Infections in the institutionalized elderly population

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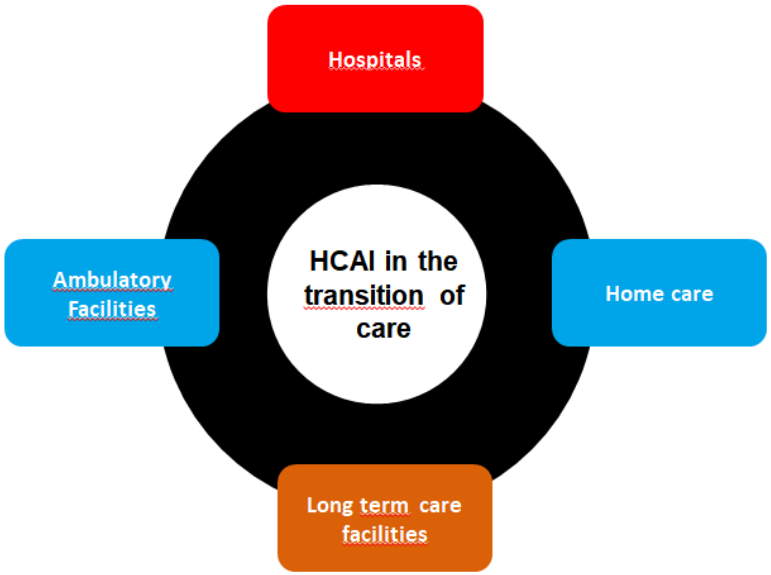
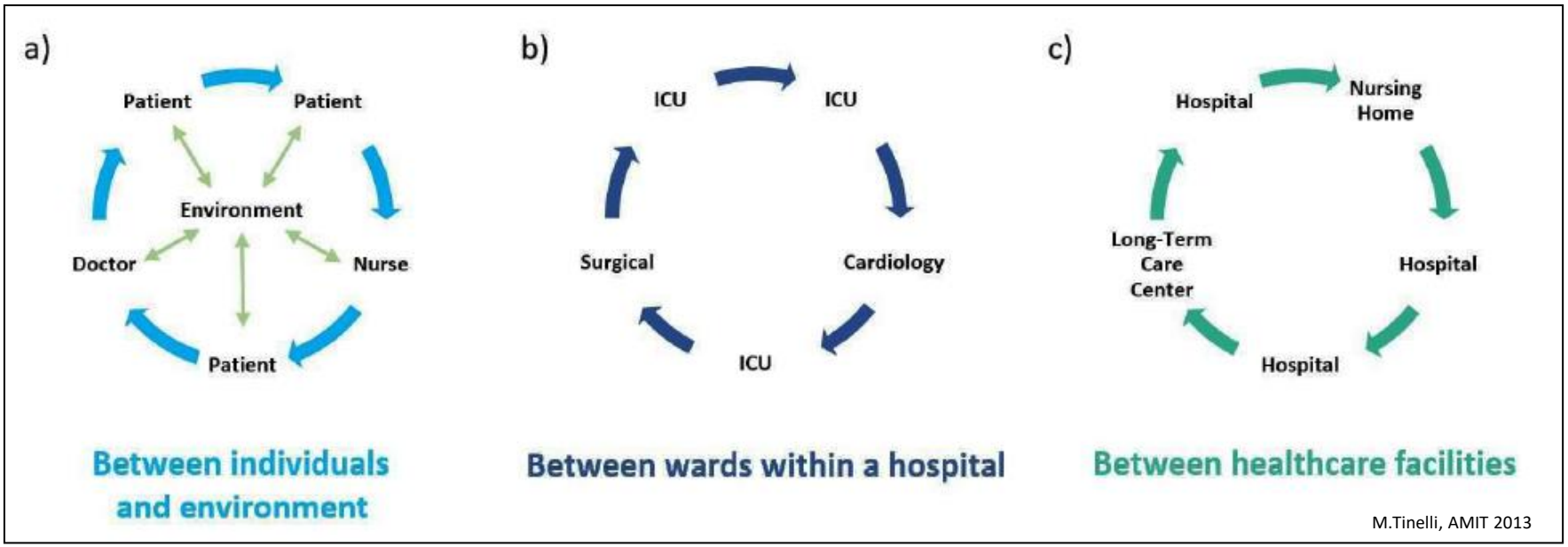
Microrganisms are spreading in the healthcare system



MDROs has moved beyond hospitals towards the transition of care

Mechanisms of MDROs spreading



M.Tinelli, AMIT 2013

Infections in LTCFs

LTCFs/NHs acquired infections
strictly depend on
several factors quite heterogeneous

Variety of ongoing health and social services

Long-term care facilities are heterogenous for:

- Typology of LTCF
- Providers by organisational status and regulatory processes
- Standards of care and quality monitoring
- Epidemiology of MDRO infections
- Risks factors of infection
- Infection control and surveillance
- Antimicrobial stewardship

Typologies of LTCFs by European Countries

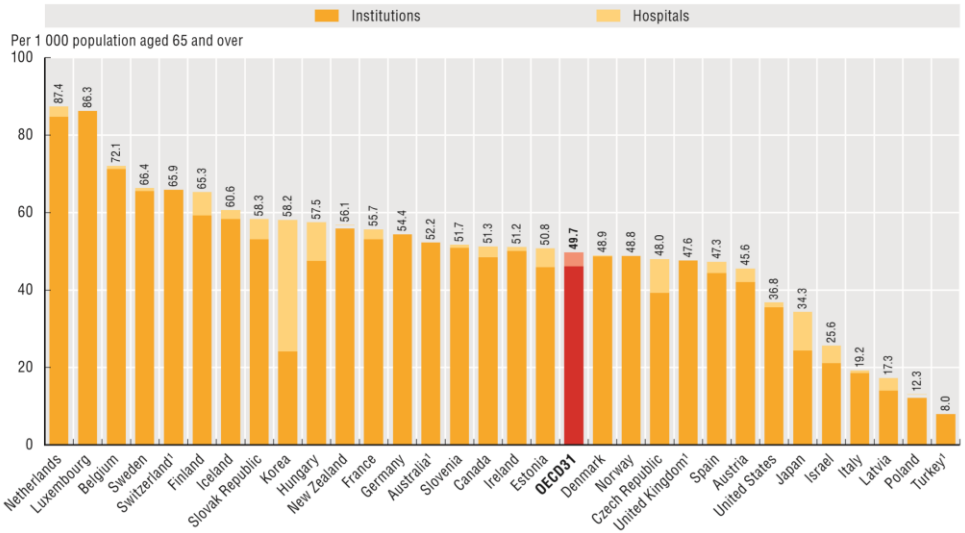
LTCF types include:

General nursing homes	In these facilities, residents need medical or skilled nursing and supervision 24h a day. These facilities provide principally care to seniors with severe illnesses or injuries.
Residential homes	In these facilities residents are unable to live independently. They require supervision and assistance for the activities of daily living (ADL). These facilities usually include personal care, housekeeping and three meals a day
Specialised LTCFs	These facilities are specialised in one specific type of care for e.g. physical impairment, chronic diseases such as multiple sclerosis, dementia, psychiatric illnesses, rehabilitation care, palliative care, intensive care
Mixed LTCFs	These facilities provide different types of care in the same facility (a mix of the above mentioned LTCF types).
Other LTCFs	Other facilities, not classifiable among the above mentioned LTCF types.

Remark: This classification does not imply that the characteristics of residents within each facility type are strictly homogeneous.

- Number of beds **range from 55 to 300**
- It can be **over 1000** in some countries.
- **Mean beads 49.7 per 1000 population in EU.**
- Median percentage of **single room is 57.1%**
- In **58.4 %** of LTCFs medical care is provided by **GPs**, in **25.6%** by **employed medical staff**

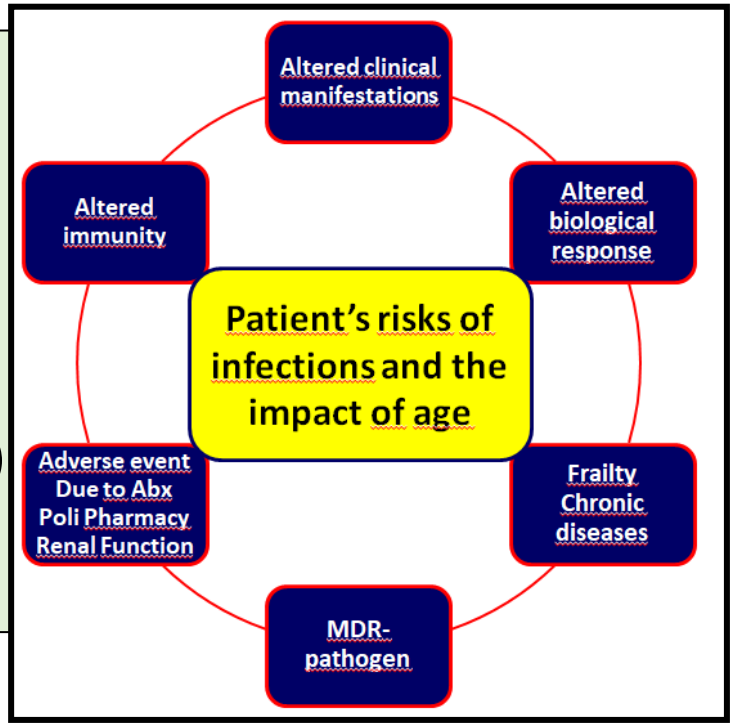
11.22. Long-term care beds in institutions and hospitals, 2015 (or nearest year)



