2° CONGRESSO NEWMICRO

I laboratori di Microbiologia e la Clinical Governance

Il ruolo del microbiologo nell'*antimicrobial stewardship*

A. Camporese
SOC Microbiologia e Virologia
Azienda Ospedaliera S.Maria degli Angeli, Pordenone

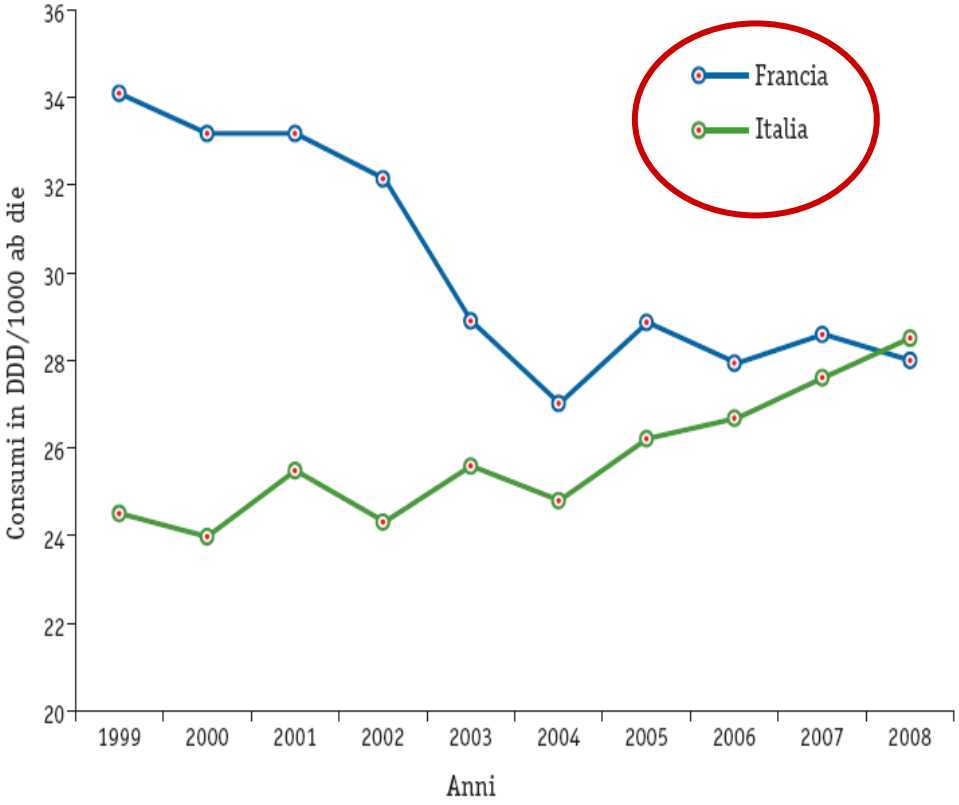
ANTIMICROBIAL USE (AND MISUSE) IN HOSPITALS

- Appropriate use of antimicrobial agents may improve patients outcomes and reduce hospital costs.
- It has been estimated than 50% of antimicrobial use in hospitals is inappropriate.
- Inappropriate antibiotic use has been associated with propagation of antimicrobial resistance and other adverse effects.

