



THE IMPACT OF ANTIMICROBIAL RESISTANCE ON CLINICAL OUTCOMES: RESULTS OF THE ITALIAN SPIN-UTI NETWORK

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Antimicrobial resistance: a global public health threat



Each year, about 25 000 patients die in the EU from an infection with the selected multidrug-resistant bacteria.

Infections due to these selected multidrug-resistant bacteria in the EU result in extra healthcare costs and productivity losses of at least EUR 1.5 billion each year.



Estimated minimum number of illnesses and deaths caused by antibiotic resistance*:

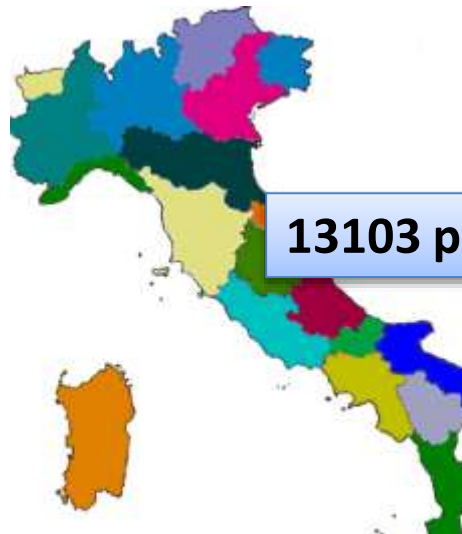
At least  **2,049,442** illnesses,
 **23,000** deaths

*bacteria and fungus included in this report

Burden of Six Healthcare-Associated Infections on European Population Health: Estimating Incidence-Based Disability-Adjusted Life Years through a Population Prevalence-Based Modelling Study

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13103 patients - 79 ICUs - 55 Hospitals

Trends, risk factors and outcomes of healthcare-associated infections within the Italian network SPIN-UTI

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Aim: to investigate the impact of HAI and of AMR on mortality and length of ICU stay, focusing on multidrug-resistant (MDR) *Acinetobacter baumannii* and *Klebsiella pneumoniae* HAIs in Italy

Control of intubator associated pneumonia in intensive care unit: results of the GISIO-SItI SPIN-UTI Project

Antonella Agodi,¹ Francesco Auxilia,² Martina Barchitta,¹ Marcello Mario D'Errico,³ Maria Teresa Montagna,⁴ Cesira Pasquarella,⁵ Stefano Tardivo,⁷ Ida Mura⁷ e GISIO-SItI^h

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Antibiotic consumption and resistance: results of the SPIN-UTI project of the GISIO-SItI
Consumo di antibiotici e resistenze: i risultati del progetto SPIN-UTI del GISIO-SItI

Antonella Agodi,¹ Francesco Auxilia,² Martina Barchitta,¹ Silvio Brusaferrero,³ Marcello Mario D'Errico,⁴ Maria Teresa Montagna,⁵ Cesira Pasquarella,^{6,9} Stefano Tardivo,⁷ Ida Mura,⁸ and the SPIN-UTI network and the GISIO Working Group of the Italian Society of Hygiene, Preventive Medicine and Public Health (SItI)

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Building a benchmark through active surveillance of intensive care unit-acquired infections: the Italian network SPIN-UTI[®]
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Validation of intensive care unit-acquired infection surveillance in the Italian SPIN-UTI network
M.D. Masia^a, M. Barchitta^b, G. Liperi^c, A.P. Cantù^d, E. Allia^e, F. Auxilia^f, V. Torregrossa^g, I. Mura^h, A. Agodi^{h,*} and Italian Study Group of Hospital Hygiene (GISIO)

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**1764 patients with an ICU-acquired infection
(13.5% of patients)**

