TECHNICAL DOCUMENT

Protocol for point prevalence surveys of healthcare-associated infections and antimicrobial use in European long-term care facilities

Version v.2014

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This protocol for repeated point prevalence surveys of healthcare-associated infections and antimicrobial use in European long-term care facilities is a direct adaptation of the protocol and questionnaires used by 16 EU Member States and Norway for the *Point prevalence survey of healthcare-associated infections and antimicrobial use in European long-term care facilities (HALT-2), April – May 2013* (Stockholm: ECDC; 2014).

Suggested citation: European Centre for Disease Prevention and Control. Protocol for point prevalence surveys of healthcare-associated infections and antimicrobial use in European long-term care facilities. Version v.2014. Stockholm: ECDC; 2014.

Stockholm, May 2014

ISBN 978-92-9193-576-5

doi 10.2900/29556

Catalogue number TQ-01-14-593-EN-N

Contents

Abbreviations

AMR	Antimicrobial resistance
ECDC	European Centre for Disease Prevention and Control
EEA	European Economic Area
EU	European Union
GP	General practitioner
HAI	Healthcare-associated infection
HALT	Healthcare-Associated infections in long-term care facilities project
HALT-2	Healthcare-associated infections and antimicrobial use in long-term care facilities project
IPC	Infection prevention and control
IPSE	Improving Patient Safety in Europe project
LTCF	Long-term care facility
NC	National coordination
NR	National representative
PPS	Point prevalence survey
RTI	Respiratory tract infection
UTI	Urinary tract infection

Brief overview

What: a point prevalence survey (PPS; data collection on one single day) on healthcare-associated infections (HAIs) and antimicrobial use with voluntary participation.

Setting: all types of long-term care facilities (LTCFs), including nursing homes, residential homes and rehabilitation centres.

Timing: Data collection on one single day.

Tools:

- **An institutional questionnaire** collecting denominator data for the entire eligible resident population.

  Eligible residents: resident living full-time in the LTCF and present at 8:00AM on the day of the PPS and present in the LTCF for at least 24 hours.

- **A resident questionnaire** for each resident:

  receiving systemic antimicrobial agent(s) at the time of the survey

  Included: antibacterials and antimycotics for systemic use, drugs for systemic treatment of tuberculosis, antibiotic treatment by inhalation (aerosol therapy)

  Excluded: antimicrobial agents for topical use, antivirals and antiseptics

  AND/OR

  presenting with signs/symptoms of an **active** HAI on the day of the PPS

  An infection is **active** when signs and symptoms of the infection are present on the survey date **or** signs and symptoms were present in the past and the resident is (still) receiving treatment for that infection on the day of the PPS.

- **Stand-alone software** for data entry at the local (LTCF) or national (national centre) level.

Data collectors: local (i.e. person(s) from LTCF) or external (i.e. person(s) recruited by national centre).

Training: national representatives must be trained (train-the-trainer course) and should then organise national/regional training sessions.

Validation study: one LTCF per country must perform a validation study (simultaneously with PPS).

1 Introduction

As part of the transition of the project 'Improving Patient Safety in Europe' (IPSE), the European Centre for Disease Prevention and Control (ECDC) outsourced the EU surveillance of healthcare-associated infections (HAIs) in long-term care facilities (LTCFs) to the Healthcare-associated infections in European long-term care facilities project (HALT, 2009–2011). The project developed, tested and implemented a protocol for repeated point prevalence surveys (PPSs). In addition to HAIs, the project also aimed to collect data on antimicrobial use (integration of the European Surveillance of Antimicrobial Consumption Nursing Home subproject), antimicrobial resistance (AMR) and infection prevention and control (IPC) resources in European LTCFs. A PPS was completed in 2010 in 722 LTCFs across 25 European countries (HALT (2010)).

In 2011, ECDC outsourced the Healthcare-associated infections and antimicrobial use in long-term care facilities (HALT-2) project to further implement this PPS methodology in LTCFs. The overall aim of HALT-2 was to develop a standardised tool that enables trends to be followed in the prevalence of HAIs and antimicrobial use, at local (LTCF), national and European levels. For this purpose, HALT-2 promoted a European protocol, based on a repeated PPS design, to identify the prevalence of HAIs and antimicrobial use and related IPC performance indicators in European LTCFs. As a secondary objective, HALT-2 helped identify priorities for national and local intervention and enable their implementation to be monitored , thereby improving resident safety and the quality of care in European LTCFs.

This protocol for repeated PPSs in European LTCFs is a direct adaption of the protocol and questionnaires used by 16 EU Member States and Norway for the second PPS of HAIs and antimicrobial use in European long-term care facilities (HALT-2), April–May 2013.

2 Objectives

The overall aim of the protocol is to support the implementation of PPSs of HAIs and antimicrobial use in LTCFs, and more generally to support the prevention and control of HAIs and antimicrobial resistance in LTCFs in EU/EEA countries.

The main objectives of the protocol for repeated PPSs are to:

- identify the prevalence of HAIs and antimicrobial use in European LTCFs;
- identify related IPC process and structure indicators in the same group of LTCFs.

The obtained data are considered useful to:

- quantify the prevalence of HAIs and antimicrobial use in LTCFs, countries and European regions;
- identify needs for intervention, training and/or additional IPC resources;
- identify priorities for national and local intervention and raise awareness;
- foster the safety of healthcare for residents in LTCFs and the ageing European population in general.

3 Study design

3.1 Time schedule for the repeated PPSs

Data should be collected on one single day. In LTCFs with a large number of beds, data collection can be spread over two or more consecutive days. However, all beds in one ward should be surveyed on the same day.

3.2 Study population

3.2.1 Countries

National survey coordinators are responsible for the invitation of LTCFs and the organisation of the survey in their country. For the purpose of an EU-wide survey, countries are invited to participate through ECDC's network for surveillance of healthcare-associated infections (HAI-Net).

3.2.2 Eligibility criteria for LTCFs

All types of LTCFs will be given the opportunity to participate in the PPS. Afterwards, each LTCF will receive individual feedback of their results but **only the data from nursing homes, residential homes and mixed facilities will be used for the main analyses in the European report**.

LTCFs (included in the main analysis) typically have residents who:

- need constant supervision (24/24 hours);
- need 'high-skilled nursing care', i.e. more than 'basic' nursing care and assistance for daily living activities;
- are medically stable and do not need constant 'specialised medical care' (i.e. care administered by specialised physicians)
- do not need invasive medical procedures (e.g. ventilation).

The following facilities should be **excluded**:

- hospital long-term care wards, residential care (hotel/without any kind of nursing care), sheltered care houses, day centres, home-based centres, protected living.

3.2.3 Eligible residents

Residents are eligible, and should therefore be included in the study, if they are:

- living full-time (24/24 hours) in the LTCF
  AND
- present at 8:00 AM on the day of the PPS
  AND
- present in the LTCF for at least 24 hours.

The following residents should be excluded:

- residents not living full-time in the LTCF
  OR
- residents living full-time in the LTCF but not present at 8:00 AM (e.g. absent for leave or admitted to a hospital)
  OR
- residents not present in the LTCF for at least 24 hours (as the recent medical history of such residents is often incompletely known at the time of the PPS)
  OR
- residents from day care centres (not living full-time in the LTCF)
  OR
- residents hospitalised on the day of the PPS (inpatient hospital stay for at least 24 hours)
  OR
- residents who choose not to participate.

Note: Residents receiving chronic ambulatory care on a regular basis in an acute care hospital (e.g. haemodialysis or chemotherapy) should not be excluded from the PPS if they are not hospitalised on the day of the PPS or during the previous 24 hours (i.e. inpatient in an acute care hospital with a hospital stay of at least 24 hours).

3.3 Participation options

Countries can participate by collecting PPS data in LTCFs from the entire country (national data) or can limit data collection to settings from one region (i.e. regional data).

The results of the PPS should ideally be based on data from LTCFs that are representative for all LTCFs in the country/region. Given the large variety and number of LTCFs and the voluntary nature of the PPS, this is not always possible. However, countries that can do this are encouraged to do so. More information on how to select a representative sample of LTCFs can be obtained from ECDC.

3.4 Data collectors

Depending on the available resources, data can be collected by **local data collectors** (e.g. designated physician, infection control doctor/nurse, head nurse, etc.) or local data collectors supported by an **external data collector** (i.e. person recruited by the national representative, e.g. doctor, infection control nurse).

Both local and external trained data collectors should visit the facility on the day of the PPS to review each resident with the nurse in charge, nurses' aide and healthcare workers of the LTCF, looking for recent symptoms suggestive of infection, examining charts, case notes and drug charts. Residents with suspected infection(s) and residents receiving antimicrobial agents should be reviewed, and discussed with the attending physician if possible.

It is recommended that extra staff are involved during this period to take into account the extra workload that the PPS is foreseen to generate.

Training material was developed by the HALT-2 management team. Training of data collectors is strongly recommended (see 7 Training).

4 Data collection

Data are collected using two questionnaires:

- An **institutional questionnaire** to explore important structural & functional characteristics, denominator data and information about antimicrobial policies and infection control resources in the LTCF;
- A **resident questionnaire** for each resident using antimicrobial agents and/or presenting signs/symptoms of active healthcare-associated infection on the PPS day.

A **ward list** (optional, for internal use only) is offered to aid collection of denominator data for the entire LTCF eligible population. A **code list for microorganisms** should be used to complete the section on microorganisms and their resistance in the resident questionnaire.

4.1 Institutional questionnaire

The institutional questionnaire collects general data on factors relating to each LTCF's profile (e.g. public/private ownership, presence of qualified nurses) and specific questions on medical care & coordination, infection prevention & control resources, and antimicrobial policies.

The information collected by the institutional questionnaire can be used to make appropriate adjustments for case mix which is critical to compare infection rates and antimicrobial use in different types of facilities, at national/regional level and at European level.

4.1.1 Denominator data and ward list

The case mix of each LTCF's eligible residents will be described through the collection **denominator data**, i.e. total numbers of:

- available and occupied beds
- hospitalised residents
- eligible residents
- male residents
- residents with signs/symptoms of infection
- residents receiving antimicrobial agents
- residents with a urinary catheter
- residents with a vascular catheter
- residents with pressure sores
- residents with other wounds
- residents disoriented in time and/or space
- residents using a wheelchair or that are bedridden
- residents that have had surgery in the previous 30 days
- residents with urinary and/or faecal incontinence.

