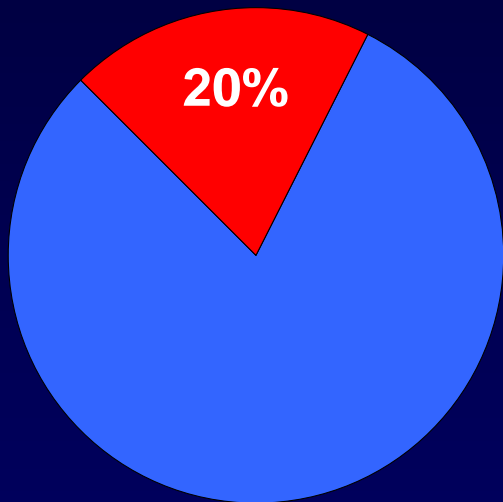


CA-MRSA is Increasing in Four Facilities in Hawaii, 2001-2003

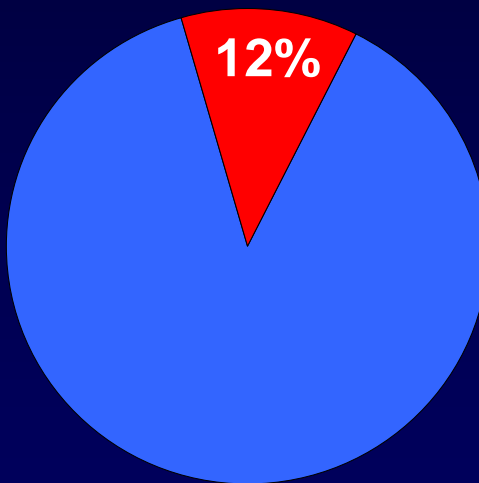


CA-MRSA Prevalence Varies by Region

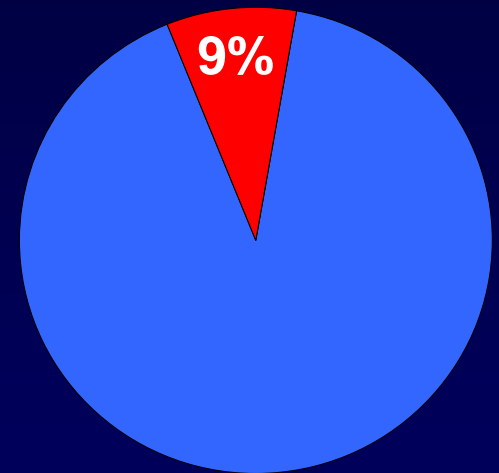
■ Healthcare-Associated MRSA ■ Community-Associated MRSA