Mortality

	2006-2007	2008-2009	2010-2011	2012-2013	2014-2015	All editions
All patients	17,7	18,3	18,2	17,9	18,8	18,1
Infected patients	34,8	44,1	44,7	31,9	37,7	38,1
Patients without infection	15,5	14,9	14,0	15,7	15,4	15,1
RR (CI95%)	2,476 (2,028-3,023)	3,526 (2,811-4,423)	3,623 (2,995-4,383)	2,031 (1,719-2,400)	2,449 (2,071-2,896)	2,529 (2,347-2,724)

Risk of death (all patients)

	<i>p-value</i>	HR	95% CI per HR	
			Inferior	Superior
SPIN-UTI edition	0,187	0,962	0,909	1,019
Mixed ICU	0,000	1,575	1,227	2,022
Type of admission (emergency)	0,005	1,355	1,096	1,676
Origin (Hospital)	0,425	0,918	0,744	1,133
Age > median value (69 years)	0,000	1,477	1,245	1,752
Gender	0,108	0,877	0,748	1,029
SAPS II > median value (38)	0,000	3,120	2,511	3,877
Trauma	0,035	0,705	0,510	0,975
Impaired Immunity	0,001	1,655	1,231	2,225
Antibiotic treatment (<48> hours from admission)	0,322	1,112	,901	1,372
Coronary care	0,006	1,420	1,104	1,828
Surgical treatment	0,324	0,906	0,745	1,102
HAI	0,942	1,007	0,841	1,205

