Canadian Consensus Development Conference on Surveillance and Screening for AROs

Lindsay E. Nicolle, M.D.
Professor, Department of Internal Medicine &
Medical Microbiology
University of Manitoba, Winnipeg, MB Canada

Consultant, Speaker, Advisory Panel

J & J Pharmaceuticals

LEO Pharmaceuticals,

Cerexa Inc.

Boeringer Ingelheim ,

Hollister Inc.

Questions

What is appropriate screening for ARO's in various settings?

- Epidemic/Endemic/not introduced
- Populations
  - psychiatry
  - rehabilitation
  - long term acute care

ARO Epidemic/Outbreak Infection

Potential:

- ↑ transmission
- ↑ morbidity

Screening:

- describe extent of outbreak
- identify patients at risk
- monitor effectiveness of interventions

Srinavasan & Jarvis, Pract HC Epi 3rd Ed, 2010

Table 12-1. Steps of an outbreak investigation

Preliminary investigation and descriptive study

Review existing information

Determine the nature, location, and severity of the disease problem

Verify the diagnoses

Create a case definition

Find and ascertain cases

Request that the laboratory save isolates from affected patients and any suspected sources or vehicles

Graph an epidemic curve

Summarize case patient data in a line listing

Establish the existence of an outbreak

Institute or assess the adequacy of emergency control measures.

Srinavasan & Jarvis, Pract HC Epi 3rd Ed, 2010

Table 12-1 Steps of an outbreak investigation

Comparative study and definitive investigations

Review records of existing case patients

Develop hypotheses

Conduct comparative studies (case-control or cohort) to test hypotheses

Conduct microbiologic or other laboratory studies and surveys

Conduct observational studies, including interviews and questionnaire surveys

Conduct experiments to confirm the mode of transmission

Acting on results

Communicate the results of the investigation to the administration and the departments involved (as well as any necessary regulatory bodies), along with a plan for definitive control measures

Implement definitive control measures

Maintain surveillance for a sufficient time to ensure that control measures are effective

Pilot Testing of Out-of-Country Medical Care Questionnaire with Screening and Cost Analysis of Pre-emptive Isolation for CRE

Rajapske et al, ICHE, 2014; 35:450

- CRE not endemic in Alberta
- Identification of OCMC past 12 months (questionnaire)
  - CRE colonization screening
  - Pre-emptive isolation

Results: 6,646 of 13,855 admission questioned)

- OCMC 3.1% (59% outpatient)

CRE: 0/101 colonized

Estimated: cost pre-emptive isolation

$1.19 million/year

National multi-drug resistant bacteria (MDRB) surveillance in France through the RAISIN network: a 9 year experience

J Antimicrob Chemother 2013;68:954

Table 2. Incidence per 1000 PDs of cases of MRSA and ESBLE according to the type of hospital activity in 2010

		MRSA		ESBLE	
Activity	Total PDs	total cases	incidence/ 1000 PDs	total cases	incidence/ 1000 PDs
ACF	10272131	4978	0.48	4745	0.46
ICU	514801	585	1.14	839	1.63
→ Psychiatry	1118781	13	0.01	16	0.01
RLTCF	5947956	1631	0.27	1387	0.23
Total	17853669	7207	0.40	6987	0.39

Prevalence, risk factors, and molecular epidemiology of MRSA nasal and axillary colonization among psychiatric patients on admission to an academic medical centre

Farley et al AJIC 2013; 41:199

Admission colonized	**6.0%**
HIV ⊕	33.3%
Abscess < 6 mo.	33.3%
Acquisition by discharge	2.6%
USA 300 (5), USA 100 (2)	

Psychiatry Inpatients

Levitt, Gen Hosp Psych 2014

- Limited evidence re ARO screening
  - no descriptions of infection burden
- Problematic to manage behaviors (uncooperative)
- Treatment in groups is the norm
- Some communal bathrooms & shower areas; dining

Infection control for MRSA in a psychiatric hospital

Levitt Gen Hosp Psych, 2014

Case Report:

"hospital policies interfered with the psychiatric treatment and recovery of an acutely ill patient as well as create possibly unnecessary costs".

