# **Workshop case studies – indicators**

## Second ECDC point prevalence survey of healthcare-associated infections and antimicrobial use in acute care hospitals, 2016-2017

**Indicator case 1 – Case objective: address the indicator for infection control and antimicrobial stewardship FTEs**

In a secondary care hospital of 190 beds a physician with interest in infectious diseases is responsible for infection control, according to a decision by the clinical director. The physician performs infection control tasks for 4 out of 8 hours of her daily worktime on average, in addition to other clinical duties. There is one full-time infection control nurse. In addition, the physician reviews antimicrobial treatment on the surgical ward and the intensive care unit (ICU) on Tuesdays and Thursdays 10:00-12:00. The antimicrobial review task is not included in the job description or the decision of the clinical director.

***Use Form H1: Hospital data***

*How many full-time equivalents (FTEs) are dedicated to infection control?*

**Answer:** 1 1/2

*How many FTEs are dedicated to antimicrobial stewardship in this hospital?*

**Answer:** 0

**Indicator case 2 -** Case objective: address the indicator for multimodal strategy for the prevention of HAIs

A 450-bed acute care hospital has established an infection control programme. The programme includes surveillance of central line-associated infections (CLABSI) and ventilator-associated pneumonia (VAP) in the ICU and surveillance of surgical site infections. Guidelines for prevention of CLABSI and VAP in the ICU were introduced recently, with care bundles to support implementation of the available guidelines. All newcomer healthcare staff undergo half-day training and there are checklists for the implementation of the guidelines. The results of surveillance are posted monthly on the notice board. On the surgical ward, a printed guideline for perioperative antibiotic prophylaxis is available in card format for all surgeons. Surveillance results are presented in quarterly meetings.

***Use Form H2: Hospital data***

Q: *Does your hospital have a* ***multimodal strategy*** *for the prevention of following infections (see table)?*

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Guideline** | **Care bundle** | **Training** | **Checklist** | **Audit** | **Surveillance** | **Feedback** |
| **ICU** | | | | | | | |
| **Pneumonia** |  |  |  |  |  |  |  |
| **Bloodstream infections** |  |  |  |  |  |  |  |
| **Urinary tract infections** |  |  |  |  |  |  |  |
| **Antimicrobial use** |  |  |  |  |  |  |  |
| **Hospital-wide / other wards** | | | | | | | |
| **Pneumonia** |  |  |  |  |  |  |  |
| **Bloodstream infections** |  |  |  |  |  |  |  |
| **Surgical site infections** |  |  |  |  |  |  |  |
| **Urinary tract infections** |  |  |  |  |  |  |  |
| **Antimicrobial use** |  |  |  |  |  |  |  |

**Indicator case 3 -** Case objective: address the indicator for FTEs registered nurses and nursing assistants in ICU

The staff of the intensive care unit of a teaching hospital (capacity: 10 beds, 1450 patient-days last years) includes 21 registered nurses and 8 nurse aides. Three out of the 21 nurses work 75% while the head nurse does administrative work except from one shift per week when she does clinical work. From September until May four to six student nurses at the graduating year are also practicing on a shift basis. Two of the 21 registered nurses are trainees in ICU but participate in the shift system. The point prevalence survey (PPS) is carried out in March.

*What is the number of FTE registered nurses in ICU*?

**Answer:** 18 FTEs + 3 \*0.75 FTEs = 20.25 FTEs. Student nurses are not registered.

*What is the number of FTE nursing assistants in ICU*?

**Answer:** 8 FTEs

**Indicator case 4**

The ICU of a tertiary care hospital has 25 beds. Each day the antimicrobial treatment of each patient is reviewed by the clinical team together with all other administered medication to assess the need to continue, modify or discontinue. The results from the microbiology laboratory are also reviewed by the clinical team on a daily basis.

*Is there a formal procedure to review the appropriateness of an antimicrobial within 72 hours from the initial order in this ward (post-prescription review)?*

**Answer:** No. We need a person or team that is responsible for antimicrobial review, other than the treating physicians. This could for example be the pharmacist, a clinical microbiologist etc. This activity should also be formal, i.e. documented and adopted by the management (e.g. hospital director, clinical director or other relevant level of administration) and/or included in the job description(s).

