


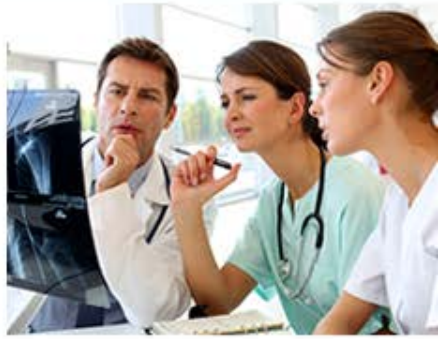

Infection Control in Long-Term Care (LTC): An Overview

Joseph M. Mylotte, MD, FIDSA, FSHEA, FACP
Professor Emeritus of Medicine
University at Buffalo

Health Services Advisory Group (HSAG)

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Conflict of Interest

None to report

Objectives

- Review the components of an infection control program for LTC
- Emphasize the important role nursing home (NH) staff members have in the infection control and antibiotic stewardship programs in LTC
- Review the problem of antibiotic (abx) resistance and abx overuse in LTC
- Understand the rationale for and elements of an antibiotic stewardship program in LTC

New CMS* Requirements for Infection Control in LTC

- Requires an infection prevention and control officer (IPCO) and a formal facility antibiotic stewardship program
- Goals are to reduce overall healthcare-associated infection rates, reduce physical harm to residents and healthcare providers, and reduce overall cost burdens to care delivery

*CMS=Centers for Medicare & Medicaid Services

Infection Prevention and Control Programs in US NHs: National Survey

JAMDA 2016;17:85-88

- Randomly sampled US NHs between Dec 2013 and Dec 2014
- Freestanding facilities identified in the Online Survey, Certification and Reporting (OSCAR) database
- Survey sent to 2,514 NHs and 990 responded (39%)
- 69% for profit homes
- 73% metropolitan location

Characteristics of NH Infection Control and Prevention Program Staffing in US NHs: National Survey

JAMDA 2016;17:85-88

RN doing Infection Control (IC)	84%
Overall mean years doing IC	11 years
% with 2 or more other responsibilities	54%
% with no IC training	61%
Certified in IC by the Association for Professionals in Infection Control and Epidemiology (APIC)	3%
Mean % time per week spent on IC duties	29%

Characteristics of NH infection prevention and control program processes

JAMDA 2016;17:85-88

- Methods used to maintain a list of residents with infections
  - Log book or paper list 76%
  - Electronic database 40%
- Information used to define and determine that a resident has an infection
  - Clinical/lab cultures 69%
  - MD/NP diagnosis 69%
  - McGeer criteria revised 41%
- Methods of notification about potentially infected residents
  - Daily report 81%
  - New abx Rx 49%
  - Staff call 36%
  - Staff worksheet 29%

LTC Population is Becoming Increasingly Complex

- Post-acute care
  - Medical complexity and care needs increasing
  - Increased exposure to devices, wounds, and abxs
  - Increased risk of colonization/infection with multidrug-resistant organisms such as methicillin-resistant *Staphylococcus aureus* (MRSA), vancomycin-resistant enterococci (VRE), and *Enterobacteriaceae* containing extended spectrum beta-lactamases (ESBL)
  - Should not be included or added to LTC infection surveillance information; should be kept separate
- Dynamic movement across healthcare settings
  - Onset of healthcare-associated infections (HAIs) is impacted

Epidemiology of Infection in LTCFs: Types of Infections

- Urinary Tract
- Skin/soft tissue
- Upper respiratory tract
- Lower respiratory tract
- *Clostridium difficile*
- Device-related infections**

Device-Related Infections in LTC

- Urinary devices
  - Urethral catheter
  - Suprapubic catheter
- Feeding tube
  - Peg [insertion site infection]
  - Nasogastic intubation (N/G tube) (pneumonia)
- Central venous catheter
  - Peripherally inserted central catheter (PICC)
  - Hickman-like catheter
  - Hemodialysis catheter

Epidemiology of Infection in LTCFs: Importance of Infections

- Morbidity
- Mortality
- Potential for transmission
- Cost
- Hospital admission/readmission