http://www.gnyha.org/antimicrobial/toolkit

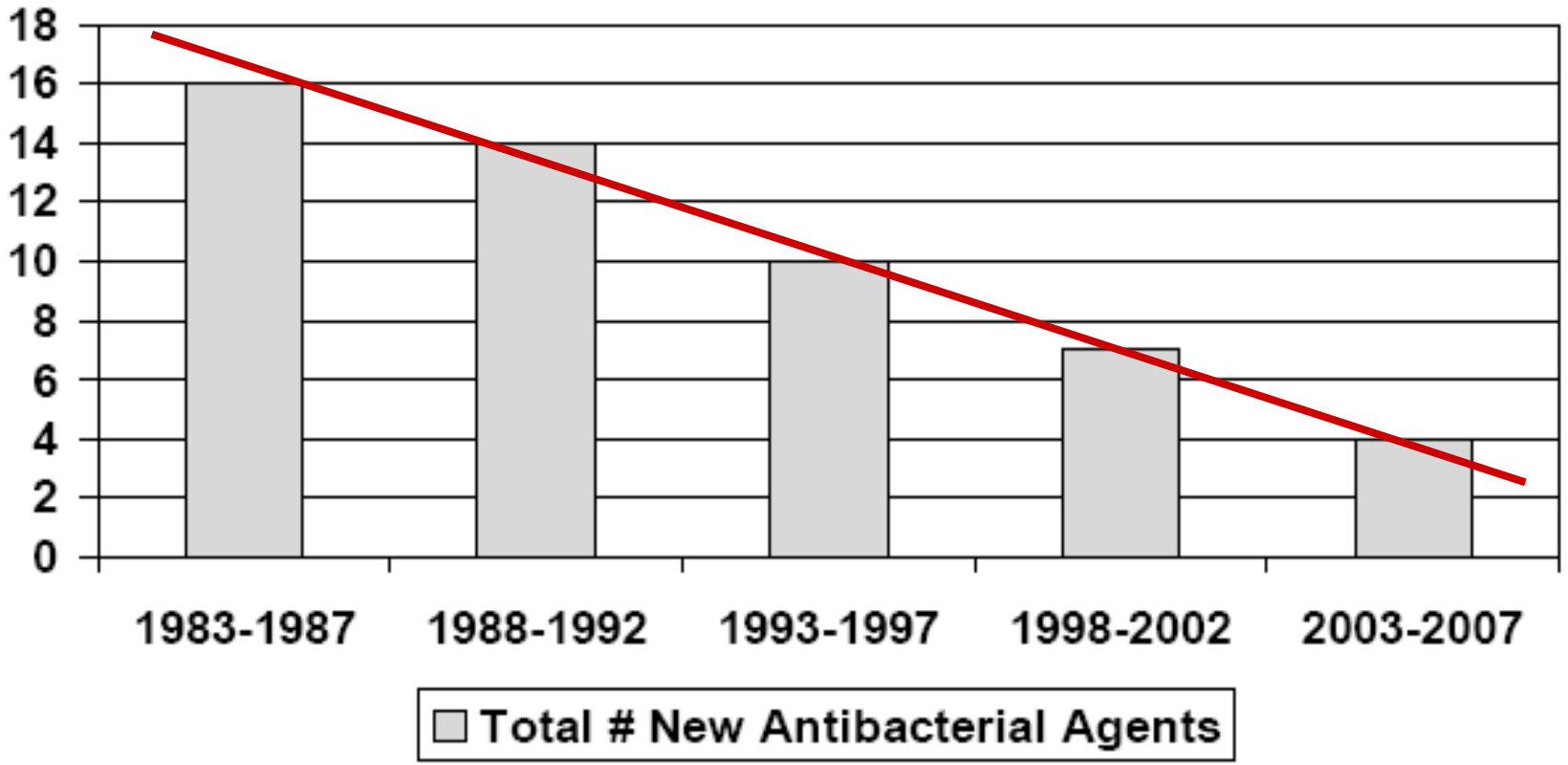
Il consumo territoriale italiano di antibiotici è uno dei più elevati in Europa, secondo solo a Cipro e Grecia, e con un trend in costante crescita (+22,2% dal 2000 al 2009).

Altri Paesi europei, che pur registrano consumi elevati, mostrano una riduzione nell'utilizzo di antibiotici: in Francia nel periodo 1999-2008 i consumi sono diminuiti del 18%.



Dossier antibiotici. Care I, 2011.