A ward list has been developed to help data collectors collect these denominator data. This ward list is for internal use only and its use is not mandatory. Once data have been collected for all wards, data collectors can sum the denominators from each ward and transfer the totals to the institutional questionnaire. Facilities that do not have different wards will only complete one ward list.

4.1.2 Variables institutional questionnaire/ward list

Variable	Description/definition
A – General information	
Facility study number	LTCF identifier; code allocated by the national coordinating centre.
Qualified nurses available 24/24 hours in the facility	Qualified nurses are available day and night, i.e. physically present and/or contactable by phone/beeper 24 hours a day.
Total number of resident rooms	Sum of all resident rooms including single rooms and multi-bedded rooms. Public areas, utility rooms, etc. should be excluded.
Total number of single rooms in the facility	Total number of rooms in the facility that are designated for single occupancy. A room with a double bed shared by partners should not be considered as a single room. The variable will be used to calculate the proportion of single rooms in the facility.
B – Denominator data	
Beds in the facility	The total number of resident beds in the LTCF, both occupied and unoccupied beds.

Variable	Description/definition
Residents absent due to hospitalisation in an acute care hospital	Total number of residents absent from the facility on the day of the PPS due to hospitalisation for at least 24 hours in an acute care hospital
Occupied beds	Total number of beds occupied by residents on the day of the PPS. This figure also includes beds occupied by residents who are absent on the day of the PPS due to hospitalisation, on holiday or with family, etc.
Eligible residents	Total number of residents present at 8:00 AM on the day of the PPS, living full-time in the facility for at least 24 hours.
Resident older than 85	Total number of eligible residents older than 85 years on the day of the PPS.
Male resident	Total number of eligible male residents on the day of the PPS.
Residents receiving any systemic antimicrobial therapy	Total number of eligible residents receiving one or more systemic antimicrobial agents (see 4.2.2) on the day of the PPS.
Residents with signs or symptoms of an infection	Total number of eligible residents presenting signs or symptoms of an infection (suspected) on the day of the PPS, OR presenting signs/symptoms of an infection in the preceding days if they are still receiving antimicrobial agents on the day of the PPS.
Residents with any urinary catheter	Total number of eligible residents with a urinary catheter, i.e. any tube system in place to drain and collect urine from the bladder, e.g. an indwelling urinary catheter, suprapubic or abdominal wall catheter, a cystostomy.
Residents with any vascular catheter	Total number of eligible residents with a tube system in place to access the vascular system (i.e. venous, arterial, arteriovenous fistulae) on the PPS day, e.g. a peripheral intravenous catheter, an implanted vascular access system, or any other intravascular access system.
Residents with pressure sores	Total number of eligible residents with a pressure sore on the day of the PPS. All grades of pressure sores should be included (e.g. the lowest grade, non-blanching erythema, characterised by discolouration of intact skin not affected by light finger pressure).
Residents with other wounds	Total number of eligible residents with a wound other than a pressure sore on the PPS day, including leg ulcers, traumatic or surgical wounds and insertion sites for percutaneous endoscopic gastrostomy (PEG), tracheostomy, urostomy, colostomy or suprapubic and peritoneal catheters.
Residents disoriented in time and/or space	Total number of eligible residents who suffer from periods of confusion especially relating to time, place or identification of persons (e.g. they cannot find their room, have no idea of time and/or are unable to recognise persons they know very well).
Residents using a wheelchair or that are bedridden	Total number of eligible residents who need a wheelchair or are bedridden on the PPS day.
Residents with surgery in the previous 30 days	Total number of eligible residents who had surgery in the 30 days preceding the PPS. Surgery is defined as a procedure that takes place in an operation room (including operating theatres/rooms, interventional radiology rooms or cardiac catheterisation laboratories) where a surgeon makes at least one incision through the skin or mucous membrane, including laparoscopic approaches, and closes the incision before the patient leaves the operating room.
Residents with urinary and/or faecal incontinence	Total number of eligible residents with urinary and/or faecal incontinence (i.e. lack of control of the bladder or bowel sphincters resulting in an uncontrolled loss of urine or faeces) necessitating the use of diapers in the 24 hours prior to the PPS day (during the day and/or night). A resident with a urinary catheter should be considered as continent (this indicator is designed to measure work load).
C- Medical care & coordination	
Personal general practitioner (GP)	A medical doctor, chosen by the resident, who provided medical care outside of the hospital environment to the LTCF resident in the years before their LTCF residence.
GP group practice	GPs in one GP practice or a network of single GP practices that collaborate to attend to the everyday medical needs of individuals within a geographical area.
Medical staff employed by the facility	Medical doctors hired by the LTCF management to provide care to the residents. These physicians are not the residents' personal GPs (see above).
Coordinating physician	A medical doctor in charge of the coordination of medical activities and standardisation of practices/policies in the facility.
Medical resident care	Diagnostic activities, medical therapy and follow-up of residents' health issues.
Supervision of medical records	Access to all medical information of all residents in the facility, with or without the ability to change the course of a treatment, often after discussion with the medical doctor who prescribed the treatment.
Antimicrobial policy	Recommendations for good antimicrobial practice, based on current knowledge and evidence, taking into account prudent antimicrobial use, i.e. avoiding unnecessary or ineffective treatments.
Care strategy	A long-term plan of actions that results in a systematic and informed approach to provide good quality of care, e.g. wound care, vaccination, infection prevention.
Infection prevention and control policy	A coherent series of precautions and actions to avoid infections and transmission of pathogens within a population.

Variable	Description/definition
Peer review of medical activities	The process through which the medical care provided by a physician is examined by an interdisciplinary team of qualified experts.
D- Infection control practice	
Person with training in infection prevention and control	'A registered nurse, physician, epidemiologist or medical technologist who helps to prevent healthcare-associated infections by isolating sources of infections and limiting their spread; systematically collects, analyses and interprets health data in order to plan, implement, evaluate and disseminate appropriate public health practices; and trains healthcare staff through instruction and dissemination of information on infection control practices.' (Source: Association for Professionals in Infection Control and Epidemiology) This person can work full-time on infection control and prevention activities or combine this with other duties such as general nursing duty, nursing supervision, quality assurance, etc.
Infection prevention and control (IPC) committee	A multidisciplinary committee consisting of at least the person with training in infection prevention and control (IPC) (IPC practitioner), the administrator, the coordinating physician (if present at the facility), the nursing supervisor(s) or by persons they designate. IPC committee members could also include quality assurance personnel, risk management personnel, representatives from microbiology, surgery, central sterilisation, pharmacy, environmental services, etc. The IPC committee functions may be merged with the performance improvement or patient safety programmes, but IPC must remain identifiable as a distinct programme. The IPC committee should meet regularly to review infection control data, review policies, and monitor programme goals and activities. Written records of meetings should be kept (Source: SHEA/APIC guidelines: Infection prevention and control in the LTCF, 2008).
Litres of hand alcohol	Total number of litres used during the course of the year preceding the PPS.
Hand hygiene training	Education of care professionals (i.e. nurses, nurse aides, doctors, physiotherapists, cleaning staff etc.), especially those new to the LTCF, on at least the importance of hand hygiene, the indications for hand hygiene, the technique and the products to use.
E- Antimicrobial policy	
Restrictive list of antimicrobials to be prescribed	A list with antimicrobial agents which are authorised for prescription, those which should not be used or should not be used for empiric therapy of any infection in the facility. The purpose of this is to preserve certain antimicrobial agents for certain culture-proven infections. In some cases exceptions are allowed with written motivation forms, explaining the reasons for the choice of that antimicrobial agent.
Antimicrobial committee	This committee is in charge of the development of local guidelines and protocols for antibiotic use in the LTCF. The team should comprise (at least) doctors prescribing antimicrobial agents to LTCF residents, a pharmacist, a co-ordinating physician (if present) and an infection prevention and control practitioner and (if possible) a microbiologist.
Written guidelines for appropriate antimicrobial use	Recommendations for empirical and targeted treatment of the most frequent infections, including dosage, administration route and duration of treatment. Commonly a first and second therapy choice is proposed.
Annual antimicrobial consumption	A report on the quantity of antimicrobial agents prescribed/received during the past year, classified by class.
Drug resistance profiles	Follow-up of the evolution of antimicrobial resistance patterns for different micro-organisms in order to orient the choice of antimicrobial agents for treatment. Data are obtained by surveillance of resistance profiles provided by microbiological protocols.
Therapeutic formulary	List of eligible antimicrobial agents by illness, intended as a manual for physicians to guide their prescriptions. The therapeutic formulary should include a specific chapter on antimicrobial therapy.
Urine dipstick test	Tests performed by dipping a paper or cardboard stick into urine to test it for the presence of white blood cells (leukocyte esterase) and/or nitrites. Results are indicated by colour changes on the stick. This test type should not be confused with 'dip slide' tests performed by laboratories to test for the presence of microorganisms in liquids by incubating 'dip slides'.

4.2 Resident questionnaire

A resident questionnaire has to be completed for each resident:

- receiving **systemic** antimicrobial agent(s) on the day of the PPS (see 4.2.2), AND/OR
- presenting signs/symptoms of an **active** healthcare-associated infection on the day of the PPS (see 4.2.4)

4.2.1. General data

To observe the profile of the resident, general data (e.g. birth year, age, length of stay, recent hospital admission) and seven case mix factors (urinary catheter, vascular catheter, pressure sores, wounds, incontinent, disoriented, impaired mobility) must be collected.