Georgia
n=7819



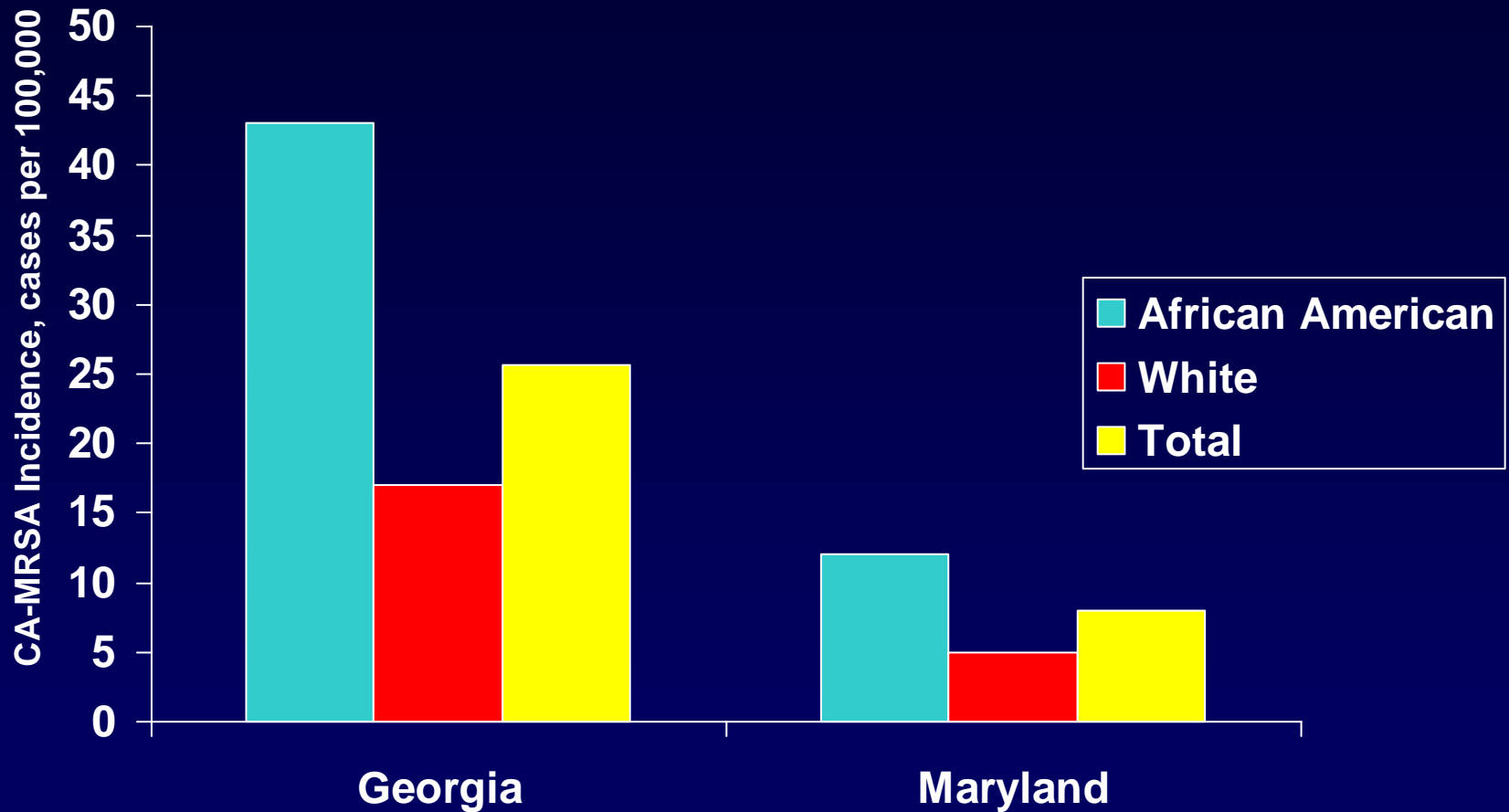
Minnesota
n=3014



Maryland
n=1720

CA-MRSA Prevalence in Three States – ABCS/EIP