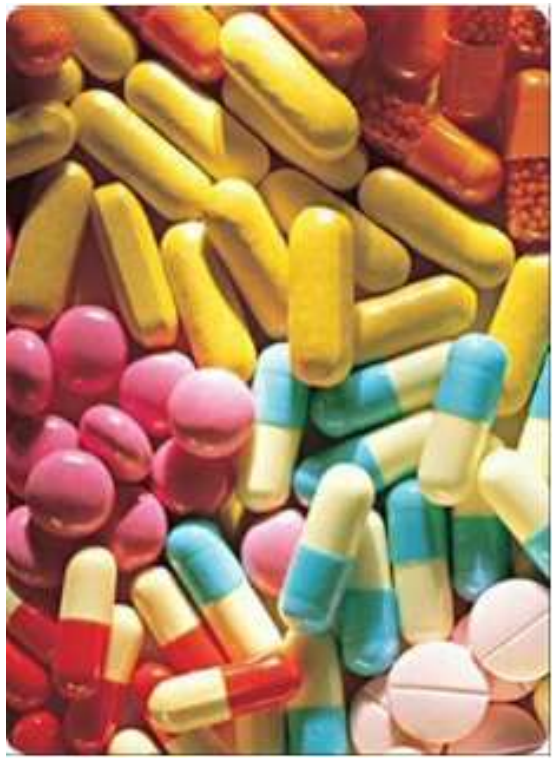
Total Approved Antibacterials: US



Adapted from Spellberg, et. al., 2004 CID;38:1279-86.*CID*

Antimicrobial stewardship - definition

- The optimisation of antibiotic utilisation
- The appropriate use of antibiotics and the limitation of unnecessary antibiotic administration and exposure
  - Optimising diagnosis
  - Selecting appropriate antibiotics
  - Optimal dosing



http://www.safetyandquality.gov.au

Clinical microbiology services involvement in ASM

The clinical microbiology service is an essential and integral part of a wide range of organisational initiatives that underpin antimicrobial stewardship efforts.

Australian Commission on Safety and Quality in Healthcare, 2011.
http://www.safetyandquality.gov.au

AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE

Antimicrobial Stewardship in Australian Hospitals

2011

Editors: **Margaret Duguid** and **Marilyn Cruickshank**

The CMS participate in a range of organisational AMS activities.

- Therapeutics committees
- Formulary controls
- Hospital antimicrobial education
- Surveillance of HAI
- Infection prevention and control
- Development of bundles and guidelines

Australian Commission on Safety and Quality in Healthcare, 2011.
http://www.safetyandquality.gov.au

The Clinical Microbiology Services participate in a range of clinical AMS activities.

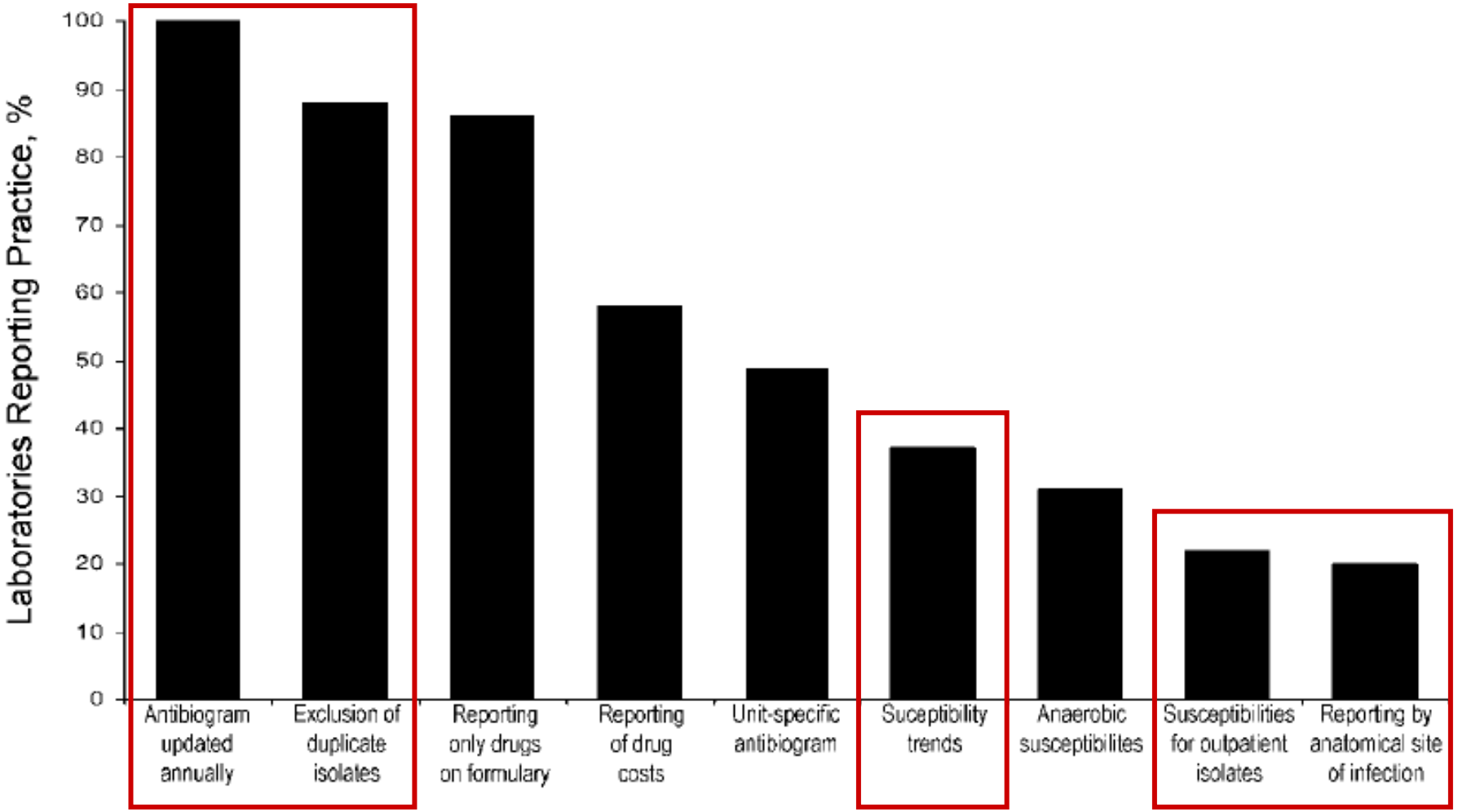
- Ensure local antimicrobial susceptibility reports;
- establish procedures for specimen collection, and incorporate them into AMS education activities;
- ensure and implement adequate analytical quality performance for organism identification and determination of antimicrobial susceptibility;
- ensure timely identification of microbial pathogens and resistance.