Components of Infection Control Program in LTC

Oversight committee

Administrative support

Infection control practitioner

Nursing staff

Surveillance for infection

Policies and procedures

Tuberculosis (TB) control

Vaccination

Employee health

Exposure control

Administrative Support

- Strong support is required from the facility administrator, DON, and medical director
- Written documentation of support is important
- Provide resources necessary to perform IC activities as outlined in IC policy and procedures

Infection Control Practitioner

- Many other responsibilities in addition to IC which limits time available
- Education regarding IC varies considerably
- Societies provide educational opportunities—Association for Professionals in Infection Control and Epidemiology (APIC), The Society for Post-Acute and Long-Term Care (AMDA), National Association Directors of Nursing Administration (NADONA), and Society for Healthcare Epidemiology (SHEA)
- Collection of IC data needs to be feasible and provide useful information
- ICP has increased importance with the new mandate for an abx stewardship program in the revised CMS LTC regulations

Infection Surveillance in LTC

Surveillance for Infection in LTC

Surveillance = Performance Measure

Performance measure [surveillance] allows review of infections and inform decisions for intervention and prevention strategies

Surveillance ≠ Quality Assurance

Infection Surveillance in LTC: Challenges

- Lack of standardized metrics
  - Applicable to all facilities
  - Focus on specific infections or high-risk groups rather than identify all infections
- Lack of consensus on how to collect infection data
- Lack of national benchmarks
  - Centers for Disease Control and Prevention (CDC) via National Healthcare Safety Network (NHSN) established a voluntary program to collect infection data from NHs in 2012
  - No adjustment for size, type, or characteristics of NH population. Are all NH populations the same?

Components of Surveillance for Infection in LTC

- Definitions of infection
- Identifying infections [variability]
- Analysis of surveillance data
- Identifying and managing outbreaks
- Reporting

Infection Surveillance in LTC: Definitions of Infection

- Surveillance definitions are not intended to be used:
  - as diagnostic criteria.
  - as part of a clinical intervention.
- Characteristics of surveillance definitions:
  - highly specific to minimize false positives.
  - used to identify infections retrospectively.
  - focus is on prevention/minimize transmission.

Infection Surveillance in LTC: Definitions

- McGeer criteria for infection surveillance first published in 1991
  - Based on consensus of a multidisciplinary group
  - Based on hospital definitions used in the National Nosocomial Infections Surveillance (NNIS) system
  - Generally accepted, especially in research
  - Never validated
- McGeer criteria updated and published in 2012
  - Similar process as in 1991
  - Used published literature and expert opinion
  - Substantive changes made only to definitions for urinary tract infection (UTI) and respiratory tract infection
  - Added definitions for norovirus and *C. difficile* infection

Considerations When Applying Surveillance Definitions

- Symptoms are new or acutely worsening
  - First consider non-infectious causes
  - Must know baseline (normal) to evaluate change
- All criteria must be met
  - No infection based on a single piece of evidence
  - Infection is not exclusively determined by physician diagnosis

1991 McGeer Criteria for UTI with No Catheter

3 of the following:

- Fever (>38ºC) or chills
- New or increased burning pain on urination, frequency, or urgency
- New flank or suprapubic pain or tenderness
- Change in character of urine
- Worsening of mental or functional status (may be new or increased incontinence)

2012 Revised McGeer Criteria for UTI with No Catheter

Criteria 1 and 2 must be present:

- Criteria 1: At least 1 sign or symptom :
  - Acute dysuria or pain, swelling, tenderness (testes, epididymis, prostate)
  - Fever or leukocytosis and at least 1 of the following

    Acute costovertebral angle pain
    Suprapubic pain
    New/increase incontinence
    Gross hematuria
    New/increase urgency
  - In the absence of fever or leukocytosis: 2 or more of the localizing urinary tract criteria shown above
- Criteria 2: At least 1 microbiology criteria:
  - $>10^5$CFU/ml (colony-forming units per milliliter) of no more than 2 organisms in a voided urine sample
  - $>10^2$CFU/ml of any number of organisms in-and-out catheter sample

Comparison of Definition for UTI: 1991 vs. 2012 Criteria

1991

- Fever: >38.0ºC (100.4ºF)