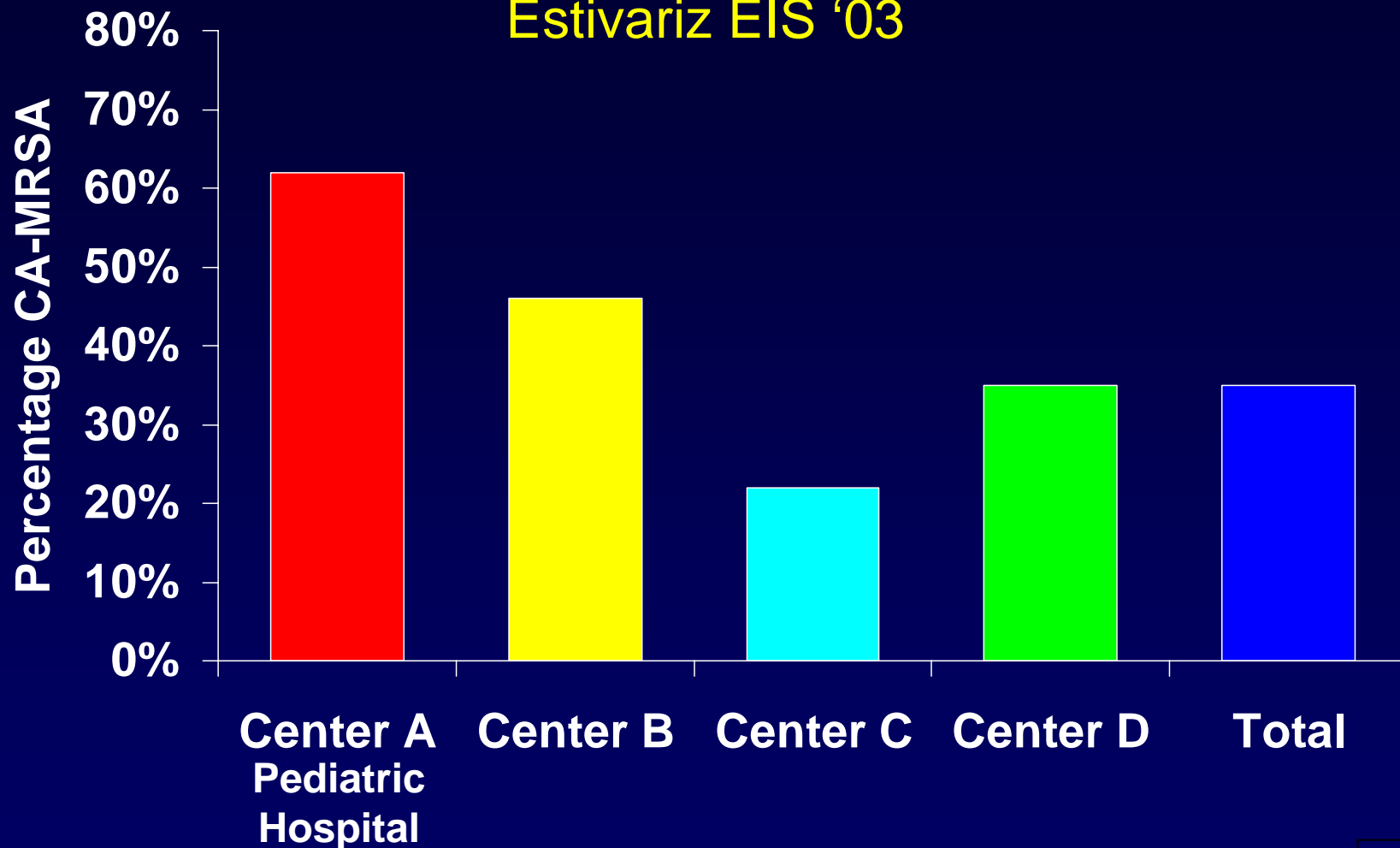
CA-MRSA Incidence Varies by Race



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%)