OECD(2015),*Health at a Glance 2015: OECD Indicators*, OECD Publishing, Paris., Frogatt K et.al.(2017) Palliative care systems and current practices in long term care facilities in Europe
Froggatt,K.et al.(2009).Research and Development in Care Homes: Setting the Scene.,*Understanding Care Homes: A Research and Development Perspective*. London: Jessica Kingsley Press.,pp9-22., HALT 2, 2013, ECDC

Reasons for increased risk of MDR/XDR infection in LTCFs

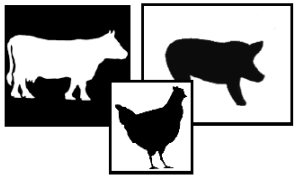
- Increased exposure to healthcare system
- **Increased exposure to antimicrobials**
- **Adherence to Infection Control Policies**
- Decreased immune system
- Comorbid illnesses
- Decreased functional status/hygiene and oral care
- Functional impairment (immobility, incontinence…..)
- Increased use of invasive devices
- Close contact with other residents,medical staff



Friedman N.D Carbapenem-resistant Enterobacteriaceae: a strategic roadmap for infection control, ICHE 2017,38, 5 Nicolle LE. Long-term care issues for the twenty-first century. In:Wenzel RP, editor. Prevention and control of nosocomial infections.4th ed Lippincott Williams & Wilkins; 2003. p. 64-86., Gavazzi G, Lancet Infect Dis 2002; Strausbaugh LJ, Emerg Infect Dis 2001; M. Tinelli, ECCMID 20; Colonization with Multi-Drug Resistant Organisms in Nursing Homes: Scope, Importance, and Management Marco Cassoneand Lona Mody. *Curr Geriatr Rep*. 2015 March ; 4(1): 87–95. McKinnell JA, Miller LG, Eells SJ, Cui E, Huang SS. A systematic literature review and meta-analysis of factors associated with methicillin-resistant Staphylococcus aureus colonization at time of hospital or intensive care unit admission. Infect Control Hosp Epidemiol. 2013; 34:1077–86. van Buul LW, van der Steen JT, Veenhuizen RB, Achterberg WP, Schellevis FG, Essink RT, van Benthem BH, Natsch S, Hertogh CM. Antibiotic use and resistance in long term care facilities. J Am Med Dir Assoc. 2012; 13:568, e1–13. This meta-analysis study highlights the proven risk factors for colonization and infection with MDROs in a sintetic way, and stratifies findings according to the strength of evidence.

Antibiotic Use in European Countries

Antimicrobial consumption and AMR: a continuum of risks in our societies



ICU & Haem./ bone marrow transplant (BMT)

152 mg/kg (country range: 3 – 419 mg/kg)

124 mg/kg (country range: 50 – 182 mg/kg)

~ 90% DDDs

~ 10% DDDs

2% (1-4%) **population on a given day**

35% (21-55%) **patients on a given day**

59% patients

MDR* | MDR | MDR | MDR, XDR, PDR

Imported animals
Imported foods

International travel

Cross-border transfer of patients

*MDR, multidrug-resistant; XDR, extensively drug-resistant; PDR, pandrug-resistant

Source: ECDC/EFSA/EMA JIACRA report, 2017; ECDC ESAC-Net 2016; ECDC PPS, 2013.

Antimicrobial consumption and impact of Antimicrobial Stewardship programmes in Long-term Care Facilities

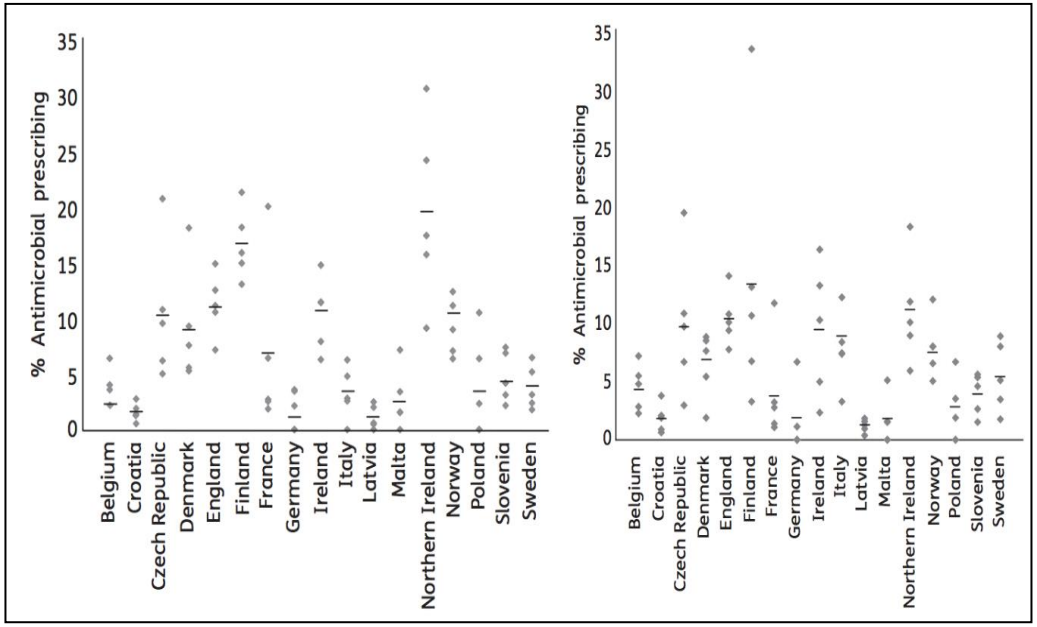
Falcone M, Paul M, Yahav D., Orlando G, Tiseo G, Prendki V, Güerri-Fernández, R, Gavazzi G, Mutters NT., Cookson B. and Tinelli M.
Study Group for Infections in the Elderly (ESGIE).

Clin Microbiol Infect. 2018 Aug 1.

TABLE 1. Results of the main study analyzing antibiotic prescriptions in LTCFs.

Author	Country	Design	Setting	Type of LTCF*	Study period	Variable	Results
Blix HS, 2007 [28]	Norway	PPS	133 LTCFs	Type A	2003	Mean use of antibiotics	14.8 DDDs/100 bed-day
Blix HS, 2010 [29]	Norway	PPS	44 LTCFs	Type A	2006	Median prevalence of antibiotic prescription	3%
Rummukainen ML, 2013 [30]	Finland	ESAC PPS	9 LTCFs	Type A	2009-2010	Prevalence of antimicrobial prescription	5-30%
Roche FM, 2016 [26]	Ireland	PPS	24 LTCFs	Type B	2013	Median prevalence of antibiotic prescription	7.5%
McClean P, 2012 [24]	Ireland	PPS	30 LTCFs	Type C	2010-2011	Median prevalence of antibiotic prescription	9.2%
Stuart RL, 2012 [39]	Australia	PPS	5 LTCFs	Type C	2011	Prevalence of antibiotic prescription	9%
van Buul LW, 2015 [13]	Netherlands	Prospective study.	10 LTCFs	Type D	2012	Prevalence of antibiotic prescription in Registered Infection Consultations	88%
Andersen BA, 2000 [27]	Norway	PPS	65-70 LTCFs	Types A, C	1997-1999	Median prevalence of antibiotic prescription	7%
Sundvall PD, 2015 [31]	UK	Retrospective longitudinal cohort study	Number not specified	Types A, C	2011	Percentage of individuals prescribed antibiotics	49% (82% with urinary catheter)
Gillespie D, 2015 [32]	UK	Prospective cohort study	10 LTCFs	Types A, C, D	2010-2012	Incidence of antibiotic prescription	2.16 prescriptions per resident year (95% CI: 1.90–2.46)
Burns K, 2015 [25]	Ireland	HALT-1/HALT-2-PPS	69/190 LTCFs	Types A, C, D	2010/2013	Median prevalence of antibiotic prescription	11.0%/ 9.7%
Roukens M, 2017 [33]	Netherlands	Retrospective study	96 LTCFs	All types	2012-2014	Mean total use of systemic antimicrobials	73 DDDs/1000 residents-day
Daneman N, 2011 [34]	Canada	PPS	363 LTCFs	All types	2009	Prevalence of antibiotic use	5.9%
Daneman N, 2013 [35]	Canada	Retrospective study	630 LTCFs	All types	2010	Prevalence of incident antibiotic treatment course	77.8%
Daneman N, 2017 [36]	Canada	Retrospective cohort study	600 LTCFs	All types	2014	Median prevalence of antibiotic prescription	44.9%

Legend. DDD: defined daily dose; ESAC: European Surveillance of Antimicrobial Consumption; LTCFs: long-term care facilities; PPS: point-prevalence survey; UK: United Kingdom;



Variation in prescribing of antimicrobials in nursing homes between **and within European countries**

- **Great variability in LTCFs across and 43 within countries.**
- **Difficult to analyze,** because of the differences in 44 the types of LTCFs, their organization and the population cared-for in the different LTCFs.
- **Educational interventions are effective in reducing unnecessary antibiotic prescriptions**

Are all nursing homes ready for modern infection control and the burn of MDROs ?