2012

- Fever: Single temp >37.8ºC (100ºF), repeat temp >37.2ºC (99ºF), or 1.1C (2ºF) over baseline
- Urine culture required
- Add: Leukocytosis
- Deleted: Change in urine character; mental status change

Infection Surveillance in LTC: Case Finding

- Results of cultures
- Antibiotic use
- Fever rounds
- Daily (morning) report
- Unit reports
- Unit RNs identify cases using report form with definitions [see Appendix A]
- Unit rounds by ICP

Collection of Infection Data

- Bias is to have nursing staff collect data on infection occurrence for each unit using a form with definitions for each infection listed
- ICP randomly performs chart reviews to determine accuracy of information on forms
- Makes staff part of the process

Analysis of IC Data

- Analysis of IC data by ICPs in LTC is variable and tends to be less than optimal
- Most report numerator data only
- Numerator data can provide some information on trends if analyzed appropriately but requires knowledge of assumptions regarding population at risk for proper interpretation
- In order to make inter-facility comparisons, rates of infection are required (denominator data)

Analysis of Trends in Infection Surveillance Data: Rationale

To identify excess infections not related to outbreaks that may be amenable to prevention

Analysis of Trends in Infection Surveillance Data: Key Point

Establish the endemic rate of each infection

Analysis of Trends in Infection Surveillance Data: Endemic Rate

Average Rate

Is

Baseline Rate

Is

Endemic Rate

Analysis of Trends in Infection Surveillance Data: Goals

- Use standard definitions of infection for LTC
- Use the same method of infection detection consistently
- Define the endemic rate
- Use a method to identify when there is a significant deviation from the endemic rate

Infection Surveillance is One Component of a Successful Infection Control Program in LTC

"Surveillance without action should be abandoned"

or

"Surveillance for surveillance sake (because you are required to do it) is of no value in improving quality of care"

LTC Infection Surveillance with “Action”

- Perform surveillance to establish baseline (“pre-intervention rates”)
- Present data in a manner to stimulate ideas for improvement; using a valid analysis method
- Develop and implement interventions as necessary based on the analysis
- Perform follow-up surveillance to monitor for improvement

Role of NH Staff in Infection Control

- All NH staff in serviced regarding IC on initial employment and yearly thereafter
- Nurse in charge of a unit needs to be empowered to monitor staff for compliance with IC techniques and correct errors
- RN or LPN is the “point person” for contacting provider re: suspected infection in a resident; MUST be educated about information that needs to be collected before calling provider (templates); information provided impacts decision on testing, and treatment

National Nursing Home Quality Care Collaborative (NNHQCC) *Clostridium difficile* Reporting and Reduction Initiative

- New CMS funded national initiative to prevent and reduce CDIs in NHs
- NHs receive support on enrollment and data submission into the CDC National Healthcare Safety Network (NHSN)
- Training on TeamSTEPPS® LTC Communication Module
- Training on antibiotic stewardship principles and practices
- Contribute to establishing a national baseline for CDIs in NHs
- Over 108 Florida NHs members of the CDI Cohort

NHSN CDI Surveillance Definitions for LTC: Background

- CDC Work Group proposed surveillance definitions for CDI for healthcare facilities in 2007 [McDonald et al. Infect Control Hosp Epidemiol 2007;28:140-145]
  - Healthcare facilities (HCF) defined as a hospital, long-term care facility, long-term acute hospital, or other skilled nursing facility
  - HCF-onset, HCF-associated CDI = person with CDAD symptom onset more than 48 hours admission
- Editorial challenged HCF-onset, HCF-associated CDI definition for LTCFs [Mylotte. Infect Control Hosp Epidemiol 2008;29:760-763]
  - Based on clinical experience it was hypothesized that the majority of CDI cases occur within 4 weeks of admission to a LTCF and occur primarily in the post-acute population
  - Hypothesized that "true" nursing home-onset, nursing home-associated CDI was uncommon; defined as CDI occurring more than 30 days after admission to a LTCF and no episodes in the prior 90 days
- Studies have found that about 2/3 of CDI cases occurring in LTCFs had onset within 2–4 weeks of admission