Admission to a hospital in the last three months	Was the resident admitted to an acute care hospital in the three months preceding the PPS study date? Only admissions for at least 24 hours to acute care hospitals – i.e. hospitals with at least one medical or surgical ward - should be considered.
Urinary catheter	Any tube system placed in the body to drain and collect urine from the bladder, e.g. an indwelling urinary catheter, suprapubic or abdominal wall catheter, a cystostomy.
Vascular catheter	Any tube system placed in the body to access the vascular (venous, arterial) system, (e.g. a peripheral intravenous catheter, an implanted vascular access system or any other intravascular access system (including arteriovenous fistulae).
Urinary and/or faecal incontinence	Lack of control of the sphincter from bladder or bowel resulting in an uncontrolled loss of urine or faeces and necessitating the use of diapers in the 24 hours prior to the PPS day (during the day and/or night). A resident with a urinary catheter should not be considered as incontinent.
Pressure sores	All grades of pressure sores should be considered, even the lowest grade characterised by discolouration of intact skin not affected by light finger pressure (non-blanching erythema)
Other wounds	All wounds other than a pressure sore, including leg ulcers, traumatic or surgical wounds and insertion sites for percutaneous endoscopic gastrostomy, tracheostomy, urostomy, colostomy or suprapubic and peritoneal catheters.
Disoriented in time and/or space	Residents who suffer from periods of confusion especially as to time, place or identification of persons (e.g. resident cannot find his/her room or has no idea of time).
Mobility	In general, is the resident ambulant (he/she can walk alone with or without canes, crutches, walkers), does he/she need a wheelchair for his/her movement or is he/she bedridden on the PPS day?

4.2.2 Antimicrobial consumption data

The following antimicrobial agents should be included:

- All oral, rectal, intramuscular (IM) and intravenous (IV) treatment with:
  - antibacterial and antimycotic agents for systemic use
  - antimycobacterials, i.e. agents for the systemic treatment of tuberculosis
- Antibiotic treatment by inhalation (aerosol therapy)

The following antimicrobial agents should be excluded:

- Antiviral agents for systemic use
- Antimicrobial agents for topical use
- Antiseptic agents

For each included antimicrobial agent, the following information has to be recorded: antimicrobial name, administration route, end/review date of treatment known (Y/N), indication, antimicrobial given for (i.e. site of diagnosis), place of prescription, prescriber, culture taken (Y/N) and dipstick test performed (Y/N; only in case of indication related to the urinary tract).

Prophylaxis	Antimicrobial agents prescribed to prevent an infection. The resident presented no signs/symptoms of an infection when the antimicrobial agent(s) was prescribed.
Treatment	Antimicrobial agents prescribed to treat an infection. The resident presented signs/symptoms of an infection when the treatment was prescribed. Both empirical treatments (i.e. initiation of treatment before the causative pathogen is known) and microbiologically-documented treatments (i.e. with known pathogen known) should be considered.
End/review date of treatment known	The resident's medical or nursing records clearly state the final date when the antimicrobial agents should be given (end date) or when the antimicrobial agents treatment should be revised by the prescriber (review date).
Urine dipstick test	Tests performed by dipping a paper or cardboard stick into urine to test it for the presence of white blood cells (leukocyte esterase) and/or nitrites. Results are indicated by colour changes on the stick. This test type should not be confused with 'dip slide' tests performed by laboratories to test for the presence of microorganisms in liquids by incubating 'dip slides'.

In the infection section of the resident questionnaire, local use of antibiotics for cellulitis/soft tissue/wound infections and conjunctivitis can be reported by checking a tick box.

4.2.3 Antimicrobial resistance

Data on antimicrobial resistance are collected in the resident questionnaire. It will be recognised during analysis that recording such data in LTCFs is hampered by the low frequency of laboratory testing, the limited accessibility of the test results and by differences between antimicrobial susceptibility testing protocols across Europe.

If a microbiological sample was taken to guide the prescription of antimicrobial agents, up to three isolated microorganisms should be indicated using the microorganism code list (Annex 3). If no microbiological result is available on the day of the PPS, one of the following options should be selected:

_NOEXA	EXAMINATION NOT DONE:	no diagnostic sample taken, no microbiological examination done
_NA	RESULTS NOT AVAILABLE:	the results of the microbiological examination are not (yet) available or cannot be found
_NONID	MICROORGANISM NOT IDENTIFIED:	evidence exists that a microbiological examination has been done, but the micro-organism cannot be correctly classified
_STERI	STERILE EXAMINATION:	a microbiological examination has been done, but the result was negative (e.g. negative culture)

Selected bacteria should have their antimicrobial resistance reported as 0, 1 or 2 according to their resistance profile as indicated in the table below.

Antimicrobial resistance codes and profiles

Bacterium	Antimicrobial resistance code (and corresponding resistance profile)			
	0	1	2	?
Staphylococcus aureus	Oxacillin-S **MSSA**	Oxacillin-R **MRSA**	NA	Unknown
***Enterococcus* species**	Glycopeptide-S	Glycopeptide-NS **VRE**	NA	Unknown
Enterobacteriaceae, including: *Escherichia coli* *Klebsiella* species *Enterobacter* species *Proteus* species *Citrobacter* species *Serratia* species *Morganella* species	Third-generation cephalosporin-S AND Carbapenem-S	Third-generation cephalosporin-NS AND Carbapenem-S	Third-generation cephalosporin-NS AND Carbapenem-NS	Unknown
Pseudomonas aeruginosa	Carbapenem-S	Carbapenem-NS	NA	Unknown
Acinetobacter baumannii	Carbapenem-S	Carbapenem-NS	NA	Unknown

Glycopeptides: vancomycin AND/OR teicoplanin; third-generation cephalosporins: cefotaxime AND/OR ceftriaxone; carbapenems = imipenem AND/OR meropenem AND/OR doripenem; NA: not applicable; S: susceptible; R: resistant; NS: non-susceptible (resistant and intermediate)

4.2.4 Infection data

It has been decided to identify infections by applying decision algorithms as the diagnosis of infections in LTCFs is mainly based on clinical criteria. In LTCFs, a nurses' aide is more often than not the first line of infection detection, identifying a problem and reporting it to the nurse in charge; physician visits are infrequent. Moreover, on-site diagnostic testing is uncommon.

These **decision algorithms are based on CDC/SHEA case definitions**[1] which in turn are based on the McGeer[2] criteria for the surveillance of infections in LTCFs.

[1]Stone ND, Ashraf MS, Calder J, Crnich CJ, Crossley K, Drinka PJ, et al; for the Society for Healthcare Epidemiology Long-Term Care Special Interest Group. Surveillance definitions of infections in long-term care facilites: Revisiting the McGeer criteria. Infect Control Hosp Epidemiol. 2012;10:965-977.

[2]McGeer A, Campbell B, Emori TG, Hierholzer WJ, Jackson MM, Nicolle LE, et al.. Definitions of infection for surveillance in long-term care facilities. Am J Infect Control. 1991;19:1-7.

Because European LTCFs have more limited access to microbiological and laboratory tests than institutions in Canada and the United States of America, two levels have been built into the algorithm for the case definitions of some infections: for 'probable' infections and for 'confirmed' infections.

Initially, data collectors must identify **residents presenting signs and/or symptoms of an active healthcare-associated infection** on the day of the PPS. By checking signs/symptoms in the decision algorithms, data collectors must ultimately decide whether or not enough signs/symptoms are present to consider the infection as probable or confirmed.

Remarks:

- Exhaustive searching of signs/symptoms present in residents is crucial in order to be able to confirm infections.
- Only the infection confirmation, local antimicrobial use, urine dipstick test result and type of other infections should be reported in the software.

Classification of infections:

Respiratory tract infections (RTIs) • Common cold syndromes/pharyngitis • Influenza-like illness ('Flu') • Pneumonia or other lower RTI	**Gastrointestinal tract infections** • Gastroenteritis • *Clostridium difficile* infection
Skin infections • Cellulitis/soft tissue/wound infection • Fungal infection • Herpes simplex or herpes zoster infection • Scabies	**Eye, ear, nose and mouth infections** • Conjunctivitis • Ear infection • Mouth infection or oral candidiasis • Sinusitis
Urinary tract infections (UTIs) • Without urinary catheter • With urinary catheter	**Systemic infections** • Bloodstream infection
Unexplained febrile episode	**Other infection(s)**

An **active healthcare-associated infection** present on the day of the PPS is defined as follows:

> 'An infection is active when signs and symptoms of the infection are present on the survey date OR signs and symptoms were present in the past and the resident is (still) receiving treatment for that infection on the survey date. The presence of symptoms and signs in the two weeks (14 days) preceding the PPS day should be verified in order to determine whether the treated infection matches one of the case definitions of healthcare-associated infection.'

Note:

- **The onset of the symptoms should have occurred 48 hours after the resident was admitted or re-admitted to the LTCF** (excluding infections already present or incubating at the time of (re-)admission).
- Surgical site infections should be excluded from this study if the onset of the symptoms took place within 30 days after the operation or within one year in case of surgery involving an implant. In these situations, the surgical site infections are considered as hospital acquired.
- **All symptoms must be new or acutely worse**. Many residents have chronic symptoms, such as cough or urinary urgency that are not associated with infection. However, a change in the resident's status is an important indication of infection in development.
- Non-infectious causes of the signs and symptoms should always be considered before a diagnosis of infection is made.