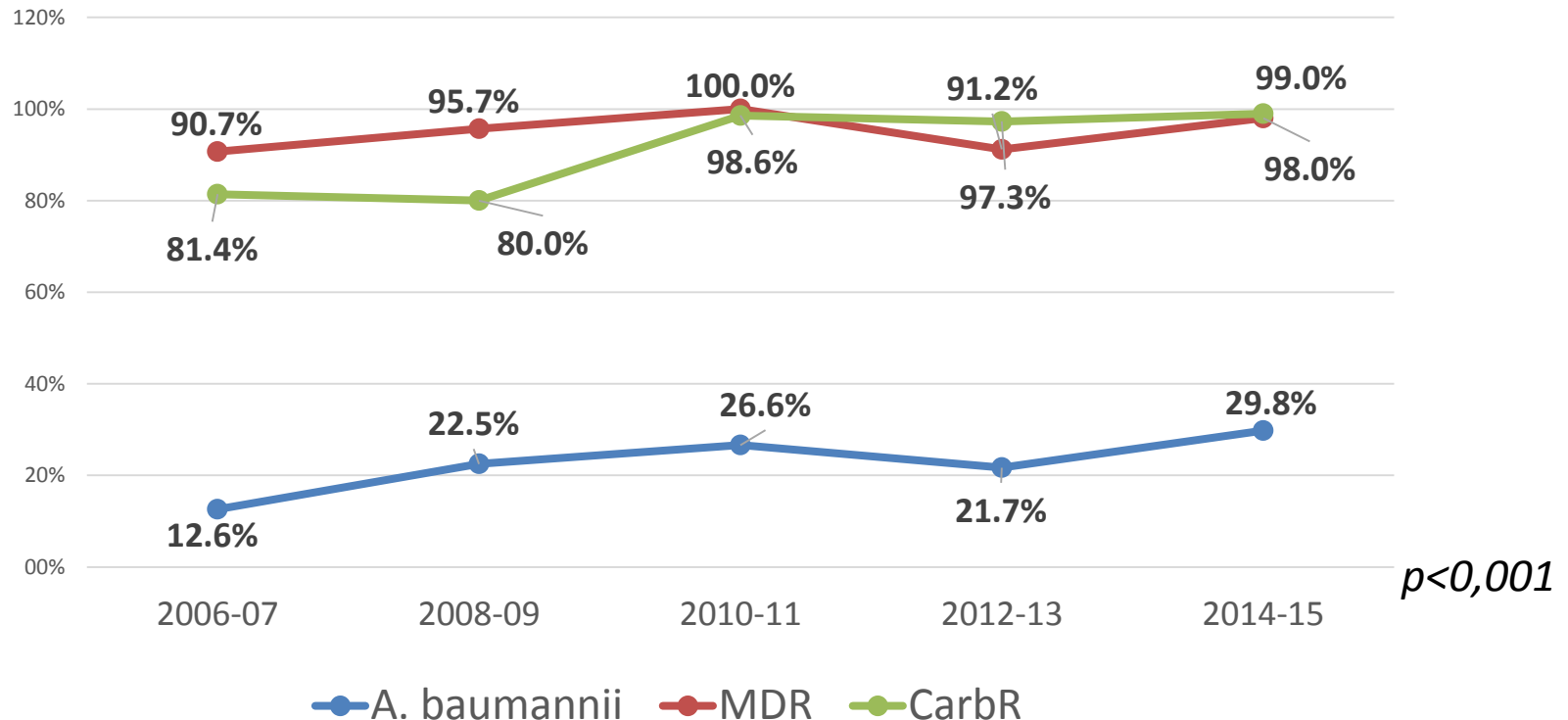
Cox Regression Model

A total of 38.8% of infected patients were infected by *A. baumannii* and/or *K. pneumoniae* (co-infection: 5.8%)

Incidence of patients with *A. baumannii*-HAI

Overall, 398 patients with *A. baumannii* infection:

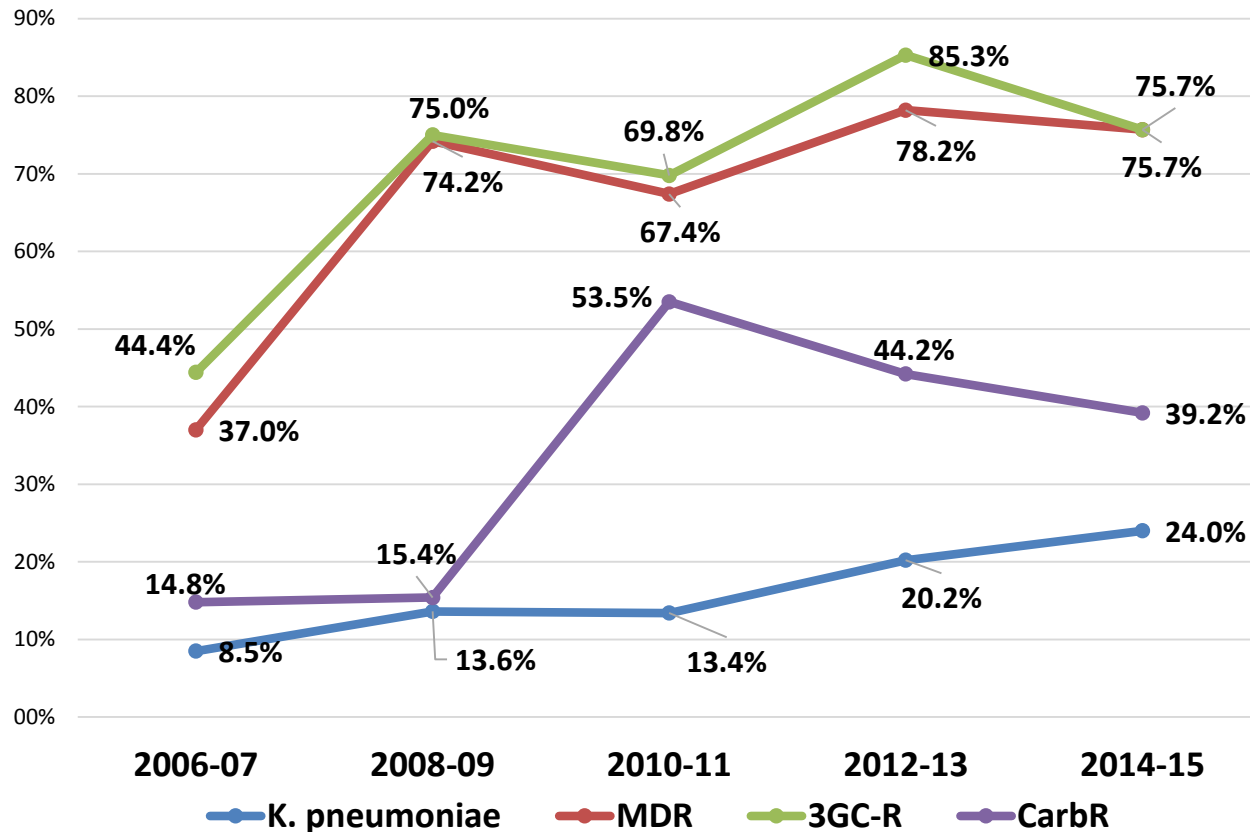
- 95.5% patients with MDR *A. baumannii* infection
- 93.7% patients with carbapenem-resistant *A. baumannii* (CarbR)