NHSN *C. difficile* Surveillance by Laboratory-identified [LabID] Event for LTC

- LabID event method allows laboratory testing data to be used without clinical information making it a less labor intensive method to track CDI in LTCFs
- Based solely on lab data and limited resident admission/transfer data; increases chance that rate of CDI will be overestimated
- Definitions:
  - *C. difficile* -positive laboratory assay: A positive laboratory test for *C. difficile* toxin A and/or B (e.g., enzyme immunoassay), **OR** a toxin-producing *C. difficile* organism detected in the stool specimen by culture or other laboratory means (polymerase chain reaction [PCR])
  - Community-onset (CO) LabID Event: Date specimen collected ≤ 3 calendar days from date of current admission to the facility (i.e., days 1, 2, or 3 of admission)
  - Long-term Care Facility-onset (LO) LabID Event: Date specimen collected > 3 calendar days after current admission to the facility (i.e., on or after day 4)
  - LO further subclassified as: Acute Care Transfer-Long-term Care Facility-onset (ACT-LO): LTCF-onset (LO) LabID Event with date specimen collected ≤ 4 weeks following date of last transfer from an Acute Care Facility

NHSN CDI Rates and Metrics for LTCF

- Total CDI Rate/10,000 resident-days = Number of CDI LabID Events per month regardless of time spent in the facility (i.e., CO + LO) / Number of resident-days per month x 10,000.

- CDI Long-term Care Facility-onset Incidence Rate/10,000 resident-days = Number of all incident LO CDI LabID Events per month / Number of resident-days x 10,000. [Excludes recurrent cases]

- *Percent* that is Long-term Care Facility-onset = Number of CDI LabID Events that are LO / Total number of CDI LabID Events x 100.

- *Percent* of LO that is Acute Care Transfer-Long-term Care Facility-onset = Number of ACT-LO CDI LabID Events / Total number of LO CDI LabID Events x 100.

Infections in LTCFs: Benchmarks

What is benchmarking?

- “Benchmarking” represents an external source of information that provides a standard for comparison
- National Healthcare Safety Network (NHSN) has provided benchmarks for hospital-associated infections for decades--standardized online reporting system that provides an external standard for comparison

Benchmarks for Infection in LTCFs

- No benchmarks for infection in LTCFs are presently available
- CDC developed a voluntary system via NHSN for LTCFs for benchmarking beginning in 2012
- Published literature provides some help to individual facility

Variation in Infection Rates Among LTCFs

- Studies done in different geographic areas in the U.S. identified significant variation in rates among LTCFs

- Explanation for the variation
  - Variability in infection identification
  - Variation in application of definitions and over- or underestimating infection rate
  - Variation in risk for infection

Antibiotic Use in Long-Term Care

Antibiotic Use In LTC

- Abx are among the most commonly prescribed medications in LTC (Benoit JAGS 2008)
- On average, 1 of 10 residents in NHs is receiving an abx on any given day (Danemen JAC 2011)
- In addition to the risk of promoting resistance, abx also pose a risk of adverse events similar to anti-psychotics (Field Arch IM 2001)

Adverse Effects of Antibiotic Treatment

- *C. difficile* infection—risk is increased 8-fold following treatment of suspected UTI in LTC residents (Drinka JAMDA 2013)
- Allergic reactions
- Development of resistance and transmission of resistant organisms to others in NH or other healthcare facilities

Characteristics of Antibiotic Treatment in LTC

- Prospective studies have suggested that nearly 50% of abx prescribed in NHs are unnecessary (Rotjanapan Arch IM 2011; Vergidis JAGS 2011)
- Abx treatment often excessively broad-spectrum
- Abx treatment is too long (Daneman JAMA IM 2013)
- Most infections in NHs can be treated with alternative agents; e.g. do not use fluoroquinolone (FQ) as empiric treatment of suspected UTI

Antibiotic Resistance in Long-Term Care

Resistant Organisms of Concern for LTC [CDC]

- Urgent level of concern
  - *C. difficile*
  - Carbapenem-resistant Enterobacteriaceae [CRE]

- Serious level of concern
  - MRSA
  - VRE
  - ESBL Enterobacteriaceae
  - Multidrug-resistant (MDR) Acinetobacter, Ps. Aeruginosa