# **Workshop case studies – case definitions**

## Second ECDC point prevalence survey of healthcare-associated infections and antimicrobial use in acute care hospitals, 2016-2017

Use the cases below to complete the attached case form. You will need to refer to the codebook to fill in the form.

Use the case number as the patient counter on the form to allow the results to be reviewed and discussed.

**Clinical case 1:** Case objective: introductory case without HAI treated with antibiotics for community infection

Six-year-old girl admitted on 6 April due to profuse diarrhea, abdominal pain and fever up to 40.3°C. The girl was initially treated with fluid and electrolyte replacement. *Salmonella typhimurium* was isolated on 7 April from the stool and blood culture and treatment with cefotaxime 4 x 500mg IV was initiated. On 9 April the patient was afebrile with mild diarrhea. You performed the survey at 13:00. Use Form A/B: Patient-based data

Receives antimicrobial: Yes

Antibiotic code(s): J01DD01 (cefotaxime)

Route: P (parenteral)

Indications for antibiotic(s): CI (community infection)

Diagnosis (site) for antimicrobial use: BAC

Date start antimicrobial: 7 April

Changed? + reason: N (no change)

Dosage: 4 x 500mg

Active HAI: No

**Clinical case 2** Case objective: address common pneumonia types and resistance coding

68-year-old female is admitted on 15 March comatose with severe stroke. A peripheral venous and urinary catheter are inserted. She has low grade fever up to 37.7°C and the white blood cell (WBC) count on admission is 14,000 cells/mcl. Her condition remains serious but stable until 24 March, when she presents with fever 39.0°C, tachypnoea, cough and sputum production. The chest x-ray shows an infiltrate at the right middle lobe. WBC is 19,000 cells/mcl. Blood, urine and bronchial secretions are sent for culture and treatment with ampicillin/sulbactam 4 x 3g is initiated. A diagnosis of aspiration pneumonia is recorded in the notes. Fever persists at 38.4°C on 25 March. On 26 March, growth of *Klebsiella pneumonia* resistant to ceftriaxone and ampicillin/sulbactam and susceptible to meropenem is reported in the bronchial secretions and ampicillin/sulbactam is replaced by meropenem 3 x 2g IV. On 27 March, you perform the PPS. Use Form A/B: Patient-based data

Receives antimicrobial: Yes

Antibiotic code(s): J01DH02 (meropenem)

Route: P (parenteral)

Indications for antibiotic(s): HI (hospital infection)

Diagnosis (site) for antimicrobial use: PNEU

Date start antimicrobial: 26 March

Changed? + reason: E (escalation)

If changed, date start 1st antimicrobial: 24 March

Dosage per day: 3 x 2g

Active HAI: Yes

Case definition codes: PN4 (clinical picture, radiology and non-quantitative culture of lower respiratory tract specimen)

Relevant device: No

Present on admission: No

Date of onset: 24 March

Origin of infection: Current hospital

HAI associated to current ward: Yes

Microorganism code(s): KLEPNE

Resistance marker(s) and code(s): C3G-R, CAR-S (PPS-1 protocol: 1)

**Clinical case 3** Case objective: address complicated surgical site infection (SSI) with secondary bloodstream infection (BSI)

69-year-old male admitted on 2 March to be operated for oesophageal cancer. He was operated on 4 March and was transferred to the ICU after operation. On 5 March, he returned to the surgical ward. On 6 March, he developed fever 37.8°C. A chest x-ray showed multifocal ill-defined infiltrates in both lung bases. Antibiotic treatment with ampicillin/sulbactam 3 x 2g was initiated. On 7 March, the patient had a low-grade fever up to 37.7°C. A chest CT scan displayed signs of atelectasis in both lower lobes and inflammatory signs around the oesophageal anastomosis, consistent with the recent operation. On 11 March, a central venous catheter was inserted due to difficult peripheral access. The clinical condition remained stable with low grade fever until 19 March when the patient developed fever 39.2°C with septic shock. The WBC was 19,000/mm3. He was intubated and transferred to the ICU. The central catheter was replaced, and the tip sent for culture. An urgent chest CT scan revealed widening of the mediastinum with the presence of an air-fluid level, consistent with mediastinitis. Treatment with meropenem 3 x 2g IV, vancomycin 2 x 1g IV and micafungin 1 x 100mg IV was initiated for the treatment of sepsis according to the patient record. An emergency reoperation for debridement was performed on 20 March. Cultures of blood, the catheter (10 CFU on semiquantitative culture), urine and intra-operatively collected pus were positive for *Candida glabrata*. The patient’s condition remained critical under treatment until 23 March when the survey was carried out. Use Form A/B: Patient-based data