Case definitions	
Constitutional signs/symptoms	
Fever	① Single >37.8°C oral/tympanic membrane* ***OR*** ② Repeated >37.2°C oral or >37.5°C rectal ***OR*** ③ >1.1°C over baseline from any site (oral, tympanic, axillary) * tympanic membrane = membrane that separates the external ear from the middle ear.
Leukocytosis	① Neutrophilia > 14 000 leucocytes/mm^3 *OR* ② left shift (>6% bands or ≥ 1500 bands/mm^3)
Acute change in mental status	Acute onset + fluctuating course + inattention AND either disorganised thinking or altered level of consciousness
Acute functional decline	New three-point increase in total ADL score (Range 0–28) from baseline based on seven ADL items (bed mobility, transfer, locomotion, dressing, toilet use, personal hygiene, eating) each scored from 0 (independent) to 4 (total dependence) OR increased dependency defined by scales other than ADL
Urinary tract infection	Can be an infection of the kidney, ureter, bladder or urethra
Costovertebral angle pain	Pain in the area of the back overlying the kidney (between the 12th rib and the spine)
Suprapubic pain/tenderness	Pain or tenderness in the area above the pubis

Respiratory tract infection	Can be an infection of the upper or lower respiratory tract
Upper respiratory tract infection	Infection of the (naso-)pharynx ((naso-)pharyngitis) or tonsils (tonsillitis)
Lower respiratory tract infection	Infection of the trachea and bronchus (bronchitis), bronchiole (bronchiolitis) or lung and alveoli (pneumonia)
Lymphadenopathy	Disease of the lymph nodes (swollen or enlarged)
Infiltrate	Deposition of fluid (e.g. blood, pus, etc.) in tissues and cells
Sputum	Secretion expectorated from the lower respiratory tract (not to be confused with saliva)
Pleuritic chest pain	Pain in the chest during inhalation which can cause fast and superficial breathing to decrease the pain
Skin infections	
Cellulitis	Infection of the connective tissue
Soft tissues	Tissues that connect support or surround other structures or organs (muscles, tendons, ligaments, nerves, blood vessels, fat, fibrous tissues, fascia and membranes)
Maculopapular rash	Rash characterised by spots and bumps
Herpes simplex	Disease caused by a virus leading to a rash (often around the lips and nose) with groups of blisters containing fluid which soon dry out
Herpes zoster	Disease caused by a virus; mostly painful blister-shaped rash in areas where many sensory nerves are present (e.g. face, chest, shoulders and hip)
Scabies	Contagious and heavy itching disease of the skin caused by a mite
Gastrointestinal infection	Infection of the stomach and/or intestines
Clostridium difficile (CD)	*C. difficile* (gram-positive sporulating bacilli); can cause persistent diarrhoea and ulcero-haemorrhagic colitis
Toxic megacolon	Life-threatening complication that causes widening (dilation) of the large intestine and symptoms such as abdominal pain, distension, tenderness, fever, rapid heart rate and can even lead to shock
Pseudomembranous colitis	A cause of antibiotic-associated diarrhoea (often caused by *C. difficile*) characterised by abdominal cramps, bloody stools, fever and diarrhoea
Eye infection	
Conjunctival erythema	Redness of the conjunctiva (mucous membrane lining the eyelid)

5 Data delivery

5.1 Software

A stand-alone software programme developed for the HALT-2 project may be used for data entry. It can be used either at local (LTCF application) or national (NC application) level. National representatives (NRs) are encouraged to offer this software to LTCFs.

LTCFs can enter their data into the LTCF application. A user guide provided with the application assists the local data collector or person designated in the LTCF during software installation and data entry. Once all data for an LTCF are entered into the software, a summary report with preliminary results can be automatically generated for that LTCF. Afterwards, data need to be exported. By clicking this function in the menu, a zip file will be created. This zip file has to be sent to the NR.

NRs import all zip files received from their participating LTCFs, or enter the data themselves into the NC ('national coordination') application. NRs can use their application to view all national data and check for errors. If needed, changes can be made using the software (and not directly into the database), and ATC codes can be added for the antimicrobial agents. The NC application also allows NRs to generate (new) LTCF summary reports. Once all data is checked, the national database has to be created by NRs (export function).

NRs will receive a detailed user guide. Software workshops are held during train-the-trainer courses (see below). On request, the software can be delivered in a language other than English. To achieve this, the NR will have to arrange for translation of an excel file. ECDC can be contacted at ARHAI@ecdc.europa.eu to help resolve problems encountered during software use.

5.2 Deadline for data delivery

From 2014, national databases should be submitted to ECDC's European Surveillance System (TESSy). The deadlines for data submission are communicated by ECDC to participating NRs. NRs can obtain help with conversion of the data into the TESSy format from ECDC (ARHAI@ecdc.europa.eu).

5.3 Data analysis and feedback

The European database, containing data from all national databases, will be checked for errors and inconsistencies by ECDC. A feedback report (in English) will be generated for each participating LTCF and sent to the NR for further distribution. Upon request, translated feedback reports can be obtained. For this purpose, the NR will have to translate an Excel file.

A European study report with aggregated results for selected types of LTCFs can be written and sent to the NR of each participating country.

5.4 Data ownership

Data will be included in ECDC's TESSy database. The purpose of this database is to collect and store data for both analysis and anonymised dissemination of information on infectious diseases in Europe.

NRs are encouraged to publish their data in international peer-reviewed journals and/or present their results at international conferences. The work done by the NRs and the LTCFs should be acknowledged, e.g. by adding 'on behalf of the national networks' to the author list and/or by thanking all NRs by name in the acknowledgements section. ECDC should be acknowledged in all scientific publications (including posters and oral communications).

All analyses and outputs, including for data other than their own country's data, should be performed in consultation and in agreement with ECDC. All scientific outputs should be communicated to ECDC in advance of publication; these may be referred to on the ECDC website, and/or in other public outputs.

6 UTI module (optional)

6.1 Background and objectives

Data from HALT (2010) identified urinary tract infections (UTIs) as the second most common infection (22.3% of all infections) in participating European LTCFs; after respiratory tract infections (RTIs; 33.6%). The survey also identified a relatively high frequency of use of antimicrobial agents, for UTIs in particular: nearly half (48.9%) of all systemic antimicrobial agents were prescribed for an indication related to the urinary tract.

The relative frequency of uroprophylaxis was also high, representing 22.1% of all prescribed antimicrobial agents. There is currently limited evidence that antimicrobial prophylaxis is efficacious for the prevention of UTI or for the treatment of asymptomatic bacteriuria in LTCF residents. Inappropriate antimicrobial use is therefore discouraged to prevent a continued increase in resistance rates.

The aim of the optional UTI module was to explore the appropriateness of antimicrobial prescribing for prophylaxis/treatment of UTIs at the level of individual residents, and to investigate measures for the prevention and control of UTIs at institutional level.

6.2 Participation

The UTI module was implemented for HALT-2 (2013); participation was optional. The UTI module data are not included in the TESSy HAIHALT data and should not be submitted to ECDC.

6.3 Data collection

Additional questionnaires needed to be completed when taking part in this module. These documents were designed for optical reading. All documents were sent to the national representatives who in turn transferred the documents to the HALT-2 management team for data processing.

7 Training

A two-day train-the-trainer course was organised for the HALT-2 (2013) PPS. Training material for the local/external data collectors is available from ECDC. It is recommended that national/regional PPS coordinators organise at least one one-day information and training session for LTCFs participating in the PPS prior to the national/regional survey.

8 Validation study

To test the validity of the protocol for repeated PPSs, countries are asked to participate in a validation study simultaneously with the PPS. For more information see 'validation protocol', available from ARHAI@ecdc.europa.eu.

9 Role of the national representative

National representatives are a crucial determinant of the success of repeated PPSs. Before the PPS data collection, their role is to:

- select and invite LTCFs to participate, including LTCFs to participate in the validation study;
- make a list of all participating LTCFs and to group them by LTCF type;
- participate in the two-day train-the-trainer course;
- organise at least a one-day information and training session for LTCFs participating in PPS;
- distribute the data collection tools (e.g. HALT software);
- assist LTCFs during data collection (helpdesk);
- translate PPS data collection tools and letters into national languages (if required).

After the PPS data collection, their role is to:

- collect and enter local LTCF data and check the national database;
- export the national database and submit the data to ECDC. ECDC will convert the HALT data to the HAIHALT TESSy format. Data will be pre-uploaded in TESSy by ECDC, and EU Member States will receive the converted national data in TESSy format from ECDC to identify any necessary data updates/replacement;
- distribute the feedback forms to the participating LTCF. Translation of these is possible if the national representative provides a translated Excel file;
- communicate national results, e.g. at (inter)national scientific meetings.

10 Ethical considerations

The ethical requirements will differ depending on the country. Some countries require ethical committee approval. This committee may also require written consent from (at least) each resident with signs/symptoms of infection or receiving an antimicrobial agent on the day of the PPS, or from their proxy, e.g. in cases of cognitive impairment. The experience from HALT (2010) and HALT-2 (2013) showed that this consent is generally not a major problem if the resident or their proxy are appropriately informed about the necessity of the PPS.

Confidentiality is assured as follows:

- An LTCF study number is attributed to each participating LTCF by national representatives. The participating facilities will not be identifiable by others since reports and presentations will only use LTCF study numbers, and never LTCF names.
- The software allocates a unique resident study number to each resident for whom a questionnaire is completed.

The ward list (optional document for internal use), which contains a name box, must be kept in the LTCF in a secure and confidential manner. These lists should be destroyed at the end of the project.

Data collected within the framework of this project should not be used for purposes other than those described in the objectives of the present protocol.

Contact information

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Annex 1. Institutional questionnaire

Healthcare associated infections and antimicrobial use
in European long-term care facilities (HALT-2)

INSTITUTIONAL QUESTIONNAIRE

Remark: It is **essential** that each facility enrolled in HALT-2 completes this questionnaire as it collects vital data on each facility's structural and functional characteristics including denominators, and data on antimicrobial agents and infection prevention and control policies. From our experience with HALT (2010) and HALT-2 (2013), we recommend that the person completing this questionnaire is the person in charge of the facility. If they cannot answer some of the questions, we recommend that they forward the questionnaire to persons who are able to answer those specific questions. This is **especially relevant to the questions about antimicrobial agents**.