Australian Commission on Safety and Quality in Healthcare, 2011.
http://www.safetyandquality.gov.au

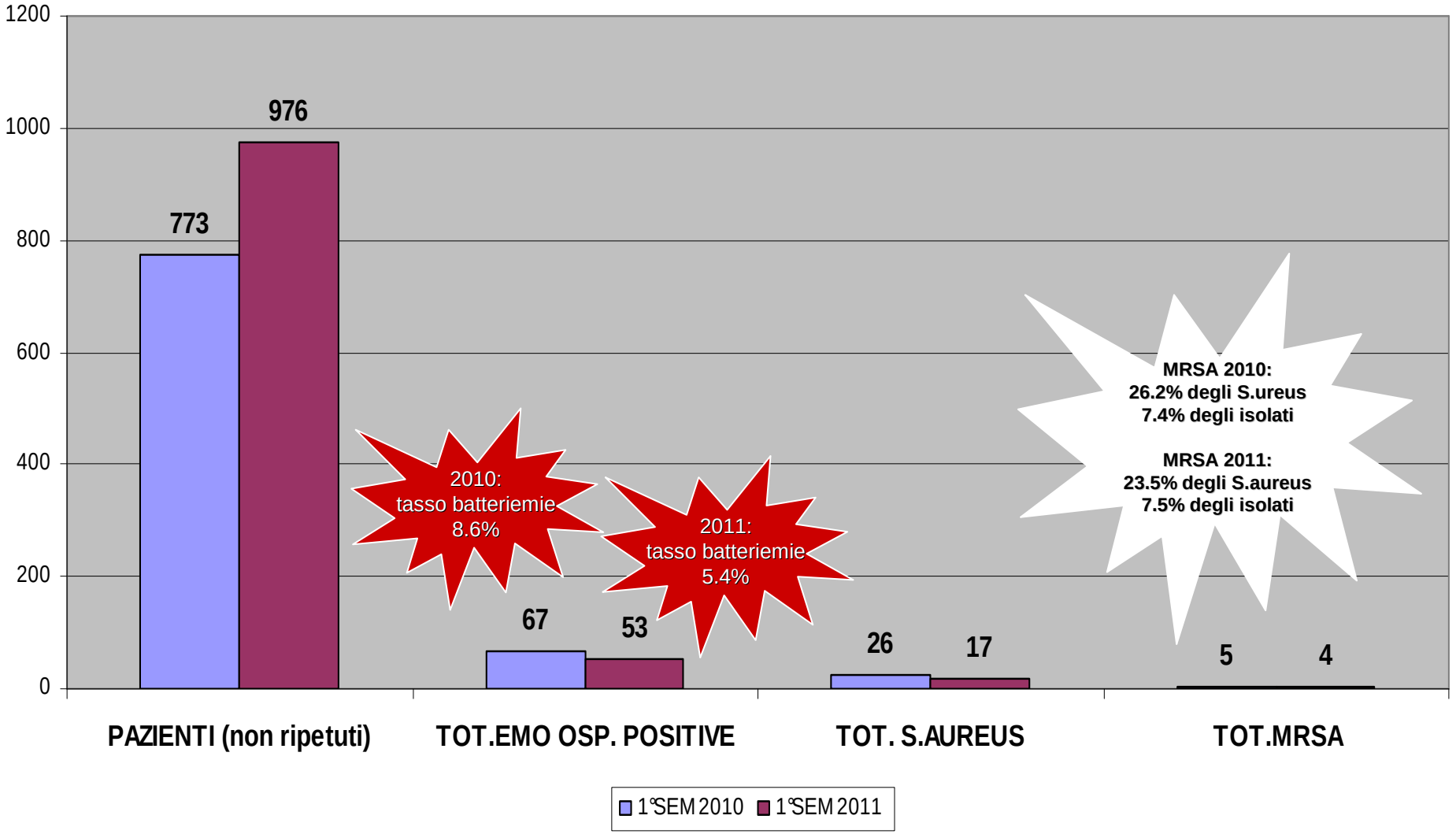
Ensure your local antimicrobial susceptibility reports !