Prospective surveillance for antibiotic-resistant organisms in patients with spinal cord injury admitted to an acute rehabilitation unit

Mylotte et al, AJIC 2000; 28:291-7

- admission and q 2 wk for 6 weeks

  Admission: 27/63 (43%) ARO's
- 8/36 initial negative (22% acquired ARO; MRSA 7/8)

<u>Conclusions</u>: Acquisition of any resistant organism after admission was uncommon on this unit, which used standard precautions in the routine care of patients.

Comparison of the Methicillin-Resistant Staphylococcus aureus Acquisition among Rehabilitation and Nursing Home Residents

Ferano et al Infect Control Hosp Epidemiol 2011; 32:244-249

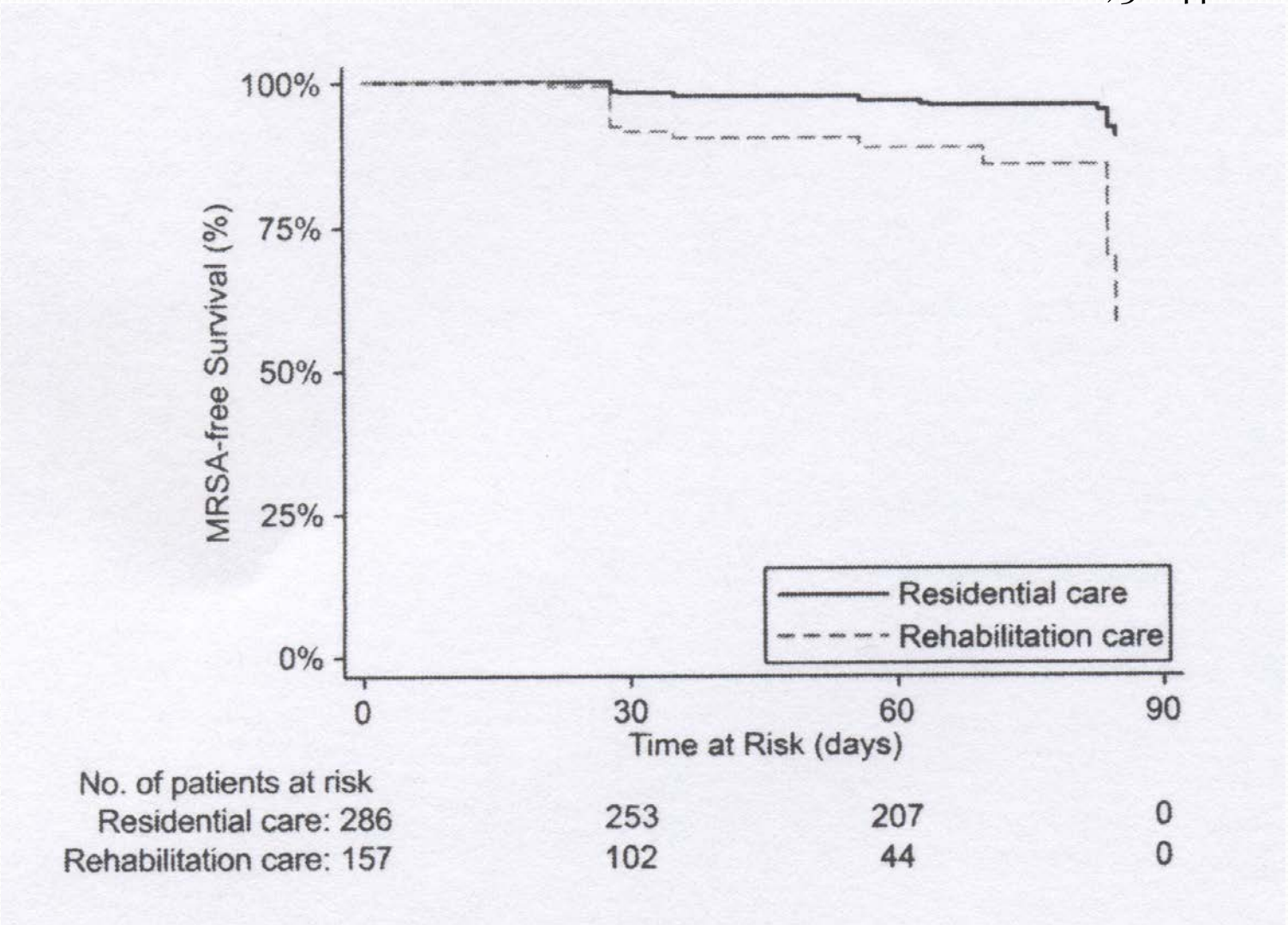
Infection control practices:

- MRSA admission surveillance
- MRSA ⊕: modified contact gowns and gloves

  placement: single > cohort > low risk negative
- Hand hygiene: alcohol/hand rinse

MRSA among Rehabilitation and Nursing Home Residents

Furuno et al 2011; 32:244 ICHE



Log Rank p < 0.01 stratified by level of care; HR 4.40 (95% CI 2.21 – 8.75); rehabilitation 11%, residential 6%

MRSA among Rehabilitation and Nursing Home Residents

Furuno et al 2011; 32:244 ICHE

2/8 roommate exposure MRSAs strain concordant

TABLE 3. Adjusted Hazard Ratios (aHRs) for Methicillin-Resistant *Staphylococcus aureus* (MRSA) Acquisition in MRSA-Negative Residents of Extended Care Facilities, Using Cox Proportional Hazards Models

Variable	aHR (95% CI)
Residential (n = 286)	
Antibiotic therapy during study cycle	3.75 (1.43–9.88)
Bedbound	4.28 (1.50–12.16)
Room placement with MRSA-positive resident	1.42 (0.51–3.93)
→ Rehabilitation (n = 157)	
Limited mobility	2.59 (0.80–8.45)
→ Bedbound	4.81 (1.24–18.68)
→ Room placement with MRSA-positive resident	0.47 (0.10–2.16)

Prevention of methicillin-resistant *Staphylococcus aureus* infections in spinal cord injury units

Evans et al AJIC 2013; 41:422-426

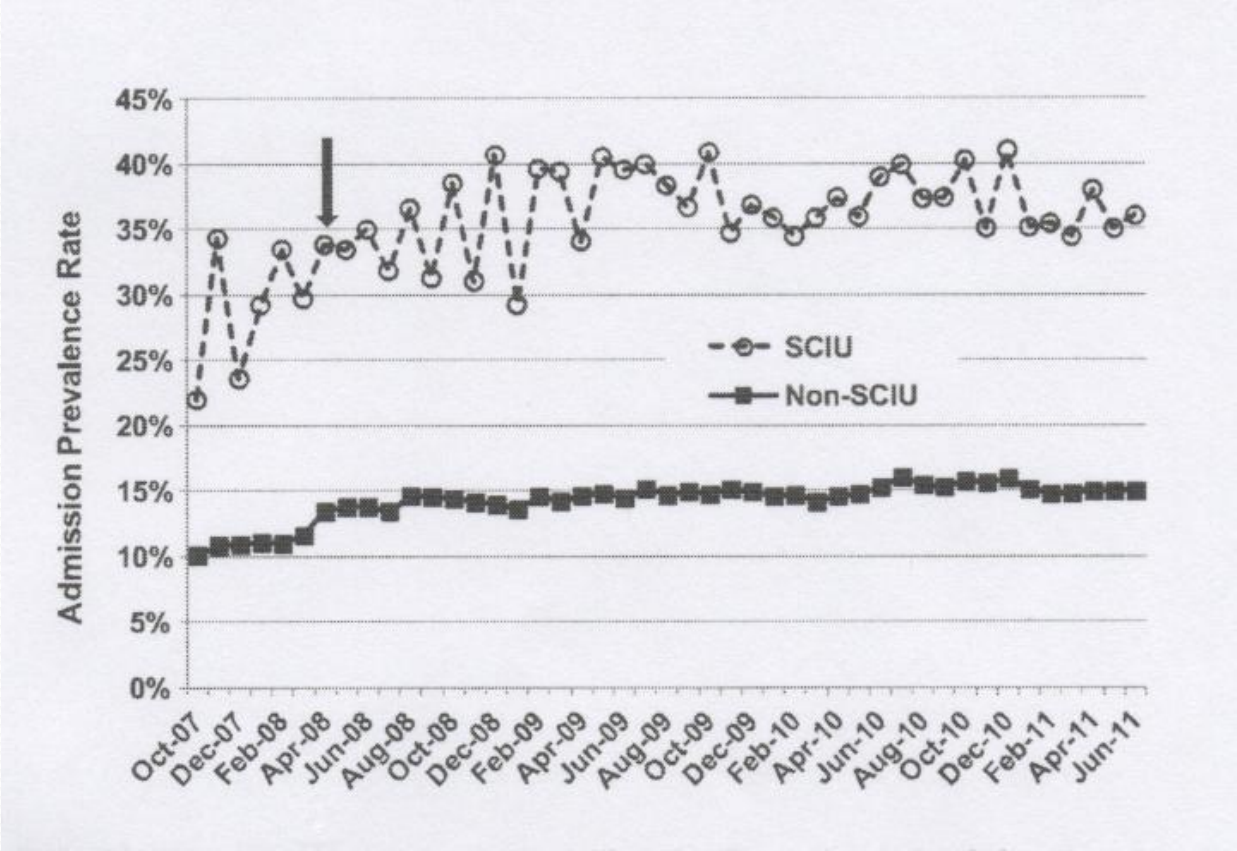
Veteran's Affairs "bundle"