Antibiotic Resistance in NHs Related to 3 Factors

- Transfers from other healthcare facilities colonized with resistant organisms (new admissions or LTC residents returning from hospital)
- Unnecessary or prolonged use of abx in NH residents—resistance often only observed in urine cultures; e.g FQ resistance is common in urinary isolates
- Transmission from resident-to-resident

Actions to Prevent Resistance from Developing or Spreading

- Prevent Infection
- Prevent transmission using proper infection control techniques*
- Track resistant bacteria in residents*
- Improve antibiotic prescribing* (includes hospital and outpatient settings as well as nursing home)
- Development of new abx
- Development of diagnostic tests to identify etiology of infection; e.g., using molecular testing to identify cause of pneumonia

Monitoring Resistant Organisms in LTC

- Active surveillance
  - Prospective surveillance cultures
  - Time consuming and costly
  - Difficult to do in LTCFs and has significant consequences if culture is positive for Antibiotic Resistant Organism (ARO)
- Passive surveillance
  - Based on results of cultures either in facility or prior to admission
  - Underestimates number colonized
  - Can be analyzed to detect significant trends

Monitoring Resistant Organisms in LTC

- Regardless of method chosen for identifying colonized residents, analysis and trending of information is critical for prevention and control
- Concept of "colonization pressure" is useful in evaluating trends of resistant organisms: the greater number of residents colonized, the higher the risk for transmission and infection
- Use a method of analysis that is feasible for ICPs in LTC and can identify significant change in endemic rate of residents colonized [Threshold testing]

Antibiotic Stewardship in Long-Term Care

Rationale for an Antibiotic Stewardship Program in LTC

- Excessive antibiotic use; significant variability in abx prescribing among NHs [Danemen JAMA IM 2015]
- Increasing antibiotic resistance
- Increasing *C. difficile* infection

Improving Antibiotic Prescribing in LTC: Antibiotic Stewardship

- Antibiotic stewardship programs (ASP) are being heavily promoted for hospitals and NHs
- Several studies have been published evaluating various methods to perform an ASP in LTC; none are practical or sustainable for most facilities
- CDC has published core elements for an ASP in LTC

Role of NH Staff in Antibiotic Stewardship

- Staff is a key component in ASP
  - Collect information re: resident with possible infection
  - Transmit information to provider
  - If abx is ordered, can be a key “player” in follow-up—”antibiotic timeout” after 2–3 days of treatment
- Also participate in data collection
  - E.g., monitoring abx starts on a unit each month using the metric # starts per 1000 resident care days
- This level of participation in ASP elevates the importance of staff

CDC Core Elements for ASP in LTC

- Leadership commitment
- Accountability
- Drug expertise
- Action
- Tracking
- Reporting
- Education

See checklist for Core Elements listed in references for specific issues to address for each element

Questions?

Please send all questions to FL-NNHQCC@hsag.com.