A – GENERAL INFORMATION

DATE OF THE SURVEY IN YOUR FACILITY ⌊_⌋⌊_⌋ ⌊_⌋⌊_⌋ ⌊_⌋⌊_⌋⌊_⌋⌊_⌋

FACILITY STUDY NUMBER (*allotted by your national coordinator*) ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋

OWNERSHIP OF THE FACILITY □ *Public* □ *For profit* □ *Not for profit*

QUALIFIED NURSING CARE AVAILABLE 24/24 HOURS IN THE FACILITY □ *Yes* □ *No*

IN THE FACILITY:

Total number of RESIDENT ROOMS ⌊_⌋⌊_⌋⌊_⌋⌊_⌋ *Rooms*

Total number of SINGLE RESIDENT ROOMS ⌊_⌋⌊_⌋⌊_⌋⌊_⌋ *Single rooms*

B –DENOMINATOR DATA

This table when completed will summarise the data collected in each ward (ward list) for the total population

IN YOUR FACILITY, ON THE DAY OF THE PPS, TOTAL NUMBER OF:

BEDS IN THE FACILITY *(both occupied and non-occupied beds)* ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋

RESIDENTS ABSENT DUE TO HOSPITALISATION IN AN ACUTE CARE HOSPITAL ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋

OCCUPIED BEDS ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋

ELIGIBLE RESIDENTS, PRESENT (AT 8AM) IN THE FACILITY

- FOR AT LEAST THE PREVIOUS 24 HOURS ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋
- RESIDENTS OVER 85 YEARS ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋
- MALE RESIDENTS ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋
- RESIDENTS RECEIVING ANY SYSTEMIC ANTIMICROBIAL THERAPY ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋
- RESIDENTS WITH SIGNS OR SYMPTOMS OF AN INFECTION ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋
- RESIDENTS WITH ANY URINARY CATHETER ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋
- RESIDENTS WITH ANY VASCULAR CATHETER ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋
- RESIDENTS WITH PRESSURE SORES ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋
- RESIDENTS WITH OTHER WOUNDS ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋
- RESIDENTS DISORIENTED IN TIME AND/OR SPACE ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋
- RESIDENTS USING A WHEELCHAIR OR BEDRIDDEN ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋
- RESIDENTS THAT HAVE HAD SURGERY IN THE PREVIOUS 30 DAYS ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋
- RESIDENTS WITH URINARY AND/OR FAECAL INCONTINENCE ⌊_⌋⌊_⌋⌊_⌋⌊_⌋⌊_⌋

C – MEDICAL CARE AND COORDINATION

1. Is medical resident care, including antimicrobial prescribing, in the facility provided by the:

   □ *Personal general practitioners (GP) or group practice(s) only*

   □ *Medical staff, employed by the facility only*

   □ *Both personal GPs/group practice(s) and medical doctor(s) employed by the facility*

2. Are medical activities in the facility coordinated by a coordinating physician?

   □ *No, there is no internal or external coordination of medical activities*

   □ *Yes, there is a physician from inside the facility (internal) who coordinates medical activities*

   □ *Yes, there is a physician from outside the facility (external) who coordinates medical activities*

   □ *Yes, there is both a physician from inside and outside the facility (internal and external) who coordinates medical activities*

3. What kinds of tasks are performed by the coordinating physician?

   □ *Medical resident care*

   □ *Organising the medical on-call service in the facility (continuity of medical care)*

   □ *Supervising the medical records of all residents (even for residents treated by other GPs)*

   □ *Clinical training of medical doctors in the facility*

   □ *Clinical training of nursing staff in the facility*

   □ *Development of an antimicrobial policy in the facility*

   □ *Development of care strategies in the facility*

   □ *Development of an infection prevention and control policy in the facility*

   □ *Coordinating resident vaccination policy in the facility*

   □ *Organising meetings with GPs in order to harmonise medical care practices/policies*

   □ *Peer review of medical activities in the facility*

   □ *None of the above*

4. Can any of the following persons consult the medical/clinical records of all residents in the facility?

   The physician(s) in charge of medical coordination in the facility? □ *Yes* □ *No*

   The nursing staff □ *Yes* □ *No*

D – INFECTION CONTROL PRACTICE

1. Are there persons <u>with training in infection control/prevention</u> available to the staff of the facility?

   □ *Yes* □ *No*

2. If a person with training in infection control/prevention is available, is this person:

   □ *A nurse* □ *A doctor* □ *There is both a nurse and a doctor*

   Is this/are these person(s):

   □ *Working in the facility (internal)*

   □ *Not working in the facility (external)*

   □ *There is both an internal and an external person*

3. Is there a system in place within the facility to ensure:

   □ *Infection prevention and control training of the nursing and paramedical staff*

   □ *Appropriate training of general practitioners and medical staff in infection prevention and control*

   □ *Development of care protocols*

   □ *Registration of residents colonised/infected with multi-resistant microorganisms*

   □ *Designation of a person responsible for reporting and management of outbreaks*

   □ *Feedback on surveillance results to the nursing/medical staff of the facility*

□ *Supervision of disinfection and sterilisation of medical and care material*

□ *Decisions on isolation & additional precautions for residents colonised with resistant microorganisms*

□ *Offer of annual immunisation for flu to all residents*

□ *Organisation, control, feedback on hand hygiene in the facility on a regular basis*

□ *Organisation, control, feedback of a process surveillance/audit of infection policies and procedures (on regular basis)*

□ *None of the above*

4. In the facility, is there an infection control committee (internal or external)? □ *Yes* □ *No*

5. How many infection control committee meetings were organised in the previous year?

Total number of meetings last year? └┴┴┴┘ *meetings previous year*

6. Can the facility ask for help and expertise from an external infection control (IC) team on a formal basis (e.g. IC team from a local hospital)? □ *Yes* □ *No*

7. In the facility, is a written protocol available for:

– the management of MRSA and/or other multidrug resistant microorganisms □ *Yes* □ *No*

– hand hygiene □ *Yes* □ *No*

– the management of urinary catheters □ *Yes* □ *No*

– the management of venous catheters/lines □ *Yes* □ *No*

– the management of enteral feeding □ *Yes* □ *No*

8. Is a surveillance programme of healthcare-associated infections in place in the facility? *(annual summary report of number of urinary tract infections, respiratory tract infections, etc)* □ *Yes* □ *No*

9. In the facility, which of following products are available for hand hygiene?

– Alcohol rub solution □ *Yes* □ *No*

– Wipes (alcoholic) □ *Yes* □ *No*

– Liquid soap (antiseptic/ other) □ *Yes* □ *No*

– Bar soap in clinical areas □ *Yes* □ *No*

10. Which hand hygiene method is most frequently used in your facility (only **<u>one answer</u>** is possible)?

□ *Hand disinfection with an alcohol solution*

□ *Hand washing with water and a non-antiseptic soap*

□ *Hand washing with water and an antiseptic soap*

11. How many litres of hand alcohol were used last year?

Total annual consumption in litres └┴┴┴┘ *Litres last year*

12. Last year, was a hand hygiene training session organised for care professionals of the facility?

□ *Yes* □ *No*

13. If last year a hand hygiene training session was organised, which staff members were invited to attend these sessions?

□ *Medical staff*

□ *Nurses and nurse aides*

□ *Physiotherapists, occupational therapists, speech therapists, etc*

□ *Cleaning staff*

14. In the facility, which of following equipment is available for personal protection?

– Gloves □ *Yes* □ *No*

– Masks □ *Yes* □ *No*

– Gowns (long sleeves) □ *Yes* □ *No*

– Aprons (no sleeves) □ *Yes* □ *No*

– Protective goggles □ *Yes* □ *No*

E – ANTIMICROBIAL POLICY

1. Does the facility use a 'restrictive list' of antimicrobial agents for prescriptions? *(a list that contains a subset of the prescribed antimicrobial agents that require the permission of a designated person before prescription)*

□ *Yes* □ *No*

2. If a restrictive list exists, what kinds of antibiotics are restricted?
   - □ *Carbapenems*
   - □ *Third-generation cephalosporins*
   - □ *Fluoroquinolones*
   - □ *Vancomycin*
   - □ *Mupirocin*
   - □ *Glycopeptides*
   - □ *Broad-spectrum antibiotics*
   - □ *Intravenously administered antibiotics*

3. Which of following elements are present in the facility?
   - □ *An antimicrobial committee*
   - □ *Annual regular training on appropriate antimicrobial prescribing*
   - □ *Written guidelines for appropriate antimicrobial use (good practice) in the facility*
   - □ *Data available on annual antimicrobial consumption by antimicrobial class*
   - □ *A system to remind healthcare workers of the importance of microbiological samples to inform the best choice of antimicrobial agent*
   - □ *Local (i.e. for that region/locality or national if small country) antimicrobial resistance profile summaries available in the LTCF or in the GP surgeries that prescribe*
   - □ *A system that requires permission from a designated person(s) for prescribing restricted antimicrobial agents not included in local formulary*
   - □ *Advice from a pharmacist for antimicrobial agents not included in the formulary*
   - □ *A therapeutic formulary, comprising a list of antibiotics*
   - □ *Feedback to the GPs on antimicrobial consumption in the facility*
   - □ *None of the above*

4. If written therapeutic guidelines are present in the facility, do they relate to:
   - *– Respiratory tract infections?* □ *Yes* □ *No*
   - *– Urinary tract infections?* □ *Yes* □ *No*
   - *– Wound and soft tissue infections?* □ *Yes* □ *No*

5. Do you perform a urine dipstick test for detection of urinary tract infections in the facility?

□ *Routinely* □ *Sometimes* □ *Never*

6. Is a programme for surveillance of antimicrobial consumption and feedback in place in the facility?

□ *Yes* □ *No*

7. Is a programme for surveillance of resistant microorganisms in place in the facility? (*annual summary report for MRSA,* Clostridium difficile*, etc)* □ *Yes* □ *No*

F – HOW WAS THIS SURVEY PERFORMED IN YOUR FACILITY?