Analysis and Presentation of Cumulative Antimicrobial Susceptibility Data: Substantial Variability Across Medical Centers in the United States.

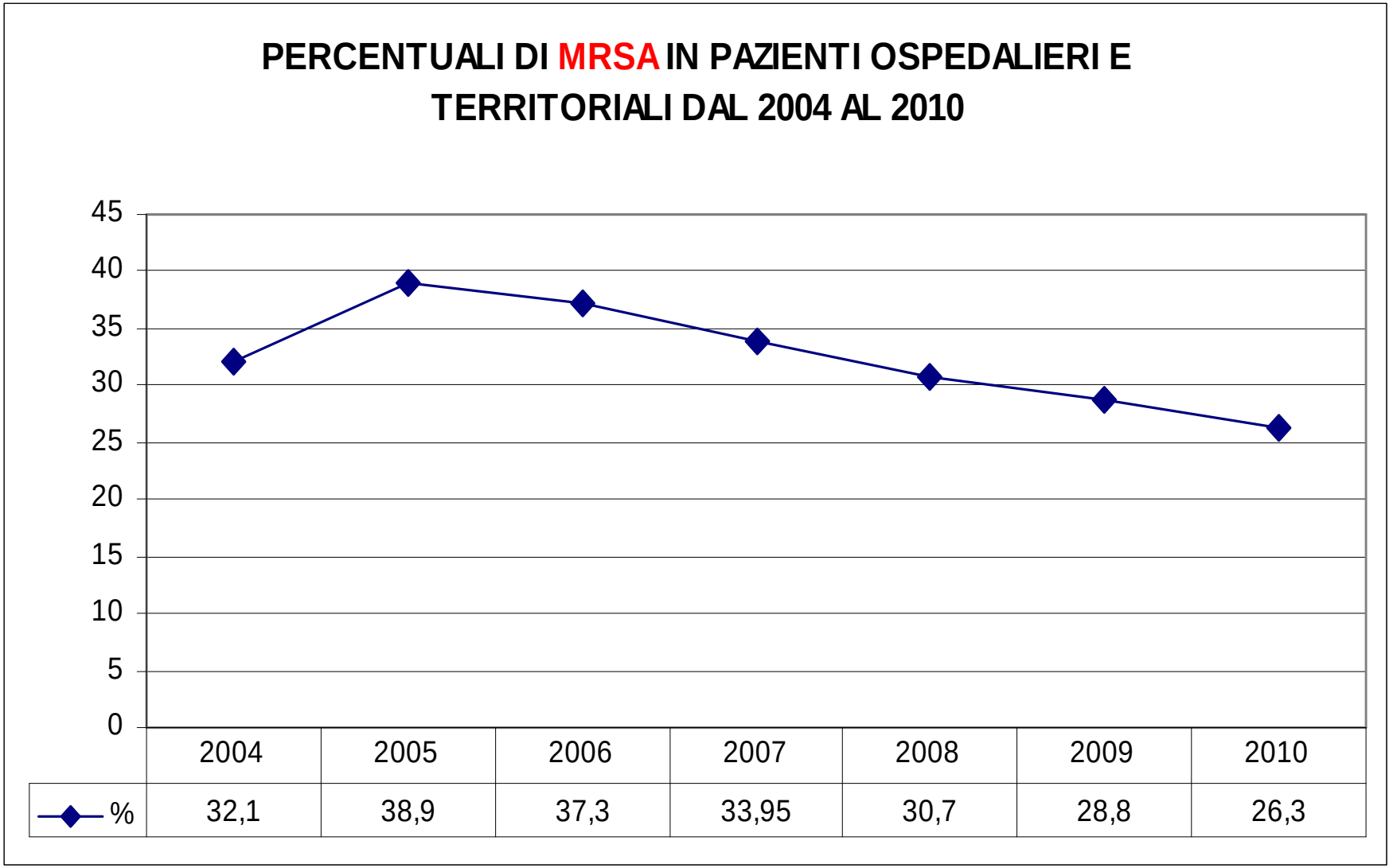
Lautenbach E and Nachamkin I. *Infect Control Hosp Epidemiol* 2006; 27:409-412