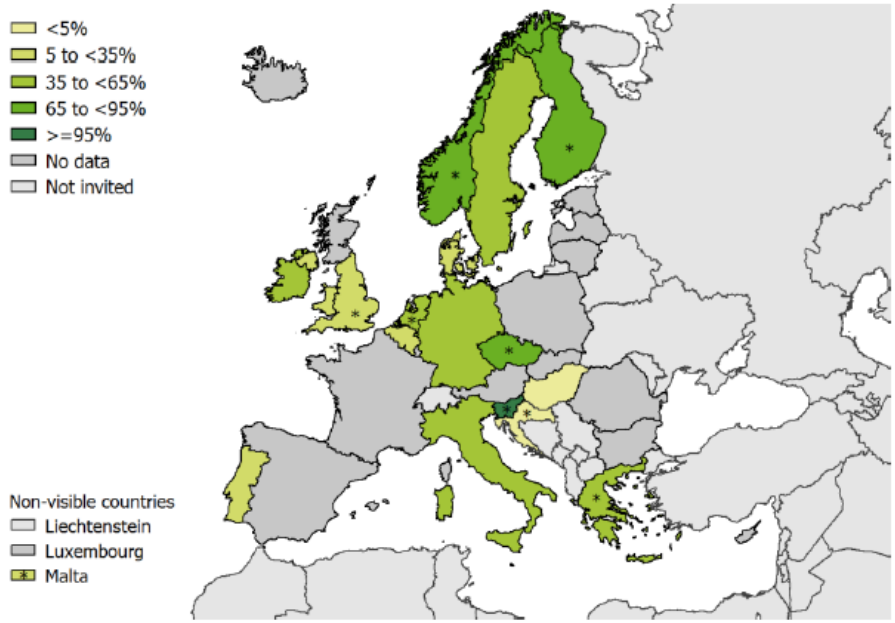
Include**, *at a minimum***, a **system** for preventing, identifying, reporting, investigating, and controlling infections and communicable diseases

Requires facilities to have **written standards, policies, procedures** for a **system of surveillance** designed to identify possible communicable disease or infections

Infection Prevention and Control Program in NH-CDC and National Healthcare Safety Network, USA 2017

European Countries written protocols

Figure 14. Percentage of included LTCFs with written protocols for all five selected infection prevention and control protocols, HALT-2, 2013**

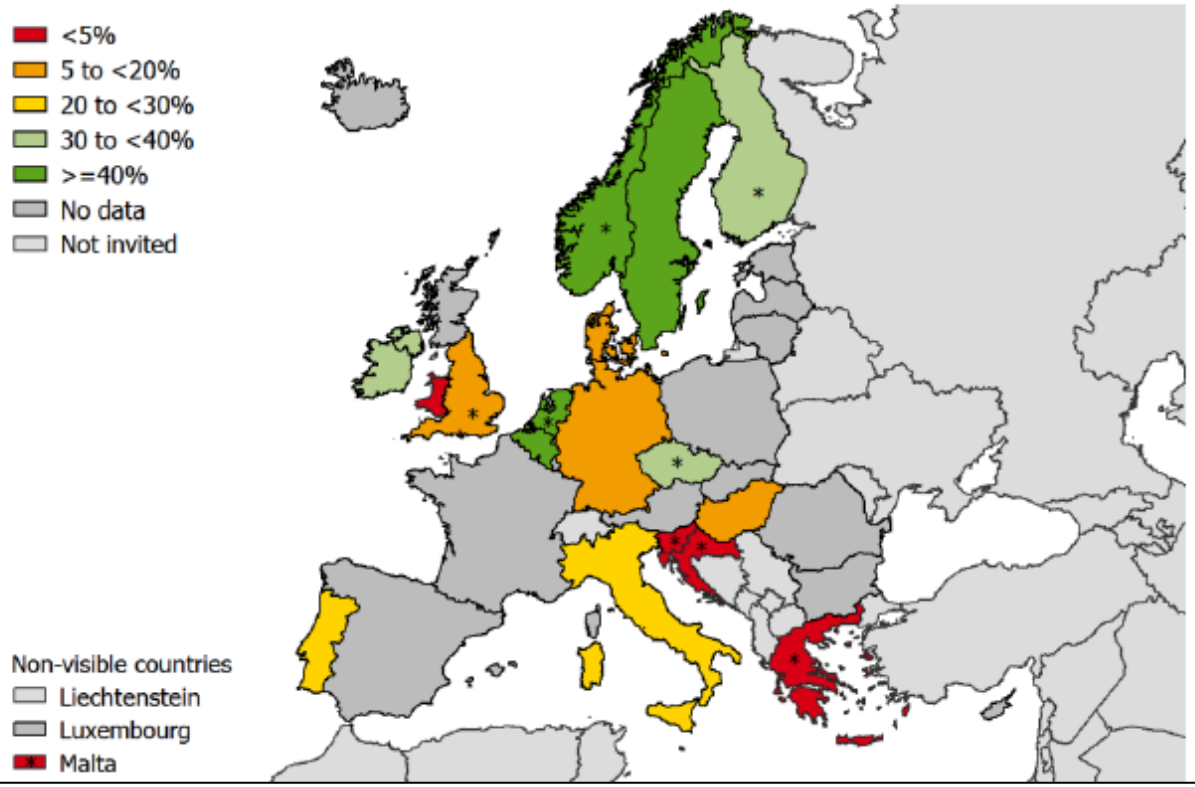


** Poor or very poor national representativeness of LTCF sample*
*** Protocols for management of MRSA and/or other multidrug-resistant microorganisms, urinary catheters, enteral feeding, venous catheters/lines, and hand hygiene.*

Hand hygiene:	95.9%
MRSA and MDRO:	76.9%
Urinary catheters:	84.0%
Venous catheters	50.0%
Enteral feeding	76.8%

HALT-2, ECDC, 2013

Figure 19. Percentage of the included LTCFs with written therapeutic guidelines for UTIs, RTIs and wound and soft tissue infections, HALT-2, 2013

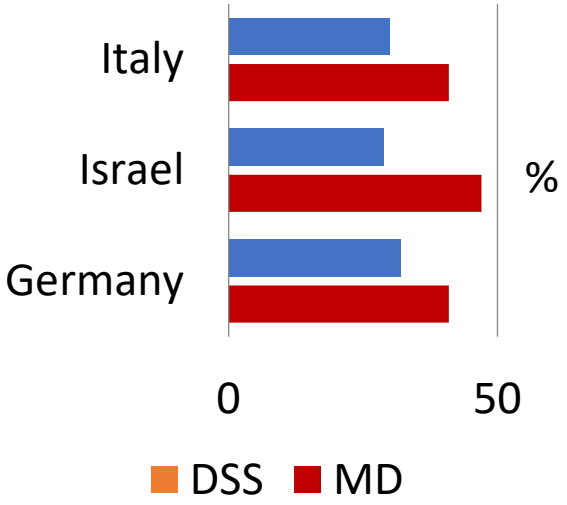


HALT-2, ECDC, 2013

- **No specific guidelines for rational prescribing in 50% of European LTCFs**
- **Restricted antibiotic formulary:16%**
- **Minimal education programs**

Effect of inappropriate antibiotic therapy against severe infections in hospitalised patients and in LTCFs residents

TREAT project



The percentage of inappropriate empiric antibiotic use ranged from 14% to 79%; 13 of 27 studies (48%) described an incidence of 50% or more

Paul and Tacconelli, JAC 2013; Marquet, Crit Care 2015

N: 350 patients; DSS: decision support system; MD: medical doctors

- **50-80% of LTCF residents** receive an antibiotic every year
- **25% - 75%** of antimicrobials prescribed in nursing homes are considered **inappropriate**

CHE 1996;17:119-28, JAMDA 2012;13:568.e1-e13

Epidemiology and genetic characteristics of extended-spectrum β-lactamase-producing Gram-negative bacteria causing urinary tract infections in long-term care facilities.