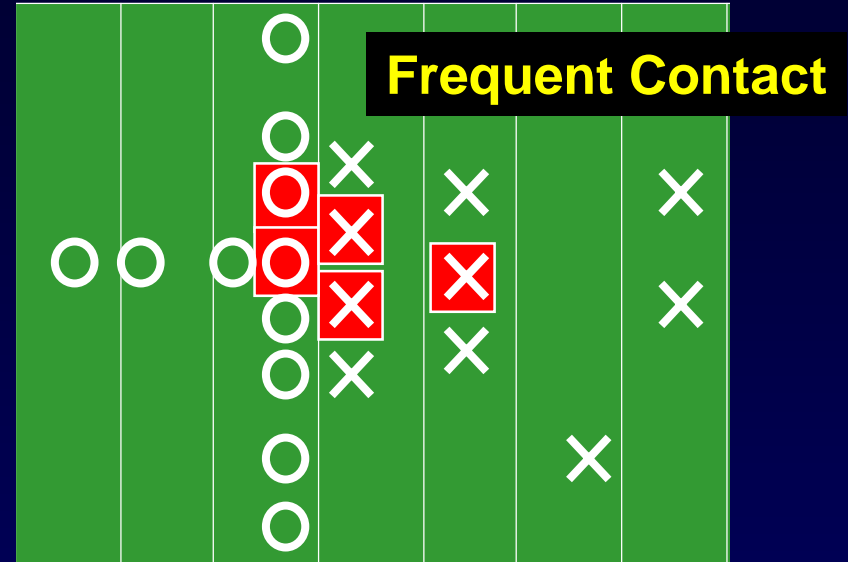


CA-MRSA: Factors for Transmission

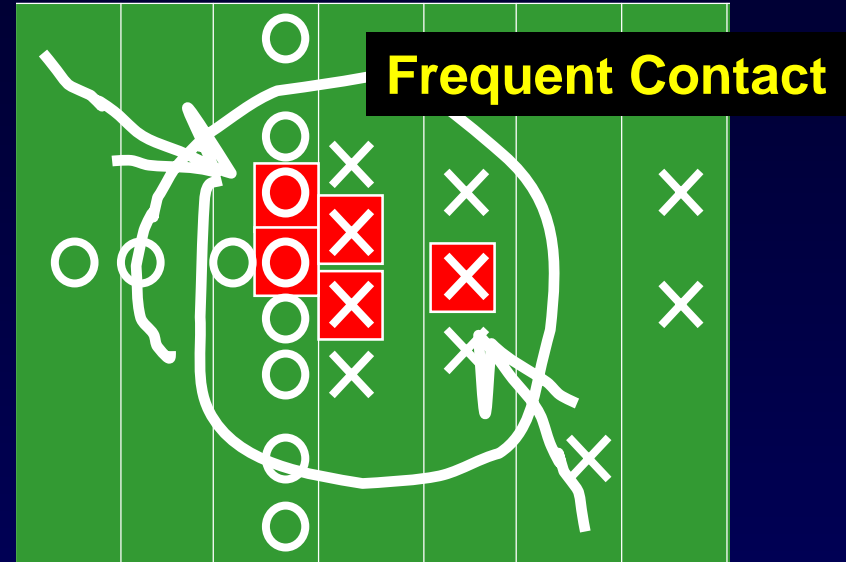
CA-MRSA: Factors for Transmission



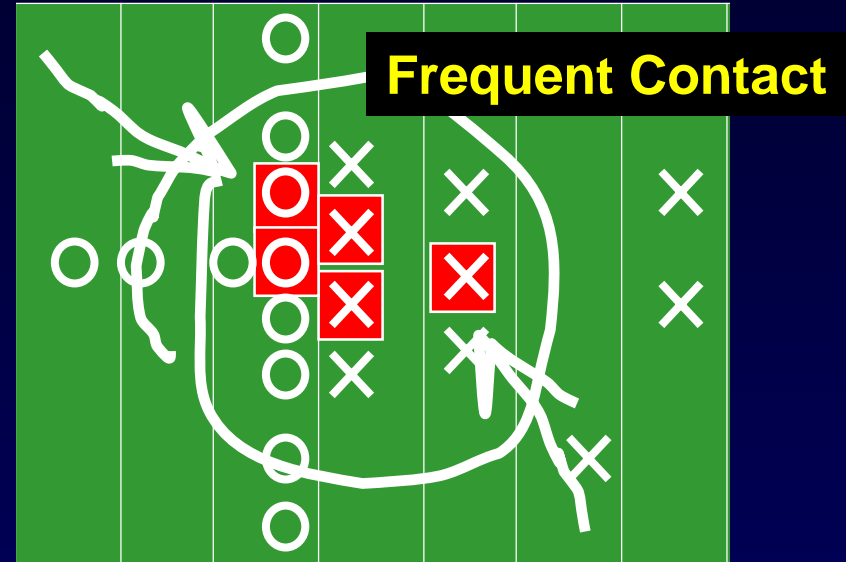
CA-MRSA: Factors for Transmission



CA-MRSA: Factors for Transmission



CA-MRSA: Factors for Transmission

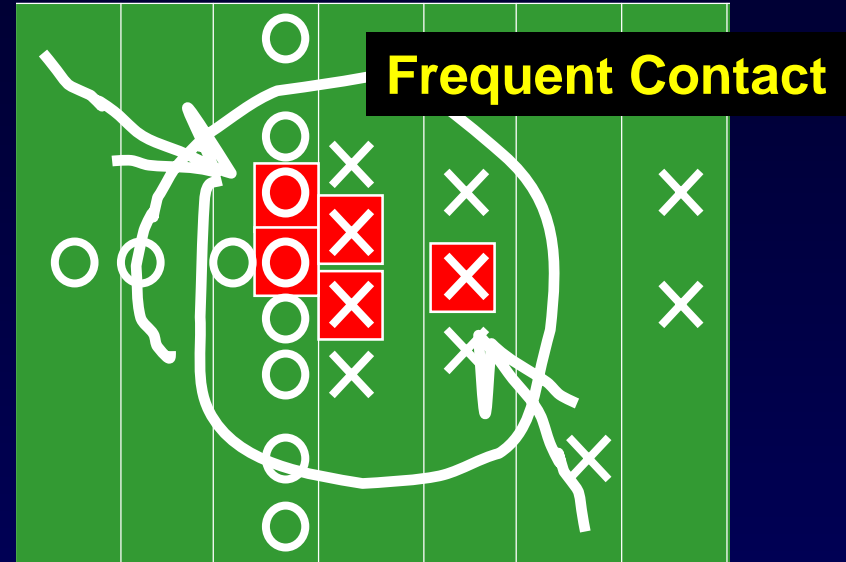


Compromised Skin

CA-MRSA: Factors for Transmission



Crowding



Frequent Contact



Compromised Skin

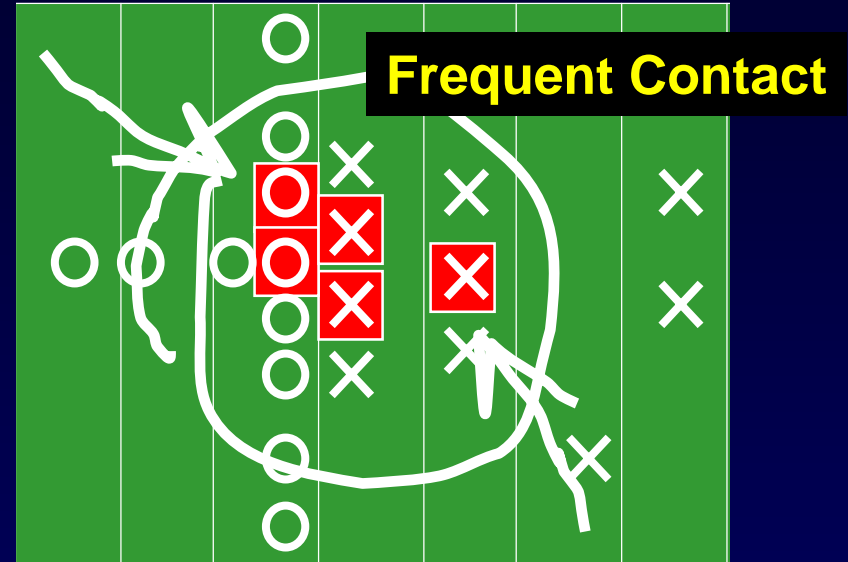


**Contaminated Surfaces
and Shared Items**

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