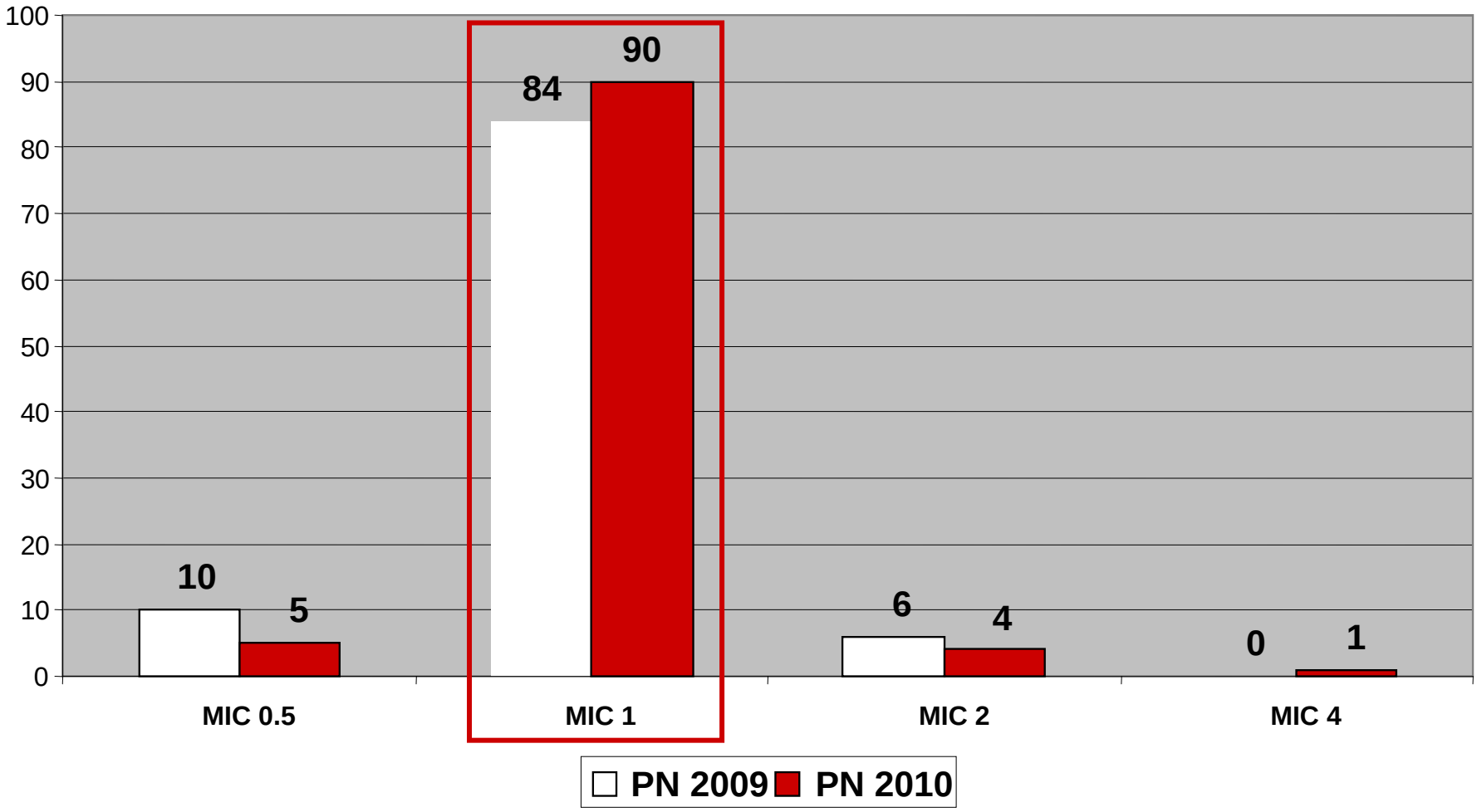
CONFRONTO BATTERIEMIE NEI PRIMI DUE SEMESTRI DI 2010 E 2011: PAZIENTI ANALIZZATI, EMOCOLTURE POSITIVE, POSITIVITA' PER STAPHYLOCOCCUS AUREUS E PER MRSA