Tinelli M. et al., J Antimicrob. Chemother., 2012 ; 67: 2982– 2987

Risks factors for ESBL + GN UTIs in elderly population (multivariate analysis)

- **Indipendent risk for UTI acquisition**
  - Previous antibiotic therapy (**OR 4**, 95% CI 1.2-10.9; p= 0.02)
  - presence of urinary catheter (**OR 15**, 95% CI 6.9-30.5; p< 0.01)
- **Highest risk for UTI development**:
  - **Exposure, whitin 30 days**, to >7 days of quinolones and cephalosporins **(OR 7**, 95% CI 1.2-40; p= 0.02)

Site of acquisition impacts on mortality of hospitalised patients with invasive infections due to extended-spectrum β-lactamases (ESBL) producing Enterobacteriaceae

Tacconelli, Evelina , Cataldo Maria Adriana, Mutters, Nico T., Carrara Elena, Bartoloni Alessandro, Bernieri Francesco, Bombana Enrico, Cauda Roberto, Luzzaro Francesco, Mantengoli Elisabetta, Orani Anna, Pan Angelo[1], Pecile Patrizia, Tinelli Marco, Rossolini Gianmaria

Int J Antimicrob Agents. 2019 Jul;54(1):49-54

Variable	HAI N = 519	COI N = 176	CAI N = 34	P
Rate of inappropriate therapy (%)	145 (28%)	**85 (48%)**	10 (29%)	<0.001
LOS post study inclusion, mean±SD	20 ± 26	16 ± 20)	9 ± 8	0.01
Bloodstream infection	20 ±26	14 ± 16	11 ± 11	0.03
Wound infection	17 ± 17	11 ±14)	--	0.80
Lung infection	24 ± 23	15 ± 11	--	0.33
Urinary tract infection	20 ± 24	**23 ± 23**	9 ±11	0.30
Mortality (%)	10%	20%	--	0.03

Legend: SD, standard deviation; *combination therapy is not included

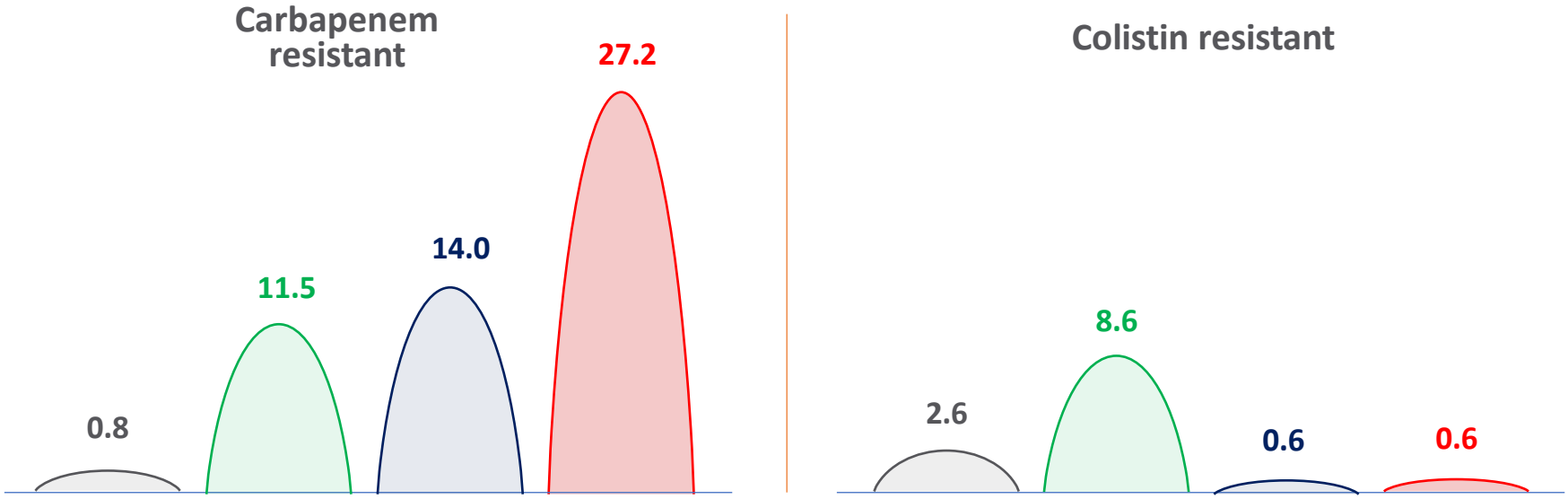
Rates of **inappropriate antimicrobial therapy** and **overall mortality** of ESBL invasive infections are **more commonly observed** in **community-onset infections-COI (LTCFs, home), than in hospital-acquired infections -HAI.**

Microbiological aspects of infections in the elderly

- **Higher diversity**
  - **Higher proportion of MDR-GNB** ←
    - E coli., Klebsiella p., Proteus, Enterobacter c., Pseudomonas spp., Acinetobacter b.
- **Higher rate of superinfection**
    - S. aureus as superinfection of influenzae
- **Higher rate of betalactamase and carbapenemase production**
- Mycoplasma Pneumoniae rarely found but Clamydia Pneumoniae more frequent
- **Higher risk of tuberculosis**

Estimated annual burden due to antibiotic-resistant infection per 100,000 population EU/EEA in 2015 EU/EEA in 2015

MEDIAN NUMBER OF DISABILITY-ADJUSTED LIFE-YEARS DUE TO RESISTANT MDR-GN



E. coli *K. pneumoniae* *Acinetobacter* spp. *P. aeruginosa*

GNI, Gram-negative infection.Cassini A, et al. Lancet Infect Dis 2019;19:56–66.

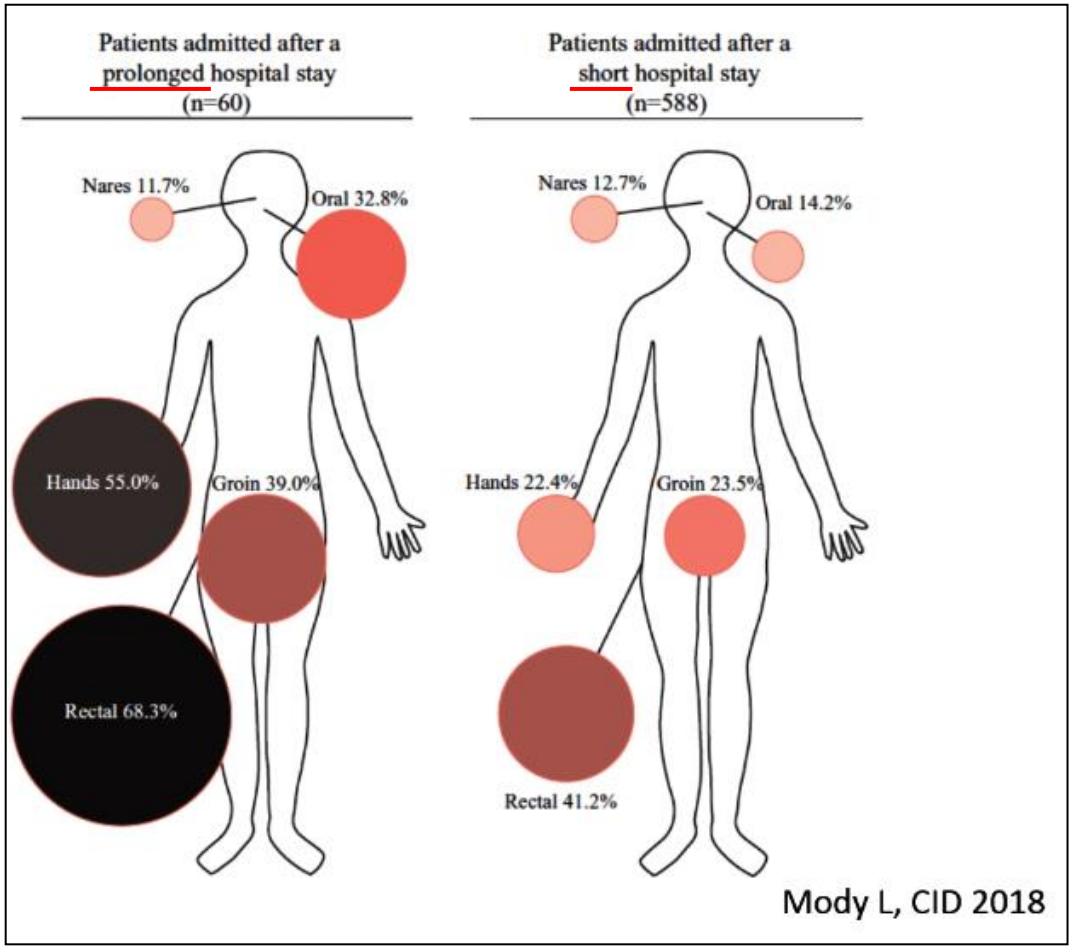
Longitudinal Assessment of Multidrug-Resistant Organisms in Newly Admitted Nursing Facility Patients: Implications for an Evolving Population

CID 2018

Lona Mody,[1,2] Betsy Foxman,[3] Suzanne Bradley,[4,5] Sara McNamara,[1] Bonnie Lansing,[1] Kristen Gibson,[1] Marco Cassone,[1] Chelsie Armbruster,[6] Julia Mantey,[1] and Lillian Min[1,2]

- ✓ Prospective, longitudinal cohort study of newly admitted patients in 6 NFs in southeast Michigan using active microbial surveillance
- ✓ Nearly all participants were **admitted for post–acute care (95%)**
- ✓ **Risk factors for colonization** at enrollment included prolonged hospitalization (>14 days), functional disability, antibiotic use, or device use.