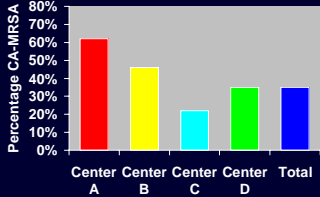
Increase Awareness

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



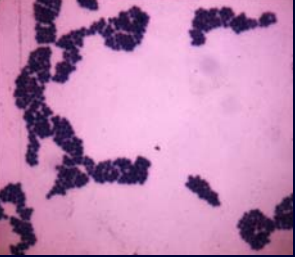
- Abscesses, carbuncles, furuncles
- “Spider Bite”
- Impetigo not common
- Erysipelas, least common

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

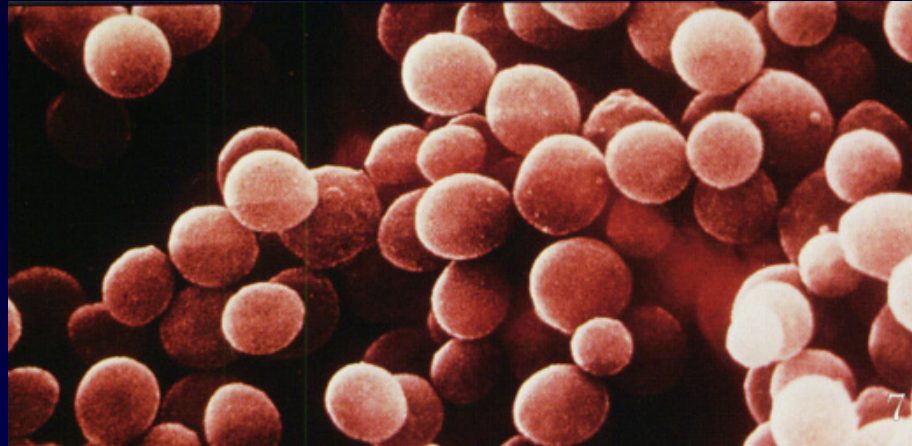
Components of a Public Health Intervention

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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Division of Healthcare Quality Promotion

National Center for Infectious Diseases