Healthcare associated infections

Read for you!

By Gabriel Birgand
Carbapenem-Resistant *Enterobacteriaceae*: A Strategic Roadmap for Infection Control

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**Graph:**
- **Y-axis:** Proportion Resistant to Carbapenems
- **X-axis:** Year of CRE Outbreak

**Legend:**
- Greece 2002-2004
- Israel 2005-2007
- Cyprus 2007-2009
- Italy 2009-2011
- Romania 2012-2014

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**Maps:**
- OXA-48
- NDM
- IMP
- KPC
- VIM

**Legend for Maps:**
- No data
- No cases
- Sporadic cases reported
- Data from exported cases
- Outbreaks reported
- Widespread/endemic
Steps in the CRE roadmap

**Step 1:** Determine Whether CRE Have Been Isolated
- CRE Have Not Been Isolated → Lab capability to identify

**Step 2:** Determine Affected Wards and Occurrence of Intrafacility Transmission
- Sporadic CRE or Single-Hospital Outbreak of CRE

**Step 3:** Implement Early CRE Detection and CRE Containment Measures

**Step 4:** Enhance existing infection control requirements

**Step 5:** Regional strategy

**Step 6:** Investigate for community spread of CRE
CRE detection strategies
– Screening + Notification

CRE containment
– Hand Hygiene
– Contact Precautions
– Discontinuation of Contact Precautions
– CRE Detection and Containment in LTCFs
– Limitation of Patient Transfer
– Environmental Surface Decontamination
– Sanitary Measures in the Outpatient Setting
– Minimizing the Use of Devices
– Decolonization of Patients
Short-term priorities

• Agreement on surveillance goals, definition, and measures of antimicrobial resistance, involving representatives from academia, public health, and the pharmaceutical industry, stakeholders, and clinicians

• Development of European data sharing policy encouraging and enabling surveillance systems to provide barrier-free and timely access to key national data on antimicrobial resistance

Long-term priorities

• Creation of a platform in which representatives from public health and the pharmaceutical industry collaborate to maximise the value of existing and future epidemiological efforts in Europe

• Ministerial involvement to include surveillance of resistance in the political agenda and define dedicated resources

• Implementation of a harmonised surveillance system that links European clinical, epidemiological, radiological, and microbiological data

• Increase in coverage and representatives of antimicrobial resistance surveillance systems in animals and the food chain

• Connection among surveillance systems in human beings, animals, and the food chain
Protection of the Human Gut Microbiome From Antibiotics

- RCT to assess the impact of an GI absorbent on fecal concentration of moxifloxacin after oral treatment

**Figure 1.** Study design. The various periods of the study (screening, treatment, follow-up) are shown in boxes at the top. The times of blood and fecal sampling for moxifloxacin pharmacokinetics and metagenomics analysis are shown by horizontal bars in the bottom section of the graph. Abbreviations: AUC, area under the time curve; MKS, moxifloxacin.
Protection of the Human Gut Microbiome From Antibiotics

- The coadministration of DAV132 decreased free moxifloxacin fecal concentrations by 99%, while plasmatic levels were unaffected.
- Shotgun quantitative metagenomics showed that the richness and composition of the intestinal microbiota were largely preserved in subjects co-treated with DAV132 in addition to moxifloxacin.
Candida auris

Candida auris: an Emerging Fungal Pathogen

Emily S. Spivak, Kimberly E. Hanson

Candida auris: a Review of the Literature

Anna Jeffery-Smith, Surabhi K. Taori, Silke Schelenz, Katie Jeffery, Elizabeth M. Johnson, Andrew Borman, Candida auris Incident Management Team, Rohini Manuel, Colin S. Brown
2066 ICU admissions, 1157 (56.0%) documented GN carriage in the rectum during ICU stay.

- GN rectal colonization:
  - Stronger associated with subsequent ICU-acquired GN infections than GN respiratory tract colonization.
  - Seems hardly associated with subsequent ICU-acquired GN respiratory tract colonization.
Overdiagnosis of HAIs $\rightarrow$ inappropriate antimicrobial

Diagnostic stewardship is defined as coordinated systems or user-based interventions designed to promote evidence-based utilization of diagnostic tests, with the primary goals of improving value and care quality and safely reducing cost.

- to effectively reduce a variety of unnecessary general inpatient medicine tests

Understanding how to limit false positives without restricting appropriate testing has become a major challenge as well as an important opportunity for improving hospital infection control, infection prevention, and patient safety.

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**TABLE 1. Examples of HAI-related Diagnostic Stewardship Strategies**

<table>
<thead>
<tr>
<th>HAI</th>
<th>Guidelines</th>
<th>Guidance to Support Stewardship Approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUTI</td>
<td>ACCM/IDSA guidelines for evaluation of new fever in critically ill patients</td>
<td>Urine culture should only be obtained in febrile catheterized patients when urinary tract is suspected as a source or if urinary obstruction, neutropenia, or recent surgery is present. Urine dipstick is not recommended for catheterized patients.</td>
</tr>
<tr>
<td></td>
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<td>Multifaceted approach in an ICU setting including &quot;stewardship of culturing,&quot; reduced CAUTI rates by a third. BPA discouraging dipsticks for catheterized patients.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Reflex urine culture protocol instituted for immunocompetent ICU patients associated with lower CAUTI rates. The lab performed urine culture only if pyuria was present on urinalysis.</td>
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<tr>
<td></td>
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<td>Clear interpretative language (eg, &quot;likely contaminant&quot;) attached to result.</td>
</tr>
</tbody>
</table>