A

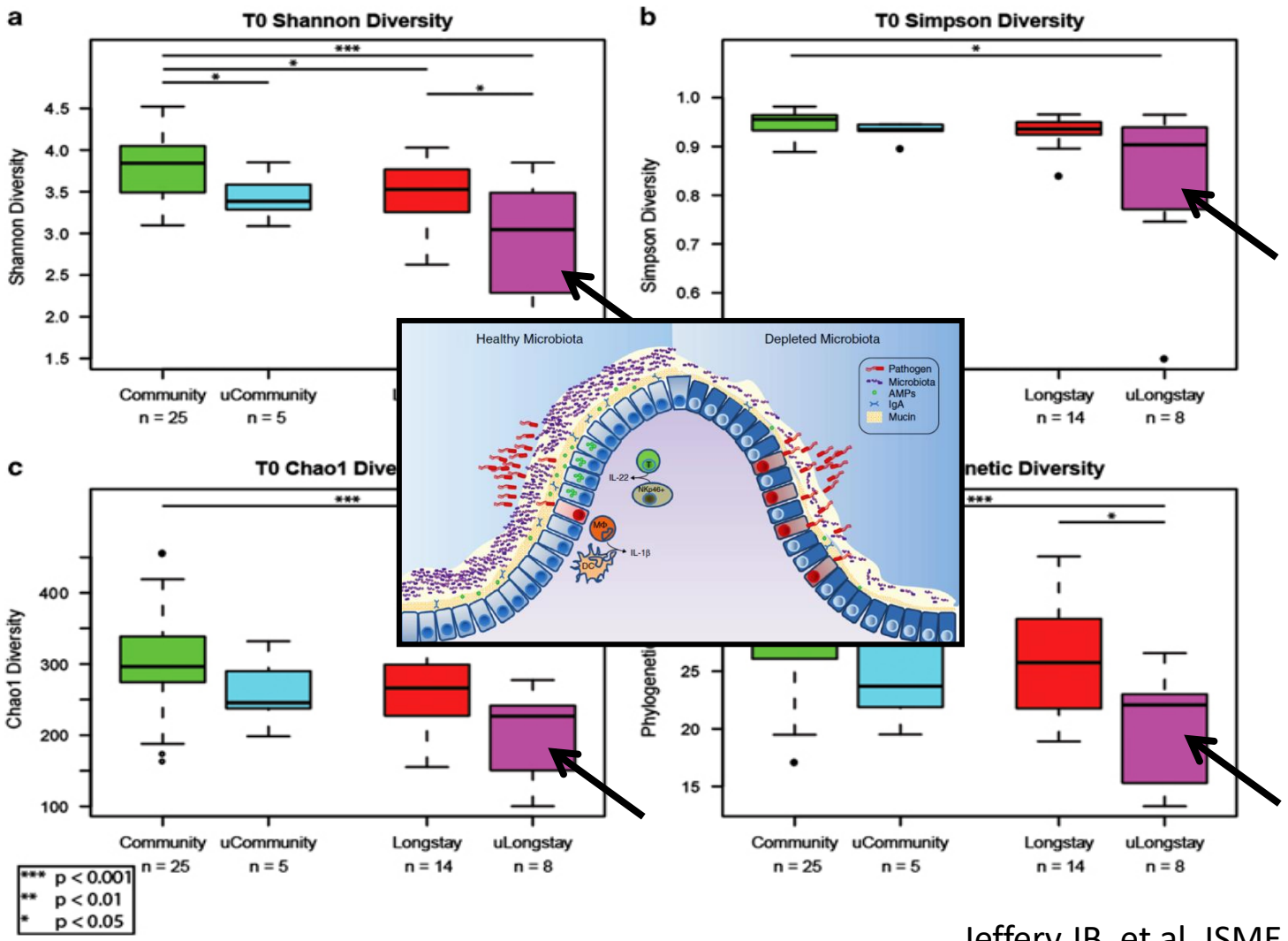


10% of CRE colonized patients progress to infection.

In the presence of neutropenia this subset is higher 20%

Saidel-Odes et al. Infect Control Hosp Epidemiol 2012, Borer A. et al. Am. J Infect Control, 2011, Schechner V et al. Clinical Microbiology Infection, 2012

Living in a LTCF is associated to a less different and not stable microbioma



Jeffery IB, et al. ISME J 2016

Increased relative abundance of carbapenemase-producing Klebsiella pneumoniae within the gut microbiota is associated with risk of bloodstream infection in long-term acute care hospital patients.

Shimasaki T et al Clin Infect Dis. 2018 Sep 18.

Risk factors associated with ≥22% relative abundance of KPC-Kp in the gut microbiota

Clinical predictors	*HR (95% CI)*	*P value*
Age in years	0.99 (0.97-1.02)	0.549
Charlson comorbidity index	0.90 (0.74-1.09)	0.277
Any medical device use	1.05 (0.25-4.48)	0.943
Any antibiotic exposure	0.70 (0.24-2.07)	0.519
Carbapenem	2.19 (1.06-4.55)	0.036
BI/BLI	0.66 (0.23-1.90)	0.436
Vancomycin IV	0.79 (0.38-1.66)	0.537
Metronidazole	0.50 (0.12-2.12)	0.351

Aschbacher *et al. Antimicrobial Resistance and Infection Control* (2016) 5:33
DOI 10.1186/s13756-016-0136-1

Antimicrobial Resistance and Infection Control

REVIEW Open Access

Review on colonization of residents and staff in Italian long-term care facilities by multidrug-resistant bacteria compared with other European countries

Richard Aschbacher[1*], Elisabetta Pagani[1], Massimo Confalonieri[2], Claudio Farina[3], Paolo Fazii[4], Francesco Luzzaro[5], Pier Giorgio Montanera[6], Aurora Piazza[7] and Laura Pagani[7]

MDR prevalence in Italian LTCFs

% Prevalence	MRSA	ESBL	CPE
Residents	7.8–38.7 %	49.0–64.0 %	1.0–6.3 %
Staff	5.2–7.0 %	5.2–14. 5 %	0.0–1.5 %

Contents lists available at ScienceDirect

Clinical Microbiology and Infection
2017 Dec;23(12):961-967
journal homepage: www.clinicalmicrobiologyandinfection.com

Original article

Colonization by multidrug-resistant organisms in long-term care facilities in Italy: a point-prevalence study*

M. Giufrè [1], E. Ricchizzi [2], M. Accogli [1], F. Barbanti [1], M. Monaco [1], F. Pimentel de Araujo [1], C. Farina [3], P. Fazii [4], R. Mattei [5], M. Sarti [6], A. Barozzi [6], R. Buttazzi [2], M. Cosentino [3], M. Nardone [5], V. Savini [4], P. Spigaglia [1], A. Pantosti [1], M.L. Moro [2], M. Cerquetti [1,*]

- ✓ 12 LTCFs located in four Italian cities (2 February to 14 March 2015).
- ✓ A total of 489 LTCF residents aged 65 years were enrolled.
- ✓ Prevalence of colonization:
  - ✓ ESBL-producing Enterobacteriaceae 57.3% (279/487),
  - ✓ MRSA 17.2% (84/487)
  - ✓ C. difficile 5.1% (21/409)
  - ✓ Carbapenemase-producing Enterobacteriaceae 1% (5/487).

Predictors of mortality in nursing-home residents with pneumonia: a multicentre study

Falcone M, Russo A, Gentiloni Silverj F, Marzorati D, Bagarolo R, Monti M, Velleca R, D'Angelo R, Frustaglia A, Zuccarelli GC, Prina R, Vignati M, Marnati MG, Venditti M, Tinelli M.

Clin. Microbiol Infect. 2018 Jan;24(1):72-77.