Receives antimicrobial: Yes

Antibiotic code(s): J01DH02 (meropenem), J01XA01 (vancomycin), J02AX05 (micafungin)

Route: P (parenteral)

Indications for antibiotic(s): HI (hospital infection)

Diagnosis (site) for antimicrobial use: CSEP for meropenem and vancomycin as no bacteria were isolated and it was initially prescribed for sepsis. BAC for micafungin (BAC includes fungemia, see FAQ). If the diagnosis changed during the patient stay, report diagnosis (site) at the time of the PPS.

Date start antimicrobial: 19 March

Changed? + reason: N (no change)

Dosage per day: 3 x 2g, 2 x 1g, 1 x 100mg

Active HAI: Yes

Case definition code(s): SSI-O (fever, radiologic findings of mediastinitis), BSI (origin: S-SSI). The definition for UTI is not fulfilled due to the presence of other recognised cause.

Relevant device: Yes (for BSI)

Present on admission: No

Date of onset: 19 March (day 18). One may also argue that the date of onset was 6 March, when the first signs of SSI-O appeared.

Origin of infection: Current hospital

HAI associated to current ward: No

Microorganism code(s): CANGLA (for both SSI-O and BSI)

**Clinical case 4** Case objective: address HAI on admission and the presence of more than one HAI

58-year-old male patient was discharged on 16 February at 18:00 after being treated for nephrotic syndrome. On discharge he had low-grade fever and was prescribed cefuroxime 2 x 500mg for five days. On 18 February at 14:00 the patient was readmitted to the same hospital with a temperature of 38.6°C and productive cough. A chest x-ray showed evidence of broncho-pulmonary infiltrates. The diagnosis on admission was pneumonia and piperacillin-tazobactam (4 x 4.5 g) was initiated after blood cultures were taken. Due to impeding respiratory failure, the patient was transferred to the ICU and intubated. Bronchial secretions were sent for culture and a urinary and central venous catheter were introduced. The condition of the patient improved slowly but weaning from the respirator was difficult. On 25 February, he presented with fever 38.3°C and diarrhea. A new x-ray did not show significant changes. Blood cultures were taken, the CVC was replaced, and the tip sent for culture. A stool specimen was sent for *Clostridium difficile* toxin testing and on the morning of 26 February a positive result was reported. Vancomycin 4 x 125mg was administered by nasogastric tube for CDI (documented in the notes) and piperacillin-tazobactam was continued. The survey was performed on 28 February at 14:00. Use Form A/B: Patient-based data

Received antimicrobial: Yes

Antibiotic code(s): J01CR05 (piperacillin and enzyme inhibitor), A07AA09 (vancomycin oral)

Route: P (parenteral), O (oral)

Indications for antibiotic(s): HI (hospital infection)

Diagnosis (site) for antimicrobial use: PNEU for piperacillin-tazobactam, GI for oral vancomycin

Date start antimicrobial: 18 February, 26 February

Changed? + reason: E (escalation), N (no change)

Date start 1st antimicrobial: 18 February

Dosage per day: 4 x 4.5g, 4 x 125mg

Active HAI: Yes, two HAIs are active at the time of the survey.

Case definition code(s): PN-5, GI-CDI

Relevant device: No (for PN-5)

Present on admission: Yes (PN-5), No (GI-CDI)

Date of onset: 18 February (PN-5), 25 February (GI-CDI)

Origin of infection: current hospital in both cases

HAI associated to current ward: No (PN-5), Yes (GI-CDI)

Microorganism code(s): \_STERI (for PN-5), CLODIF (for GI-CDI)