- universal nares surveillance MRSA
- contact precautions MRSA +
- "institutional culture change"

Prevention of MRSA Infections for acute care VA SCI units

Evans et al AJIC 2013

Monthly national mean MRSA admission prevalence by surveillance screening and clinical cultures

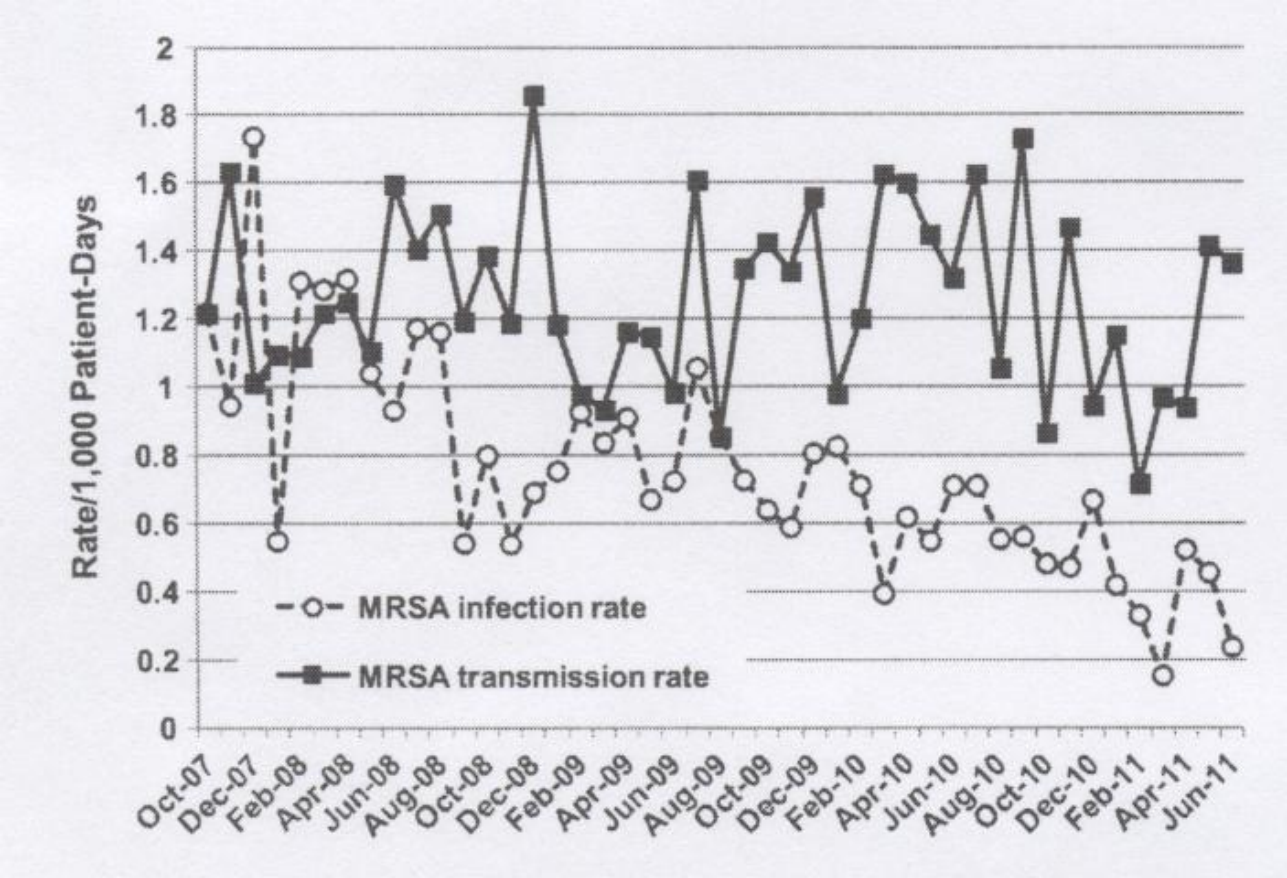


MRSA SCI 38.6% ± 19.1%; non SCI 14.2% ± 1.5%

Prevention of MRSA Infections in SCI units

Evans et al AJIC 2013

Nationwide acute care VA MRSA transmission and infection rates



Device-Associated Infection Rates, Device Utilization, and Antimicrobial Resistance in Long-Term Acute Care Hospitals Reporting to the National Healthcare Safety Network, 2010