Pathogens isolated among 120 patients with culture-positive NHAP

Etiologies	N	%
S. aureus	47	39.1
- **MRSA***	**30**	**25**
- MSSA	17	14.1
KPC-Kp	**19**	**15.8**
Streptococcus pneumoniae	14	11.7
Mycoplasma pneumoniae	10	8.3
***Pseudomonas aeruginosa* carbapenem-resistant**	**8**	**6.6**
***Enterobacter cloacae* carbapenem-resistant**	**5**	**4.2**
*Mycobacteria***	5	4.2
Serratia marcescens	3	2.5
Escherichia coli carbapenem-resistant	2	1.7
Pseudomonas aeruginosa	2	1.7
MRSA + *A. baumannii*	2	1.7
ESBL *Enterobacter cloacae*	1	0.8
ESBL *Escherichia coli*	1	0.8
Haemophilus influenzae	1	0.8
MDR pathogens	**66**	**55**

446 patients with NHAP considered in the study

Incidence of NHAP in the 9 LTCFs participants to the study: **0,27-2,32/1000 resident care days**

Prevalence of healthcare-associated infections, estimated incidence and composite antimicrobial resistance index in acute care hospitals and long-term care facilities: results from two European point prevalence surveys, 2016 to 2017

Carl Suetens[1], Katrien Latour[2], Tommi Kärki[1], Enrico Ricchizzi[3], Pete Kinross[1], Maria Luisa Moro[3], Béatrice Jans[2], Susan Hopkins[4], Sonja Hansen[5], Outi Lyytikäinen[6], Jacqui Reilly[7,8], Aleksander Deptula[9], Walter Zingg[10], Diamantis Plachouras[1], Dominique L Monnet[1], the Healthcare-Associated Infections Prevalence Study Group[11]

Euro surveillance, Volume 23, Issue 46, 15/Nov/2018

Long-term care facilities

The 10 most frequently isolated bacteria were

- E. coli (**30.7%**)
- S. aureus (**12.3%**)
- Klebsiella spp. (**11.4%**)
- Proteus spp. (**10.6%**)
- P. aeruginosa (**7.1%**)
- Enterococcus spp. (**4.8%**)
- C. difficile (**4.4%**)
- Streptococcus spp. (**2.8%**)
- Enterobacter spp. (**2.1%**)
- Coagulase-negative staphylococci (**1.9%**).

Prevalence of healthcare-associated infections, estimated incidence and composite antimicrobial resistance index in acute care hospitals and long-term care facilities: results from two European point prevalence surveys, 2016 to 2017

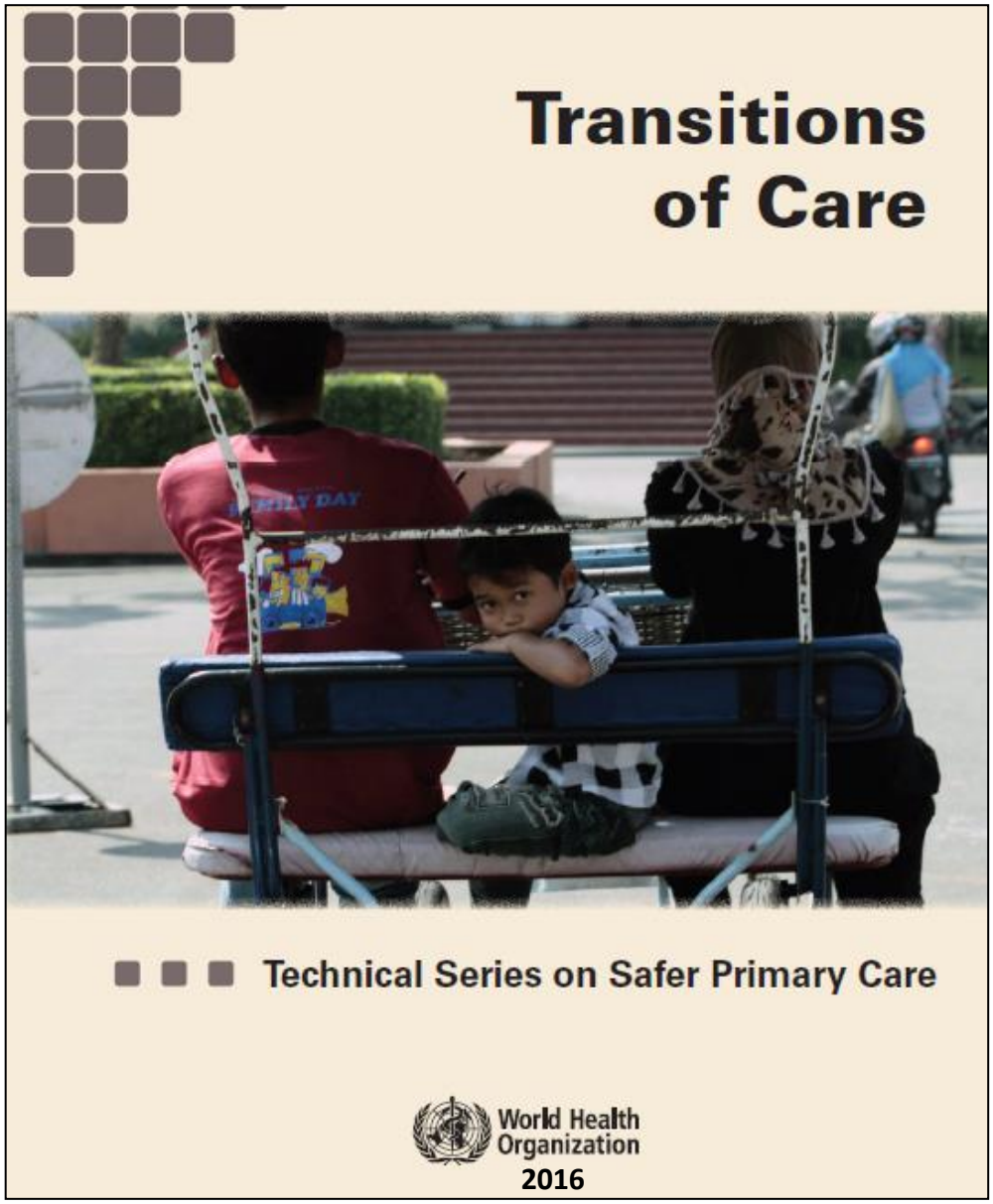
Carl Suetens[1], Katrien Latour[2], Tommi Kärki[1], Enrico Ricchizzi[3], Pete Kinross[1], Maria Luisa Moro[3], Béatrice Jans[2], Susan Hopkins[4], Sonja Hansen[5], Outi Lyytikäinen[6], Jacqui Reilly[7,8], Aleksander Deptula[9], Walter Zingg[10], Diamantis Plachouras[1], Dominique L Monnet[1], the Healthcare-Associated Infections Prevalence Study Group[15]

Euro surveillance, Volume 23, Issue 46, 15/Nov/2018

Point prevalence survey in long-term care facilities

- In 2013, 18.3% respiratory tract infections.
  In 2018, (**33.2%** overall
- In 2013, 31,0% urinary tract infections
  In 2018, (**32.0%)**
- In 2013, 20,0 % skin infections
  In 2018, (**21.5%).**

The majority of the reported **HAI (84.7%) were associated with the LTCF** where the PPS was performed, while **7.5% and 1.4% were associated with a hospital or another LTCF**, respectively.



WHO - Defining transitions of care

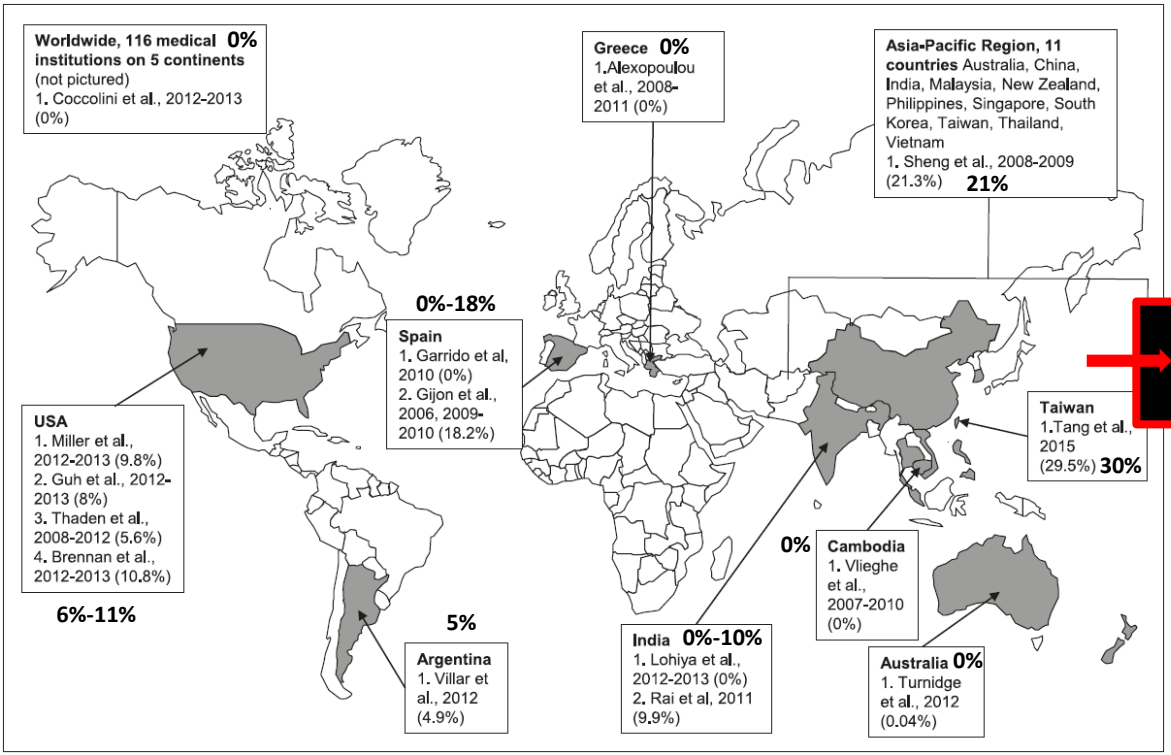
Transitions of care refers to the various points where a patient moves to, or returns from, a particular physical location or makes contact with a health care professional for the purposes of receiving health care.