1. Who collected the information for this survey, including the institutional and resident questionnaires? (tick all that apply)
   - □ *Physician*
   - □ *Nurse*
   - □ *Another person*

2. If no physician was involved in the data collection (institutional and resident questionnaires), did a physician validate the data? □ *Yes* □ *No*

Annex 2. Resident questionnaire

Healthcare-associated infections and antimicrobial use in European long-term care facilities

RESIDENT QUESTIONNAIRE

RESIDENT STUDY NUMBER |_|_|_|_|

RESIDENT DATA

GENDER	☐	*Male*	☐	*Female*	
BIRTH YEAR	|_|_|_|_| *(YYYY)*			
LENGTH OF STAY IN THE FACILITY	☐	*Less than one year*	☐	*One year or longer*	
ADMISSION TO A HOSPITAL IN THE LAST 3 MONTHS	☐	*Yes*	☐	*No*	
SURGERY IN THE PREVIOUS 30 DAYS	☐	*Yes*	☐	*No*	
PRESENCE OF:					
URINARY CATHETER	☐	*Yes*	☐	*No*	
VASCULAR CATHETER	☐	*Yes*	☐	*No*	
INCONTINENCE (URINARY AND/OR FAECAL)	☐	*Yes*	☐	*No*	
WOUNDS					
- PRESSURE SORE	☐	*Yes*	☐	*No*	
- OTHER WOUNDS	☐	*Yes*	☐	*No*	
DISORIENTATION (IN TIME AND/OR SPACE)	☐	*Yes*	☐	*No*	
MOBILITY	☐	*Ambulant*	☐	*Wheelchair*	☐ *Bedridden*

RESIDENT STUDY NUMBER |__|__|__|__|

On the day of the PPS, the resident:

☐ RECEIVES ANTIMICROBIAL AGENT TREATMENT → COMPLETE PAGE 2 OF THIS QUESTIONNAIRE

This includes: (i) Residents on prophylactic antimicrobial agents;
OR (ii) Residents on therapeutic antimicrobial agents (if commenced prior to admission, no signs/symptoms should be recorded)

☐ PRESENTS SIGNS/SYMPTOMS OF AN INFECTION → COMPLETE PAGES 3 TO 6 OF THIS QUESTIONNAIRE

Signs/symptoms not present or incubating at admission AND patient not on antimicrobial agents

☐ BOTH: ANTIMICROBIAL USE AND SIGNS/SYMPTOMS (S/S) OF AN INFECTION → COMPLETE ALL PAGES

This includes: (i) Residents with s/s AND on antimicrobial agents today (whether or not linked to same infection site)
OR (ii) Residents whose s/s have resolved but who are still receiving antimicrobial agents for that infection

ANTIMICROBIAL AGENTS TREATMENT DATA

	ANTIMICROBIAL AGENTS 1	ANTIMICROBIAL AGENTS 2	ANTIMICROBIAL AGENTS 3	ANTIMICROBIAL AGENTS 4
ANTIMICROBIAL AGENTS NAME	....	....	....	....
ADMINISTRATION ROUTE	☐ *Oral* ☐ *Parenteral (IM, IV or SC)* ☐ *Other*	☐ *Oral* ☐ *Parenteral (IM, IV or SC)* ☐ *Other*	☐ *Oral* ☐ *Parenteral (IM, IV or SC)* ☐ *Other*	☐ *Oral* ☐ *Parenteral (IM, IV or SC)* ☐ *Other*
END DATE / REVIEW DATE OF TREATMENT KNOWN?	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*
TYPE OF TREATMENT	☐ *Prophylactic* ☐ *Therapeutic*	☐ *Prophylactic* ☐ *Therapeutic*	☐ *Prophylactic* ☐ *Therapeutic*	☐ *Prophylactic* ☐ *Therapeutic*
ANTIMICROBIAL AGENTS GIVEN FOR	☐ *Urinary tract* ☐ *Genital tract* ☐ *Skin or wound* ☐ *Respiratory tract* ☐ *Gastrointestinal* ☐ *Eye* ☐ *Ear, nose, mouth* ☐ *Systemic infection* ☐ *Unexplained fever* ☐ *Other (specify)*	☐ *Urinary tract* ☐ *Genital tract* ☐ *Skin or wound* ☐ *Respiratory tract* ☐ *Gastrointestinal* ☐ *Eye* ☐ *Ear, nose, mouth* ☐ *Systemic infection* ☐ *Unexplained fever* ☐ *Other (specify)*	☐ *Urinary tract* ☐ *Genital tract* ☐ *Skin or wound* ☐ *Respiratory tract* ☐ *Gastrointestinal* ☐ *Eye* ☐ *Ear, nose, mouth* ☐ *Systemic infection* ☐ *Unexplained fever* ☐ *Other (specify)*	☐ *Urinary tract* ☐ *Genital tract* ☐ *Skin or wound* ☐ *Respiratory tract* ☐ *Gastrointestinal* ☐ *Eye* ☐ *Ear, nose, mouth* ☐ *Systemic infection* ☐ *Unexplained fever* ☐ *Other (specify)* ....
WHERE PRESCRIBED?	☐ *In this facility* ☐ *In the hospital* ☐ *Elsewhere*	☐ *In this facility* ☐ *In the hospital* ☐ *Elsewhere*	☐ *In this facility* ☐ *In the hospital* ☐ *Elsewhere*	☐ *In this facility* ☐ *In the hospital* ☐ *Elsewhere*
WHO PRESCRIBED?	☐ *GP* ☐ *Medical doctor employed by LTCF* ☐ *Specialist* ☐ *Other*	☐ *GP* ☐ *Medical doctor employed by LTCF* ☐ *Specialist* ☐ *Other*	☐ *GP* ☐ *Medical doctor employed by LTCF* ☐ *Specialist* ☐ *Other*	☐ *GP* ☐ *Medical doctor employed by LTCF* ☐ *Specialist* ☐ *Other*
FOR URINE: DIPSTICK TEST BEFORE PRESCRIBING?	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*
CULTURE SAMPLE TAKEN?	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*	☐ *No* ☐ *Yes*

RESIDENT STUDY NUMBER |_|_|_|_|

ISOLATED MICROORGANISMS (if culture was taken)					
NAME OF ISOLATED MICROORGANISM (see code list, Annex 3)	1	|_|_|_|_|_|_|	|_|_|_|_|_|_|	|_|_|_|_|_|_|	|_|_|_|_|_|_|
	2	|_|_|_|_|_|_|	|_|_|_|_|_|_|	|_|_|_|_|_|_|	|_|_|_|_|_|_|
	3	|_|_|_|_|_|_|	|_|_|_|_|_|_|	|_|_|_|_|_|_|	|_|_|_|_|_|_|
*Provide the antimicrobial resistance profile (see code list, Annex 3) if the 6-letter code of the isolated microorganism (see code list, Annex 3) includes the following: ACIBAU, CIT***, ENB***, ENC***, ESCCOL, KLE***, MOGSPP, PRT***, PSEAER, SER***, STAAUR, where '*' can be any letter*					
ANTIMICROBIAL RESISTANCE (see code list, Annex 3)	1	☐ 0 ☐ 1 ☐ 2 ☐ ?	☐ 0 ☐ 1 ☐ 2 ☐ ?	☐ 0 ☐ 1 ☐ 2 ☐ ?	☐ 0 ☐ 1 ☐ 2 ☐ ?
	2	☐ 0 ☐ 1 ☐ 2 ☐ ?	☐ 0 ☐ 1 ☐ 2 ☐ ?	☐ 0 ☐ 1 ☐ 2 ☐ ?	☐ 0 ☐ 1 ☐ 2 ☐ ?
	3	☐ 0 ☐ 1 ☐ 2 ☐ ?	☐ 0 ☐ 1 ☐ 2 ☐ ?	☐ 0 ☐ 1 ☐ 2 ☐ ?	☐ 0 ☐ 1 ☐ 2 ☐ ?

SIGNS AND SYMPTOMS OF AN INFECTION

IMPORTANT REMARK:

All **active** healthcare-associated infections (HAI) present on the day of the PPS should be reported. An infection is **active** when signs/symptoms of the infection are present on the survey date **OR** signs/symptoms were present in the past and the resident is (still) receiving treatment for that infection on the survey date. The presence of symptoms and signs in the two weeks (14 days) preceding the PPS day should be verified in order to determine whether the treated infection matches one of the case definitions for a healthcare-associated infection.

No signs/symptoms should be reported in the software. Only the decisions in the grey text boxes should be transferred.

* **Fever**: 1) single > 37.8°C oral/tympanic membrane **or** 2) repeated > 37.2°C oral or > 37.5°C rectal **or** 3) > 1.1°C over baseline from any site (oral, tympanic, axillary)

** **Leucocytosis**: 1) Neutrophilia > 14 000 leucocytes/mm^3 or 2) left shift (>6% bands or ≥ 1500 bands/mm^3)

§ **Acute change in mental status from baseline**: Acute onset + fluctuating course + inattention AND either disorganised thinking or altered level of consciousness

§§ **Acute functional decline**: New three-point increase in total ADL score (Range 0-28) from baseline based on seven ADL items (bed mobility, transfer, locomotion, dressing, toilet use, personal hygiene, eating) each scored from 0 (independent)-4 (total dependence) OR increased dependency defined by scales other than ADL

URINARY TRACT INFECTIONS

RESIDENT STUDY NUMBER |_|_|_|_|

❒ Resident without a urinary catheter

SIGNS AND SYMPTOMS
*AT LEAST **ONE** OF THE FOLLOWING (①, ② or ③) CRITERIA*:

❒ ① Acute dysuria OR acute pain/swelling or tenderness of the testes, epididymis, or prostate

❒ ② Fever* OR leukocytosis**

AND

One or more of the following:

☐ Acute costovertebral angle pain
☐ Suprapubic pain/tenderness
☐ Gross haematuria
☐ New or marked increase in frequency
☐ New or marked increase in urgency
☐ New or marked increase in incontinence

❒ ③ Two or more (in the absence of fever or leucocytosis):

☐ Frequency (new/increased) ☐ Suprapubic pain
☐ Urgency (new/increased) ☐ Gross hematuria
☐ Incontinence (new/increased)

URINE CULTURE
❒ Not done, negative or test results unknown
❒ Urine culture done AND:
☐ At least 10^5 cfu/ml of no more than 2 species of micro-organisms in a voided urine sample

OR

☐ At least 10^2 cfu/ml of any number of organisms in a specimen collected by in-and-out catheter

❒ Resident with a urinary catheter

SIGNS AND SYMPTOMS
*AT LEAST **ONE** OF THE FOLLOWING (①, ②, ③ or ④) CRITERIA*:

❒ ① Fever*, rigors, OR new onset hypotension with NO alternate site of infection

❒ ② Acute change mental status **§** OR acute functional decline **§§** with NO alternate diagnosis AND leukocytosis**

❒ ③ New onset suprapubic or costovertebral angle pain or tenderness

❒ ④ Purulent discharge around catheter or acute pain, swelling or tenderness of testes, epididymis, or prostate

URINE CULTURE
❒ Not done, negative or test results unknown
❒ Urine culture done AND:
☐ At least 10^5 cfu/ml of any organism(s) in a urinary catheter specimen

INFECTION CONFIRMATION
❒ Signs and symptoms AND urine culture positive: *INFECTION CONFIRMED*
❒ Signs and symptoms AND urine culture not done, negative or results unknown: *INFECTION PROBABLE*

URINE DIPSTICK RESULT (nitrites and/or leucocytes) ❒ Negative ❒ Positive ❒ Not done