Chitnis, ICHE 2012; 993

Device Utilization Ratios

	Pooled Ratio (Device/Patient days)			
	LTACFs		All ICUs	
	Mean	Median	Mean	Median
Central line	0.59	0.67	0.44-0.61	0.43-0.61
Urinary catheter	0.52	0.55	0.66-0.73	0.68-0.75
Ventilator	0.28	0.26	0.31-0.47	0.35-0.48

Device-Associated Infection Rates, Device Utilization, and Antimicrobial Resistance in Long-Term Care Hospitals Reporting to the National Healthcare Safety Network, 2010

Chitnis, ICHE 2012: 993

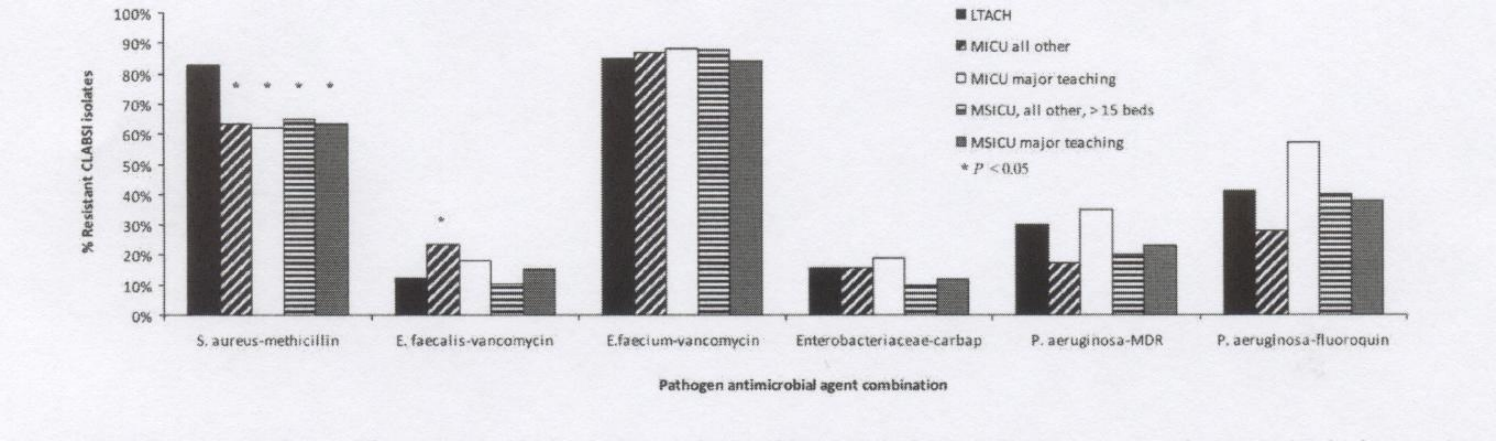
Device-Associated Infection Rates

	LTACFs		All ICUs	
	Mean	Median	Mean	Median
CLABSI	1.40	1.25	0.74 – 1.26	0.63 – 1.43
CA-UTI	2.76	2.61	0.47 – 0.87	1.08 – 1.78
VAP	0.58	0	1.73 – 3.31	0 – 0.98