This includes **transitions between home, hospital, residential care settings and consultations** with different health care providers in out-patient facilities.

Carbapenem-resistant Enterobacteriaceae in the community: a scoping review

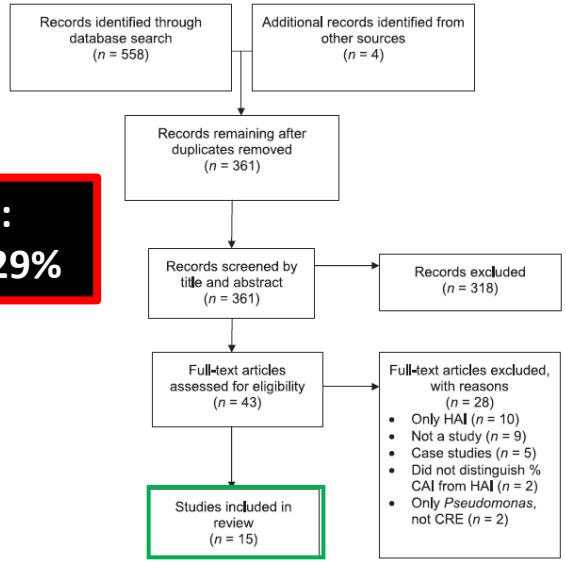
International Journal of Antimicrobial Agents 50 (2017) 127-134

Ana M. Kelly [a,*], Barun Mathema [b], Elaine L. Larson [a,b]



Overall: from 0%-29%

Literature search
1996 – March 2016



Sample sizes: 11 to 2802
(infection and colonization)

Most studies provided <u>no/partial data about healthcare e</u>xposure.
Only 4 studies performed genotypic analysis for carbapenemase genes 22

Long-term Carriage of Extended-Spectrum β-Lactamase–Producing *Escherichia coli* and *Klebsiella pneumoniae* in the General Population in The Netherlands

van Duijkeren E et al., CID. 2018 Apr 17;66(9):1368-1376

Descriptive Characteristics of the Extended-Spectrum β-Lactamase and Plasmid-Encoded AmpC β-Lactamase–Producing *Escherichia coli* and *Klebsiella pneumoniae* Persistent, Frequent, and Incidental Carriers and Continuously Negative Individuals at Sample Moment T0

Determinant[a]	Total No.	Missing Info	ESBL-E/K Persistent Carrier (n = 25)	ESBL-E/K Frequent Carrier (n = 11)	ESBL-E/K Incidental Carrier (n = 71)	ESBL-E/K Continuously Negative (n = 218)
Demographics						
Sex						
Female	176		14 (56.0)	6 (54.6)	39 (54.9)	117 (53.7)
Male	149		11 (44.0)	5 (45.5)	32 (44.4)	101 (46.5)
Age, y						
20–29	2		0 (0.0)	0 (0.0)	1 (1.4)	1 (0.5)
30–39	16		1 (4.0)	0 (0.0)	3 (4.2)	12 (5.5)
40–49	44		3 (12.0)	0 (0.0)	9 (12.5)	32 (14.8)
50–59	90		6 (24.0)	3 (27.3)	19 (26.4)	62 (28.6)
≥60	173		15 (60.0)	8 (72.7)	39 (54.9)	111 (50.9)

ESBL-E/K carriage persisted for >8 months in 32.9% of the initially ESBL-positive individuals, **while 12.4% of initially negative individuals acquired ESBL-E/K during the study.**

CREA Project: preliminary results

"Dynamic of Klebsiella pneumoniae colonization in elderly population during the transition of care"

November 2020

- **To identify risk factors for persistent CRE carriage in-hospital and post-discharge on 4^{th},8^{th},12^{th} month in the elderly population.**
- To develop a **model/score to predict persistent CRE carriage.**
- To document the **duration of colonization following CRE acquisition**, through regular rectal screening and molecular typing of isolates.
- To determine **clonality and acquisition of resistance mechanisms** in persistent and relapsing isolates.

Dati preliminari - Tinelli M. et al. , CREA Study Group

- In **60% of patients** KPC colonization is **not detectable at 4th month**
- In **1/5 patient** colonization can **persists over 12 months**
- **ST307 e ST512** are **more persistent isolated clones**.
- **KPC3 gene is** prevalent **(80%)**.
- **ST307** seem to be **endemic** in Italy.
- Risks factor statistical evaluation is ongoing

Dati preliminari - Tinelli M. et al. , CREA Study Group

Caratteristiche dei pazienti deceduti positivi all'infezione da SARS-CoV-2 in Italia

Dati al 28 ottobre 2020

Figura 1. Età mediana dei deceduti e diagnosticati positivi all'infezione da SARS-CoV-2

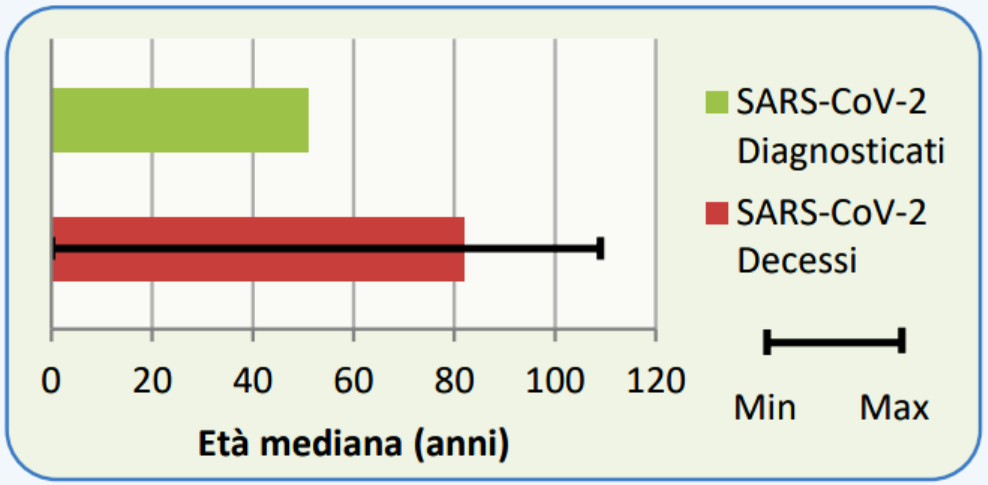
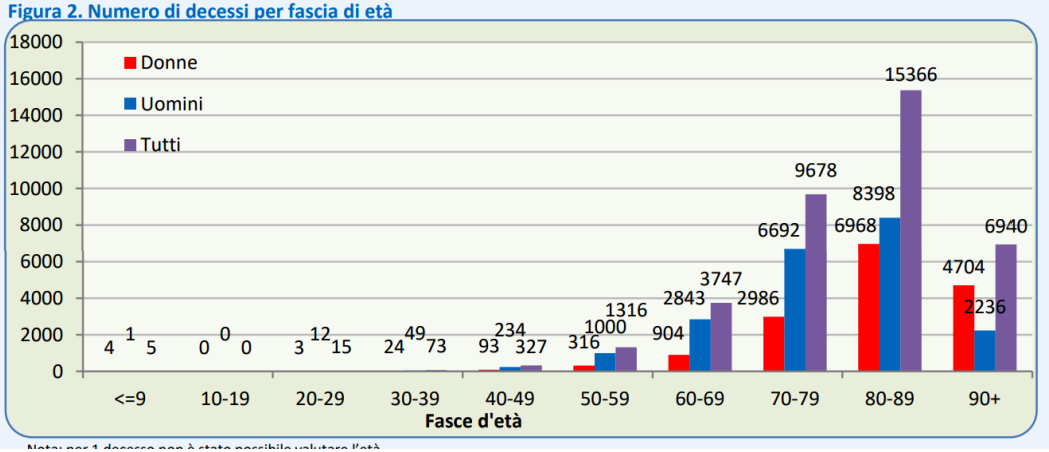
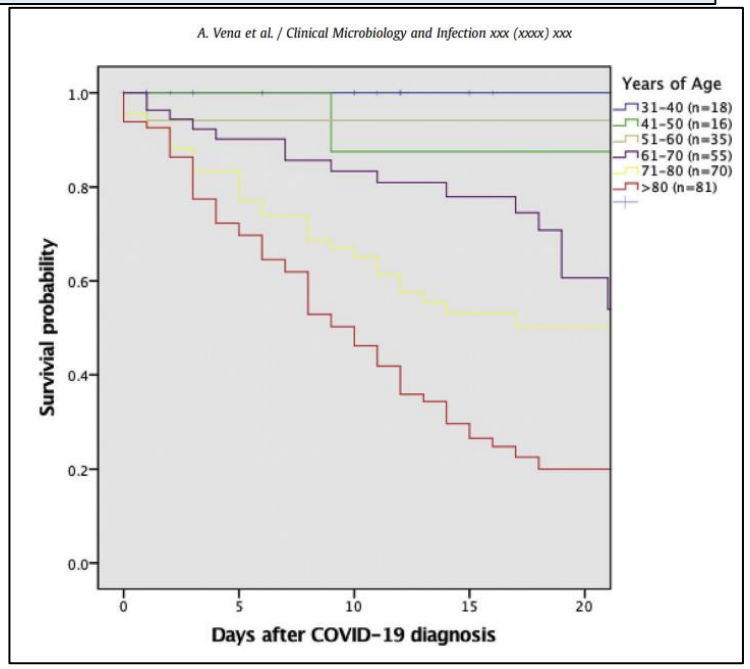