RESPIRATORY TRACT INFECTIONS

RESIDENT STUDY NUMBER |_|_|_|_|

COMMON COLD or PHARYNGITIS

*AT LEAST **TWO** OF THE FOLLOWING CRITERIA*:

- ❒ Runny nose or sneezing
- ❒ Stuffy nose (i.e. congestion)
- ❒ Sore throat or hoarseness or difficulty in swallowing
- ❒ Dry cough
- ❒ Swollen or tender glands in the neck (cervical lymphadenopathy)

INFECTION CONFIRMATION

- ❒ Criteria fully met: *INFECTION **CONFIRMED***

FLU diagnosis can be made also outside the flu season

***BOTH** OF THE FOLLOWING CRITERIA MUST BE MET:*

- ❒ Fever *(for definition see above)*

AND

- ❒ At least **three** of the following:
  - ☐ Chills
  - ☐ New headache or eye pain
  - ☐ Myalgias or body aches
  - ☐ Malaise or loss of appetite
  - ☐ Sore throat
  - ☐ New or increased dry cough

INFECTION CONFIRMATION

- ❒ Criteria fully met: *INFECTION **CONFIRMED***

LOWER RESPIRATORY TRACT INFECTIONS

- ❒ Resident **with** a POSITIVE chest x-ray for pneumonia or a new infiltrate

SIGNS AND SYMPTOMS

***BOTH** OF THE FOLLOWING CRITERIA MUST BE MET:*

- ❒ At least **one** of these respiratory signs or symptoms:
  - ☐ New or increased cough
  - ☐ New/increased sputum production
  - ☐ 0_2 saturation < 94% or reduced >3% from baseline
  - ☐ Abnormal lung examination (new or changed)
  - ☐ Pleuritic chest pain
  - ☐ Respiratory rate ≥ 25 breaths/min

AND

- ❒ One or more constitutional signs/symptoms (fever, leucocytosis, confusion, acute functional decline; *for definitions see above*)

INFECTION CONFIRMATION

- ❒ Signs/symptoms criteria met AND chest x-ray positive:

  *PNEUMONIA INFECTION **CONFIRMED***

- ❒ Resident **without** a POSITIVE chest x-ray for pneumonia or a new infiltrate OR chest x-ray not done

SIGNS AND SYMPTOMS

***BOTH** OF THE FOLLOWING CRITERIA MUST BE MET:*

- ❒ At least **two** of these respiratory signs or symptoms:
  - ☐ New or increased cough
  - ☐ New/increased sputum production
  - ☐ O_2 saturation < 94% or reduced >3% from baseline
  - ☐ Abnormal lung examination (new or changed)
  - ☐ Pleuritic chest pain
  - ☐ Respiratory rate ≥ 25 breaths/min

AND

- ❒ One or more constitutional signs/symptoms (fever, leucocytosis, confusion, acute functional decline; *for definitions see above*)

Absence of other conditions such as chronic heart failure that could account for symptoms

INFECTION CONFIRMATION

- ❒ Criteria fully met:

  *OTHER LOWER RESPIRATORY TRACT INFECTION **CONFIRMED***

SKIN INFECTIONS

RESIDENT STUDY NUMBER |_|_|_|_|

CELLULITIS/SOFT TISSUE/WOUND INFECTIONS

ONE *OF THE FOLLOWING (① or ②) CRITERIA MUST BE MET:*

❒ ① Pus at a wound, skin, or soft tissue site

❒ ② Four or more new or increasing signs/symptoms at affected site:
- ☐ Heat
- ☐ Tenderness or pain
- ☐ Redness
- ☐ Serous drainage
- ☐ Swelling
- ☐ One constitutional sign/symptom (fever, leucocytosis, confusion, acute functional decline; *for definitions see above)*

INFECTION CONFIRMATION

❒ Criteria fully met: *INFECTION **CONFIRMED***

ANTIBIOTIC USE

❒ Local AB used for treatment (e.g. ointment, unguent)

SCABIES

BOTH *OF THE FOLLOWING CRITERIA MUST BE MET:*

❒ Maculopapular and/or itching rash

AND

❒ At least **one** of the following:
- ☐ Physician diagnosis
- ☐ Laboratory confirmation (positive scraping or biopsy)
- ☐ Epidemiological linkage to a case of scabies with lab confirmation

INFECTION CONFIRMATION

❒ Criteria fully met: *INFECTION **CONFIRMED***

HERPES SIMPLEX OR ZOSTER INFECTION

BOTH *OF THE FOLLOWING CRITERIA MUST BE MET:*

❒ A vesicular rash

AND

❒ Physician diagnosis or laboratory confirmation

INFECTION CONFIRMATION

❒ Criteria fully met: *INFECTION **CONFIRMED***

FUNGAL INFECTION

BOTH *OF THE FOLLOWING CRITERIA MUST BE MET:*

❒ Characteristic rash or skin lesions

AND

❒ Physician diagnosis or lab confirmed fungal pathogen from scraping or biopsy

INFECTION CONFIRMATION

❒ Criteria fully met: *INFECTION **CONFIRMED***

GASTROINTESTINAL INFECTIONS

RESIDENT STUDY NUMBER |_|_|_|_|

GASTROENTERITIS

***ONE** OF FOLLOWING (①, ② or ③) CRITERIA MUST BE MET:*

- ❒ ① Diarrhoea, three or more liquid or watery stools above normal baseline for the resident in 24-hr period
- ❒ ② Vomiting, two or more episodes in 24-hr period
- ❒ ③ **Both** of the following:
  - ☐ Positive stool specimen for bacterial or viral pathogen

  AND

  - ☐ At least one of the following: nausea, vomiting, abdominal pain or tenderness, diarrhoea

INFECTION CONFIRMATION

❒ Criteria fully met: *INFECTION **CONFIRMED***

CLOSTRIDIUM DIFFICILE *INFECTION*

***BOTH** OF THE FOLLOWING CRITERIA MUST BE MET:*

- ❒ At least one of the following: diarrhoea (three or more liquid or watery stools above normal baseline for the resident within 24-hr period) OR presence of toxic megacolon at x-ray

AND

- ❒ At least **one** of the following:
  - ☐ Positive stool sample for toxin A or B, or positive CD culture or positive PCR
  - ☐ Pseudomembranous colitis found at endoscopy, surgery or biopsy

INFECTION CONFIRMATION

❒ Signs/symptoms criteria met + positive test OR pseudomembraneous colitis
*INFECTION **CONFIRMED***

EYE, EAR, NOSE AND MOUTH INFECTIONS

RESIDENT STUDY NUMBER |_|_|_|_|

CONJUNCTIVITIS

ONE *OF THE FOLLOWING (①, ② or ③) CRITERIA MUST BE MET*

- ❒ ① Pus appearing from one or both eyes, present for at least 24 hours
- ❒ ② New or increased conjunctival erythema, with or without itching
- ❒ ③ New or increased conjunctival pain, present for at least 24 hours

Symptoms must not be due to allergy or trauma to the conjunctiva

INFECTION CONFIRMATION

- ❒ Criteria fully met: *INFECTION* ***CONFIRMED***

ANTIBIOTIC USE

- ❒ Local AB used for treatment (e.g. ointment, unguent)

SINUSITIS

- ❒ Sinusitis diagnosed by physician

INFECTION CONFIRMATION

- ❒ Criteria fully met: *INFECTION* ***CONFIRMED***

EAR INFECTION

ONE *OF THE FOLLOWING (① or ②) CRITERIA MUST BE MET:*

- ❒ ① Diagnosis by a physician of any ear infection
- ❒ ② New drainage from one or both ears

(non-purulent drainage must be accompanied by additional symptoms, such as ear pain or redness)

INFECTION CONFIRMATION

- ❒ Criteria fully met: *INFECTION* ***CONFIRMED***

ORAL CANDIDIASIS

BOTH *OF THE FOLLOWING CRITERIA MUST BE MET:*

- ❒ Presence of raised white patches on inflamed mucosa OR plaques on oral mucosa

AND

- ❒ Diagnosed by a dentist or a physician

INFECTION CONFIRMATION

- ❒ Criteria fully met: *INFECTION* ***CONFIRMED***

BLOODSTREAM INFECTIONS

ONE *OF THE FOLLOWING (① or ②) CRITERIA MUST BE MET:*

- ❒ ① Two or more blood cultures positive for the same organism
- ❒ ② A single blood culture documented with an organism thought not to be a contaminant

AND

At least **one** of the following:

- ☐ Fever *(for definition see above)*
- ☐ New hypothermia (<34.5° C, or does not register on the thermometer being used)
- ☐ A drop in systolic blood pressure of >30 mm Hg from baseline
- ☐ Worsening mental or functional status

INFECTION CONFIRMATION

- ❒ Criteria fully met: *INFECTION* ***CONFIRMED***

UNEXPLAINED FEVER

- ❒ The resident must have documentation in the medical record of fever *(for definition see above)* on two or more occasions at least 12 hours apart in any three-day period, with no known infectious or non-infectious cause

INFECTION CONFIRMATION

- ❒ Criteria fully met: *INFECTION* ***CONFIRMED***

OTHER INFECTION(S)

Please specify

Annex 3. Code list with microorganisms

Instructions

If a culture is taken to guide antimicrobial agent treatment, please indicate the isolated microorganisms (up to three) **OR** select one of the following options:

_NOEXA	EXAMINATION NOT DONE:	no diagnostic sample taken, no microbiological examination done
_NA	RESULTS NOT AVAILABLE:	the results of the microbiological examination are not (yet) available or cannot be found
_NONID	MICROORGANISM NOT IDENTIFIED:	evidence exists that a microbiological examination has been done, but the micro-organism cannot be correctly classified
_STERI	STERILE EXAMINATION:	a microbiological examination has been done, but the result was negative (e.g. negative culture)

Selected bacteria should have their antimicrobial resistance reported as 0, 1 or 2 according to their resistance profile as indicated in the table below.