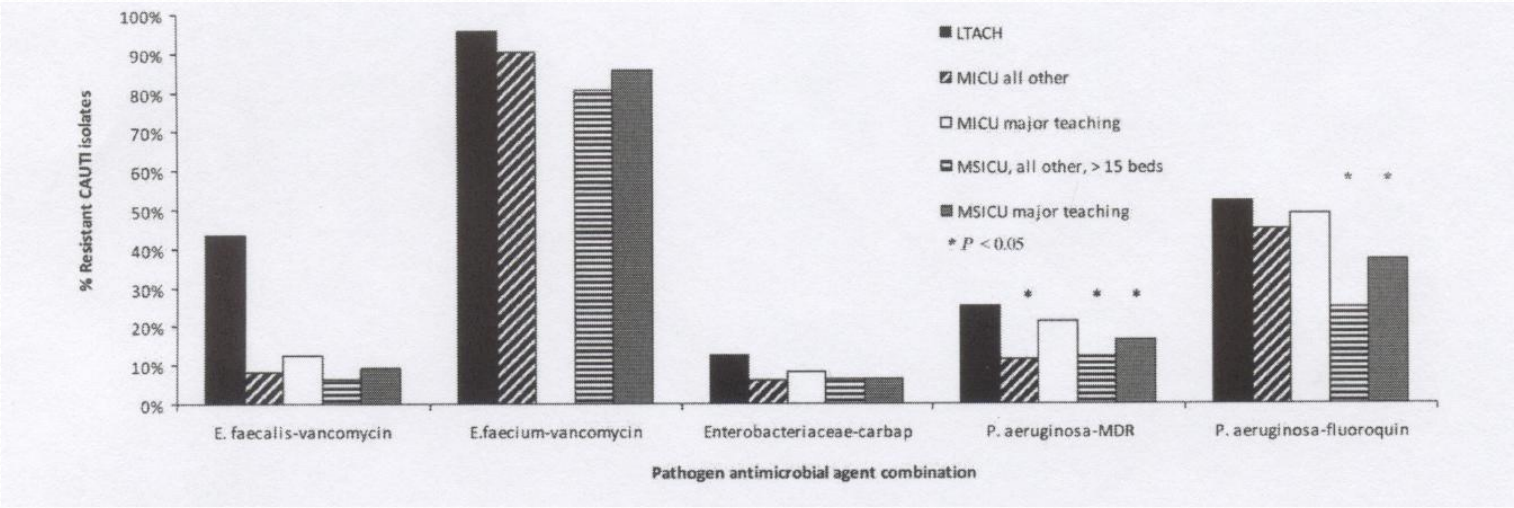
ARO Isolated,, NHSN 2010

Chitnis ICHE; 2012 P993

Central line associated infections



Catheter-associated UTI



LTAC: What is the Role of Screening for ARO

? admission to LTAC

? resident in LTAC

? readmission to acute care

Legislative Mandates for Use of Active Surveillance Cultures to Screen for Methicillin-Resistant *Staphylococcus aureus* and Vancomycin-Resistant Enterococci: Position Statement From the Joint SHEA and APIC Task Force

Stephen G. Weber, MD, MS; Susan S. Huang, MD, MPH; Shannon Oriola, RN, CIC, COHN; W. Charles Huskins, MD, MSc; Gary A. Noskin, MD; Kathleen Harriman, PhD, MPH, RN; Russell N. Olmsted, MPH, CIC; Marc Bonten, MD, PhD; Tammy Lundstrom, MD, JD; Michael W. Climo, MD; Mary-Claire Roghmann, MD, MS; Cathryn L. Murphy, MPH, PhD, CIC; Tobi B. Karchmer, MD, MS

TABLE 1. Required Elements of an Effective Active Surveillance Program

Screening test
Must be timely, affordable, and reliable
Clinical efficacy
Should reduce transmission rate to patients and healthcare workers
Should reduce infection rate by preventing acquisition
Implementation
Hospital and administrative financial support
Systems and staff to screen patients
Systems and staff to monitor effectiveness and compliance
Education of patients, staff, and families
Adequate physical plant and supplies (eg, private rooms, gloves, gowns, and antimicrobial agents)
Plan to manage social isolation and safety of patients under contact precautions