Figura 2. Numero di decessi per fascia di età



Nota: per 1 decesso non è stato possibile valutare l'età

Clinical characteristics, management and in-hospital mortality of patients with coronavirus disease 2019 in Genoa, Italy
A.Vena et al.- CMI 16 July 2020



Contents lists available at ScienceDirect
Clinical Microbiology and Infection
Langford B.J. CMI 16 July 2020
journal homepage: www.clinicalmicrobiologyandinfection.com

Systematic Review

Bacterial co-infection and secondary infection in patients with COVID-19: a living rapid review and meta-analysis

- In the meta-analysis, bacterial co-infection (estimated on presentation) was identified in 3.5% of patients (95%CI 0.4e6.7%) and secondary bacterial infection in 14.3% of patients (95%CI 9.6-18.9%)
- The overall proportion of COVID-19 patients with bacterial infection was 6.9% (95%CI 4.3-9.5%)
- Bacterial infection was more common in critically ill patients (8.1%, 95%CI 2.3-13.8%)
- The majority of patients with COVID-19 received antibiotics 71.9% 95%CI 56.1 to 87.7%)

Prevention of the spread of multidrug resistant organisms in nursing homes

M. Tinelli, G.Tiseo, M.Falcone

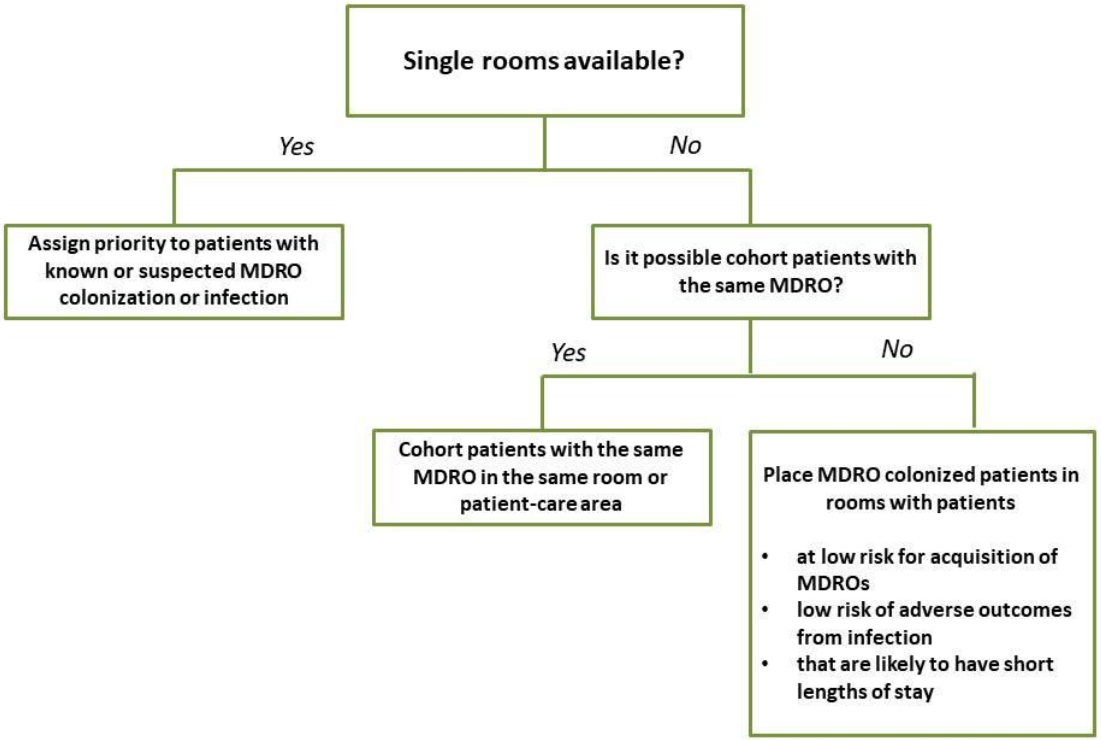
Aging Clinical and Experimental Research, accepted

Main aspects inherent to high heterogeneity of nursing homes in Europe

Aspect	Current issues
Typology of LTCF	There are different type of LTCFs in European countries. In 2017, the ECDC classified European LTCFs in: - **General nursing homes**: residents need medical or skilled nursing and supervision 24h a day. These facilities provide principally care to seniors with severe illnesses or injuries; - **Residential homes**: residents are unable to live independently, require supervision and assistance for the activities of daily living. These facilities usually include personal care, housekeeping and three meals a day; - **Specialised LTCFs**: specialised in one specific type of care for e.g. physical impairment, chronic diseases such as multiple sclerosis, dementia, psychiatric illnesses, rehabilitation care, palliative care, intensive care; - **Mixed LTCFs**: these facilities provide different types of care in the same facility (a mix of the above mentioned LTCF types); - **Other facilities**: not classifiable among the above mentioned LTCF types
LTCF providers by organizational status and regulatory processes	- Most European countries face issues relating to **access to and financing of LTCF systems**: this is problematic, also regarding the quality of LTCF - There is a clear **trend towards privatization** of LTCFs: 57.8% of LTCFs in Europe are private - High incidence and expansion of **informal care** (family members, personnel often unpaid, absence of quality control) -
Standards of care and quality monitoring	- Low quality monitoring in European LTCFs: few countries systematically measure whether LTC is safe, effective, and centred around the needs of care recipients. - **Lack of standardized assessment tools** used by providers to monitor quality
Epidemiology of MDRO infections	- The crude prevalence of residents with at least one healthcare associated infections in LTCFs ranges from 0.4% to 7.1% (HALT-2 project). - Transfer from a LTCF represent the strongest risk factor for bacteremia due to **MDR Gram-negative bacilli** in hospital setting - Lack of reports about the **local epidemiology** of MDRO infections in LTCFs - Colonization of patients by MDRO favors the spread of resistant strains
Infection control	Strategies for infection control can greatly vary among LTCFs: - **Poor compliance** with infection control practices - Adherence to hand hygiene, management of urinary catheters and enteral feeding could great vary among LTCFs - LTCFs face difficulties in implementing all the core components for infection control programmes with **the limited resources available**
Antimicrobial stewardship programs	- Great variability in antibiotic consumption among LTCFs - Different AS programs - Different outcome measures for AS programs

LTCFs: long-term care facilities; MDRO: multidrug-resistant organisms

Algorithm for the optimal use of single rooms in long-term care facilities



- Patient's accommodation
- MDRO screening on admission,
- Management of patients with rectal colonization by MDROs
- Management of patients at high risk of MDRO infections

MDRO transmission by staff and implementation of antimicrobial stewardship are key actions useful for reducing infections by resistant organisms in this setting.

Conclusion

- Improve epidemiological data about MDR in NHs and in community
- Improve laboratory-based studies and characterization of the MDR found in NHs and in community
- Adequate methods to screen CRE gut carriage and colonization in the community (healthy people, travelers)
- Establish a strong link between healthcare settings and community to better define a joint collaboration for a better management of the diagnosis and infections in the transition of care
- A participatory and collaborative collaboration among Scientific Societies and government institutions is needed