Incidence of patients with *K. pneumoniae*-HAI

286 patients with *K. pneumoniae* infection:

- 70.8% patients with MDR *K. pneumoniae*
- 74.1% patients with 3GC-resistant *K. pneumoniae*
- 47% patients with carbapenem-resistant *K. pneumoniae* (CarbR)



$p < 0,001$

Mean length of ICU stay after the first infection episod

Patients	Days	P-value
<i>A. baumannii</i> and/or <i>K. pneumoniae</i> vs. other microorganisms	20.1 vs. 16.7	<0.001
<i>A. baumannii</i> and <i>K. pneumoniae</i> (co- infection) vs. other microorganisms	33.9 vs. 16.7	<0.001
MDR <i>A. baumannii</i> e/o <i>K. pneumoniae</i> vs. other microorganisms	20.5 vs. 16.7	<0.001

The mean length of ICU stay was significantly greater in patients with *A. baumannii* and/or *K. pneumoniae* infection than length of ICU stay in patients infected by other microorganisms

Risk of death among infected patients

	p-value	HR	95,0% CI per HR	
			Inferior	Superior
<i>A. baumannii</i> and/or <i>K. pneumoniae</i> MDR	0,015	1,319	1,056	1,647
Age > median value (>69 years)	0,000	1,517	1,229	1,874
Gender (Female)	0,042	0,809	0,659	0,993
Patient origin from hospital	0,004	1,467	1,129	1,906
SAPS > median value (>38)	0,000	1,624	1,244	2,121
Trauma	0,047	0,661	0,439	0,995
Impaired immunity	0,035	1,423	1,026	1,973
Coronary care	0,021	1,391	1,050	1,842
Surgical treatment	0,866	0,982	0,796	1,211

Cox Regression Model

A. baumannii and/or *K. pneumoniae*: outcome

MDR

NON MDR

Propensity score matching

SPIN-UTI edition, SAPS score, antibiotic treatment,
surgical procedure, Mixed ICU, Trauma

53 cases

73 controls

Mortality: 43.4%

RR: 2.232
CI95%: 1.273-3.914
p=0.004

Mortality: 19.4%

Length ICU stay
(mean): 39 days

p<0,001

Length ICU stay
(mean): 18 days



Conclusions

- Significant burden of HAI caused by MDR *A. baumannii* and *K. pneumoniae* strains
- Higher mortality risk and length of ICU stay
- Need for effective efforts to prevent and control these infections

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Consumo di antibiotici e resistenze:
i risultati del progetto SPIN-UTI del GISIO-SItI

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No correlation between carbapenem and 3GC consumption and resistance rates of *A. baumannii* and *K. pneumoniae* isolates

ESCMID guidelines for the management of the infection control measures to reduce transmission of multidrug-resistant Gram-negative bacteria in hospitalized patients

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Participating Hospitals

Reference persons

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