Antimicrobial resistance codes and profiles

Bacterium	Antimicrobial resistance code (and corresponding resistance profile)			
	0	1	2	?
Staphylococcus aureus	Oxacillin-S MSSA	Oxacillin-R MRSA	NA	Unknown
Enterococcus species	Glycopeptide-S	Glycopeptide-NS VRE	NA	Unknown
Enterobacteriaceae, including: *Escherichia coli* *Klebsiella* species *Enterobacter* species *Proteus* species *Citrobacter* species *Serratia* species *Morganella* species	Third-generation cephalosporin-S AND Carbapenem-S	Third-generation cephalosporin-NS AND Carbapenem-S	Third-generation cephalosporin-NS AND Carbapenem-NS	Unknown
Pseudomonas aeruginosa	Carbapenem-S	Carbapenem-NS	NA	Unknown
Acinetobacter baumannii	Carbapenem-S	Carbapenem-NS	NA	Unknown

Glycopeptides: vancomycin AND/OR teicoplanin; third-generation cephalosporins: cefotaxime AND/OR ceftriaxone; carbapenems = imipenem AND/OR meropenem AND/OR doripenem; NA: not applicable; S: susceptible; R: resistant; NS: non-susceptible (resistant and intermediate)

Microorganism code	LABEL
_NOEXA	EXAMINATION NOT DONE
_NA	RESULTS NOT AVAILABLE
_NONID	MICROORGANISM NOT IDENTIFIED
_STERI	STERILE EXAMINATION
ACHSPP	ACHROMOBACTER SPECIES
ACIBAU	ACINETOBACTER BAUMANNII
ACICAL	ACINETOBACTER CALCOACETICUS
ACIHAE	ACINETOBACTER HAEMOLYTICUS
ACILWO	ACINETOBACTER LWOFFII
ACINSP	ACINETOBACTER SP., NOT SPECIFIED
ACIOTH	ACINETOBACTER SP., OTHER

Microorganism code	LABEL
ACTSPP	ACTINOMYCES SPECIES
AEMSPP	AEROMONAS SPECIES
AGRSPP	AGROBACTERIUM SPECIES
ALCSPP	ALCALIGENES SPECIES
ANANSP	ANAEROBES, NOT SPECIFIED
ANAOTH	OTHER ANAEROBES
ASPFUM	ASPERGILLUS FUMIGATUS
ASPNIG	ASPERGILLUS NIGER
ASPNSP	ASPERGILLUS SP., NOT SPECIFIED
ASPOTH	ASPERGILLUS SP., OTHER
BACSPP	BACILLUS SPECIES
BATFRA	BACTEROIDES FRAGILIS
BATNSP	BACTEROIDES SPECIES, NOT SPECIFIED
BATOTH	BACTEROIDES SP., OTHER
BCTNSP	OTHER BACTERIA, NOT SPECIFIED
BCTOTH	OTHER BACTERIA
BURCEP	BURKHOLDERIA CEPACIA
CAMSPP	CAMPYLOBACTER SPECIES
CANALB	CANDIDA ALBICANS
CANGLA	CANDIDA GLABRATA
CANKRU	CANDIDA KRUSEI
CANNSP	CANDIDA SP., NOT SPECIFIED
CANOTH	CANDIDA SP., OTHER
CANPAR	CANDIDA PARAPSILOSIS
CANTRO	CANDIDA TROPICALIS
CHLSPP	CHLAMYDIA SPECIES
CITDIV	CITROBACTER KOSERI (EX. DIVERSUS)
CITFRE	CITROBACTER FREUNDII
CITNSP	CITROBACTER SP., NOT SPECIFIED
CITOTH	CITROBACTER SP., OTHER
CLODIF	CLOSTRIDIUM DIFFICILE
CLOOTH	CLOSTRIDIUM OTHER
CORSPP	CORYNEBACTERIUM SPECIES
ENBAER	ENTEROBACTER AEROGENES
ENBAGG	ENTEROBACTER AGGLOMERANS
ENBCLO	ENTEROBACTER CLOACAE
ENBGER	ENTEROBACTER GERGOVIAE
ENBNSP	ENTEROBACTER SP., NOT SPECIFIED
ENBOTH	ENTEROBACTER SP., OTHER
ENBSAK	ENTEROBACTER SAKAZAKII
ENCFAE	ENTEROCOCCUS FAECALIS
ENCFAI	ENTEROCOCCUS FAECIUM
ENCNSP	ENTEROCOCCUS SP., NOT SPECIFIED
ENCOTH	ENTEROCOCCUS SP., OTHER
ESCCOL	ESCHERICHIA COLI
ETBNSP	ENTEROBACTERIACEAE, NOT SPECIFIED
ETBOTH	OTHER ENTEROBACTERIACEAE
FILOTH	FILAMENTS OTHER
FLASPP	FLAVOBACTERIUM SPECIES
FUNNSP	FUNGI, NOT SPECIFIED
FUNOTH	FUNGI OTHER
GARSPP	GARDNERELLA SPECIES

Microorganism code	LABEL
GNBNSP	G-BAC, NON ENTEROBACTERIACEAE, NOT SPEC.
GNBOTH	OTHER GRAM- BACILLI, NON ENTEROBACTERIACEAE
GNCNSP	GRAM-NEGATIVE COCCI, NOT SPECIFIED
GNCOTH	GRAM-NEGATIVE COCCI, OTHER
GPBNSP	GRAM-POSITIVE BACILLI, NOT SPECIFIED
GPBOTH	OTHER GRAM-POSITIVE BACILLI
GPCNSP	GRAM-POSITIVE COCCI, NOT SPECIFIED
GPCOTH	OTHER GRAM-POSITIVE COCCI
HAEINF	HAEMOPHILUS INFLUENZAE
HAENSP	HAEMOPHILUS SP., NOT SPECIFIED
HAEOTH	HAEMOPHILUS SP., OTHER
HAEPAI	HAEMOPHILUS PARAINFLUENZAE
HAFSPP	HAFNIA SPECIES
HELPYL	HELICOBACTER PYLORI
KLENSP	KLEBSIELLA SP., NOT SPECIFIED
KLEOTH	KLEBSIELLA SP., OTHER
KLEOXY	KLEBSIELLA OXYTOCA
KLEPNE	KLEBSIELLA PNEUMONIAE
LACSPP	LACTOBACILLUS SPECIES
LEGSPP	LEGIONELLA SPECIES
LISMON	LISTERIA MONOCYTOGENES
MOGSPP	MORGANELLA SPECIES
MORCAT	MORAXELLA CATHARRALIS
MORNSP	MORAXELLA SP., NOT SPECIFIED
MOROTH	MORAXELLA SP., OTHER
MYCATY	MYCOBACTERIUM, ATYPICAL
MYCTUB	MYCOBACTERIUM TUBERCULOSIS COMPLEX
MYPSPP	MYCOPLASMA SPECIES
NEIMEN	NEISSERIA MENINGITIDIS
NEINSP	NEISSERIA SP., NOT SPECIFIED
NEIOTH	NEISSERIA SP., OTHER
NOCSPP	NOCARDIA SPECIES
PAROTH	OTHER PARASITES
PASSPP	PASTEURELLA SPECIES
PRESPP	PREVOTELLA SPECIES
PROSPP	PROPIONIBACTERIUM SPECIES
PRTMIR	PROTEUS MIRABILIS
PRTNSP	PROTEUS SP., NOT SPECIFIED
PRTOTH	PROTEUS SP., OTHER
PRTVUL	PROTEUS VULGARIS
PRVSPP	PROVIDENCIA SPECIES
PSEAER	PSEUDOMONAS AERUGINOSA
PSENSP	PSEUDOMONADACEAE FAMILY, NOT SPECIFIED
PSEOTH	PSEUDOMONADACEAE FAMILY, OTHER
SALENT	SALMONELLA ENTERITIDIS
SALNSP	SALMONELLA SP., NOT SPECIFIED
SALOTH	SALMONELLA SP., OTHER
SALTYM	SALMONELLA TYPHIMURIUM
SALTYP	SALMONELLA TYPHI OR PARATYPHI
SERLIQ	SERRATIA LIQUEFACIENS
SERMAR	SERRATIA MARCESCENS
SERNSP	SERRATIA SP., NOT SPECIFIED

Microorganism code	LABEL
SEROTH	SERRATIA SP., OTHER
SHISPP	SHIGELLA SPECIES
STAAUR	STAPHYLOCOCCUS AUREUS
STACNS	COAGULASE-NEGATIVE STAPHYLOCOCCI, NOT SPECIFIED
STAEPI	STAPHYLOCOCCUS EPIDERMIDIS
STAHAE	STAPHYLOCOCCUS HAEMOLYTICUS
STANSP	STAPHYLOCOCCUS SP., NOT SPECIFIED
STAOTH	OTHER COAGULASE-NEGATIVE STAPHYLOCOCCI (CNS)
STEMAL	STENOTROPHOMONAS MALTOPHILIA
STRAGA	STREPTOCOCCUS AGALACTIAE (B)
STRHCG	OTHER HAEMOL. STREPTOCOCCI (C, G)
STRNSP	STREPTOCOCCUS SP., NOT SPECIFIED
STROTH	STREPTOCOCCUS SP., OTHER
STRPNE	STREPTOCOCCUS PNEUMONIAE
STRPYO	STREPTOCOCCUS PYOGENES (A)
VIRADV	ADENOVIRUS
VIRCMV	CYTOMEGALOVIRUS (CMV)
VIRENT	ENTEROVIRUS (POLIO, COXSACKIE, ECHO)
VIRHAV	HEPATITIS A VIRUS
VIRHBV	HEPATITIS B VIRUS
VIRHCV	HEPATITIS C VIRUS
VIRHIV	HUMAN IMMUNODEFICIENCY VIRUS (HIV)
VIRHSV	HERPES SIMPLEX VIRUS
VIRINF	INFLUENZA VIRUS
VIRNOR	NOROVIRUS
VIRNSP	VIRUS, NOT SPECIFIED
VIROTH	OTHER VIRUS
VIRPIV	PARAINFLUENZAVIRUS
VIRRHI	RHINOVIRUS
VIRROT	ROTAVIRUS
VIRRSV	RESPIRATORY SYNCYTIAL VIRUS (RSV)
VIRSAR	SARS-CORONAVIRUS
VIRVZV	VARICELLA-ZOSTER VIRUS
YEAOTH	OTHER YEASTS
YERSPP	YERSINIA SPECIES