Madden ICHE 2018
Prevention of hospital infections by intervention and training (PROHIBIT): results of a pan-European cluster-randomized multicentre study to reduce central venous catheter-related bloodstream infections

Adult ICUs from 14 hospitals in 11 European countries
Stepped-wedge cluster randomised controlled multicentre intervention study
(1) CVC insertion strategy (CVCi);
(2) HH promotion strategy (HHi);
(3) Both interventions combined (COMBi)
Prevention of hospital infections by intervention and training (PROHIBIT): results of a pan-European cluster-randomized multicentre study to reduce central venous catheter-related bloodstream infections

- Study nurses were trained in the direct observation of CVC insertion and hand hygiene compliance
  - Workshop + elearning
  - Encouraged to adapt the intervention program to their local context
- 25,348 patients with 35,831 CVCs
- CRBSI incidence density decreased from 2.4/1000 CVC-days at baseline to 0.9/1000 (p < 0.0001).
- 3 interventions significantly reduced CRBSI incidence density after adjustment.
  - Same when adjusted for the baseline decreasing trend,
  - CVC insertion scores and HH compliance increased significantly with all 3 interventions.
Candida auris

- 1st described in 2009
- India: 19/27 ICUs (5.2% of cases)
- WGS of U.S. isolates
  - Two geographic
  - South Asian
  - South American clade
- Can often be misidentified in conventional diagnostic laboratories
- Strong association with ICU & Catheters
  - Potential role for biofilm formation

FIG 1 Countries that have reported detection of C. auris (shown in red). C. auris has been detected in mainland Norway and Canada, a single Brazilian hospital, and the continental United States, excluding Alaska.
Candida auris

- Resistance to triazole antifungal agents and amphotericin B has led to the recommendation for the use of echinocandins as empirical treatment.

- Colonization with C. auris has been detected at multiple body sites, including nares, groin, axilla, and rectum, and has been isolated for 3 months or more after initial detection in spite of negative screens.

- Invasive C. auris infection has been associated with candidemia to a high degree, including cases associated with CVC use, but also with pericarditis and respiratory tract and urinary tract infections.
## Candida auris

### Infection control guidelines

| TABLE 4 Reported infection prevention and control recommendations

<table>
<thead>
<tr>
<th>Body</th>
<th>Patient screening</th>
<th>Contact precautions(s)</th>
<th>Contact screening</th>
<th>Decontamination procedures</th>
<th>Environmental management</th>
<th>Community management</th>
</tr>
</thead>
<tbody>
<tr>
<td>CDC (USA)</td>
<td>AVOID and grout screening; additional sites not directed clinically or by previously positive sputum, periodic measurement for presence of colonization at 1 to 3 mo intervals; for decontamination, 2 or more assessments 1 wk apart with negative results staff attendance</td>
<td>Single room with standard precautions; gown and gloves; hand hygiene procedures</td>
<td>Wait 48 h after administration of topical chlorhexidine rinsing</td>
<td>Through daily and terminal cleaning/ disinfection using Environmental Protection Agency-registered products effective against C. auris spores</td>
<td>Do not restrict nursing home residents to rooms and perform hand hygiene; keep gloves; avoid contact presecutions; maintain coughing and sneezing hygiene procedures</td>
<td></td>
</tr>
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<td>EUCIC (European)</td>
<td>All patients from in-country or internationally affected units transferred to conduct active surveillance in accordance with specified protocol; screening in all units include: sputum from, wounds, drain fluids, respiratory samples</td>
<td>Nurse in single room with an air filter; change gown, gloves, face mask, and shoe covers daily; change gown, gloves, and face mask every 4 h; all patients from in-country or internationally affected units transferred to conduct active surveillance in accordance with specified protocol; screening in all units include: sputum from, wounds, drain fluids, respiratory samples</td>
<td>Suction; decontamination with chlorine-releasing agent at 1,000 ppm for cleaning contact environments; change isolation precautions; equipervision of all patients; consider use of mouth gags with chlorhexidine and use of topical ointment and lubrication for topical management of key sites</td>
<td>NURSE IN A SINGLE ROOM WITH C. auris EXPOSED AREAS, GLOVES, AND SHOE COVERS W/ SUBSEQUENT APPLICABLE HAND DECONTESTATION</td>
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<tr>
<td>ESCMID (European)</td>
<td>EUCIC, all units with ongoing cases or colurizations; those uniting from affected units UK and already screening sites such as groin, axilla, nose, throat, ears, perineal area, rectal area, and skin; consider screening, if indicated, US, skin, ondulor sodions, drain fluids, sputum, and culucures; screening of patients known to have been previously colonized or to have had contact with relevant patients not recommend apart from units with experience in managing C. auris</td>
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*CDC, Centers for Disease Control and Prevention, USA; ESCMID, European Centre for Disease Prevention and Control; CIID, Centre for Opporuntism, Tropical, and Hospital Infections, USA; WPA, world tangible assets; PPE, personal protective equipment.*
• To assess the amount and infectiousness of influenza virus shed into exhaled breath.
• Sneezing is rare and not important for—and that coughing is not required for—influenza virus aerosolization.
• Upper and lower airway infection are independent and that fine-particle exhaled aerosols reflect infection in the lung.
• Association of current/prior year vaccination with increased shedding of influenza A might lead one to speculate that certain types of prior immunity promote lung inflammation, airway closure, and aerosol generation.
Thank you for your attention

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