NNHQCC Collaborative II: Learning Session 1

East Orlando	Tallahassee	Tampa
May 18, 2017	**June 7, 2017**	**June 20, 2017**
Lutheran Haven Nursing Home 1525 Haven Drive Oviedo, FL 32765	**Westminster Oaks** 4449 Meandering Way Tallahassee, FL 32308	**HSAG** 3000 Bayport Drive, Suite 300 Tampa, FL 33607
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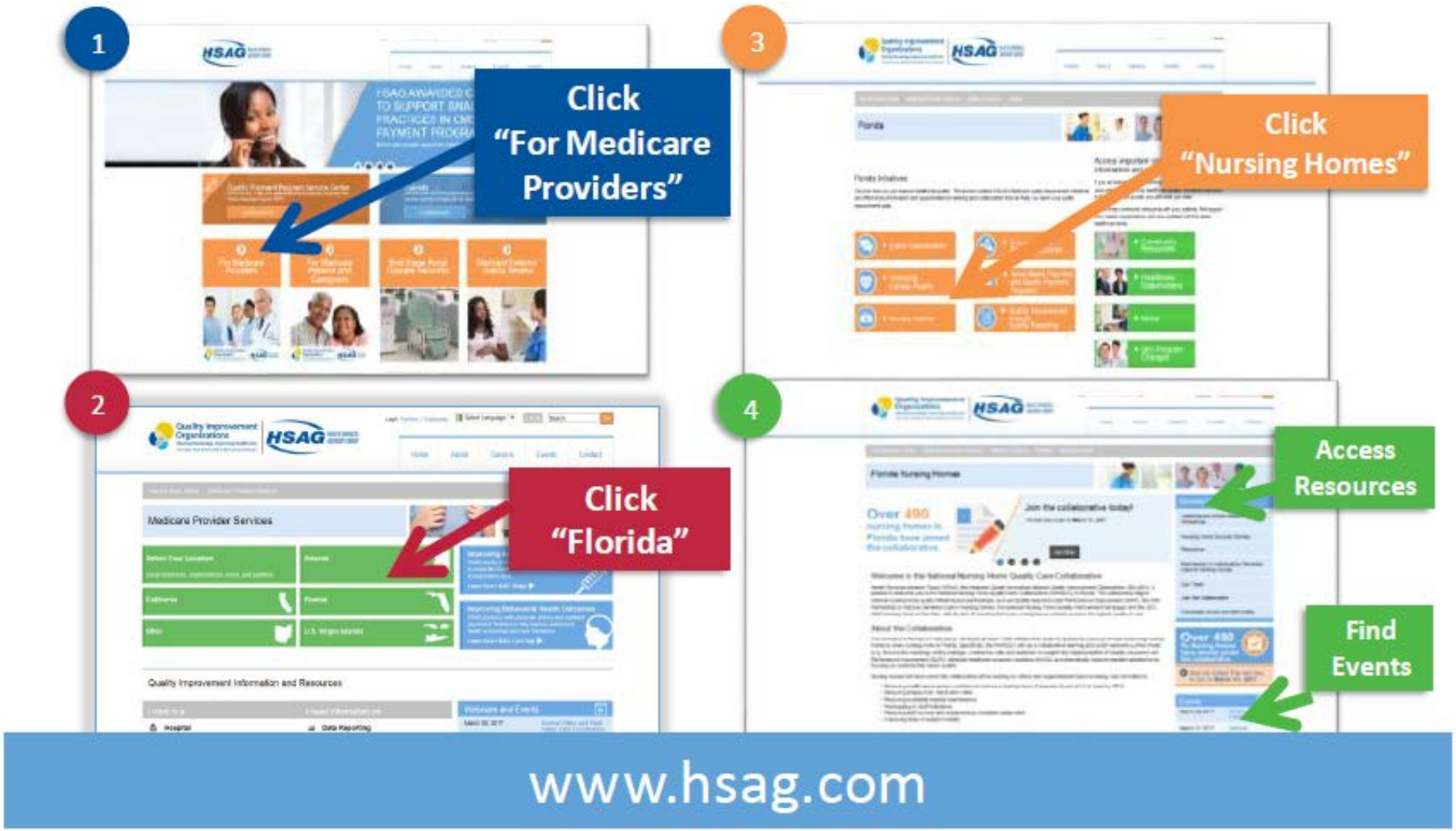


Florida NNHQCC Team

Jo Ann Bukovinsky, RN, BSN, MBA, LHCRM, RAC-CT

Associate Director

Health Services Advisory Group

813.865.3196 JBukovinsky@hsag.com

Gazelle Zeya, MS, MBA, RAC-CT

Associate Director

Health Services Advisory Group

813.865.3188 | GZeya@hsag.com

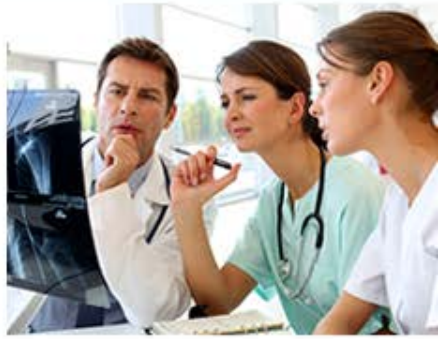
Tara Rhone, BS, MPH

Quality Improvement Specialist

Health Services Advisory Group

813.865.3191 TRhone@hsag.com



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