MRSA decreasing trend in hospital



DISTRIBUZIONE DELLE MIC DI VANCOMICINA NEI CEPPI DI S.AUREUS ISOLATI A PORDENONE NEL BIENNIO 2009-2010



Ensure timely identification of microbial pathogens and resistance

	Survey anno 2001	Survey anno 2010	Laboratori di Microbiologia	Laboratori Generali
Non esamina le emocolture nei giorni festivi	**66.3%**	**48.1%**	**39%**	**50%**
Non esegue di routine l'esame microscopico	**13.9%**	**11%**	**-**	**-**
Non esegue Identificazioni dirette	**90.7%**	**67%**	**55.3%**	**74.2%**
Non esegue test di sensibilità diretti	**82.1%**	**71%**	**34.2%**	**56.5%**

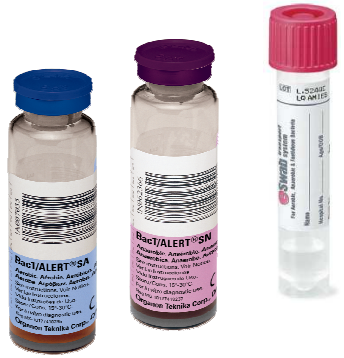
Modificato da: Goglio A, Nicoletti P. Survey of blood cultures methods in Italy in 2010. Microbiologia Medica 2011; 26 (3): 156-168.

Ensure analytical quality and procedures for specimen collection !

Specimen collection

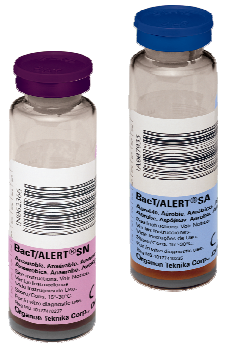
The Clinical Microbiology Services needs to provide education to clinicians about specimen collection and laboratory testing procedures.

Australian Commission on Safety and Quality in Healthcare, 2011.
http://www.safetyandquality.gov.au



Educational activity on specimen collection

Periodic summaries of blood culture contamination rates and analyses of organisms detected in particular specimen types provide useful feedback that can help modify practice.



Australian Commission on Safety and Quality in Healthcare, 2011.
http://www.safetyandquality.gov.au

Solitary blood cultures and blood cultures' contamination: results from 2003 to 2010

	2003	2008	2010
Solitary blood cultures	13.4%	7.1%	8.2%
Blood cultures' contamination (Weinstein MP. J Clin Microbiol, 2003)	4.4%	1.3%	1.7%

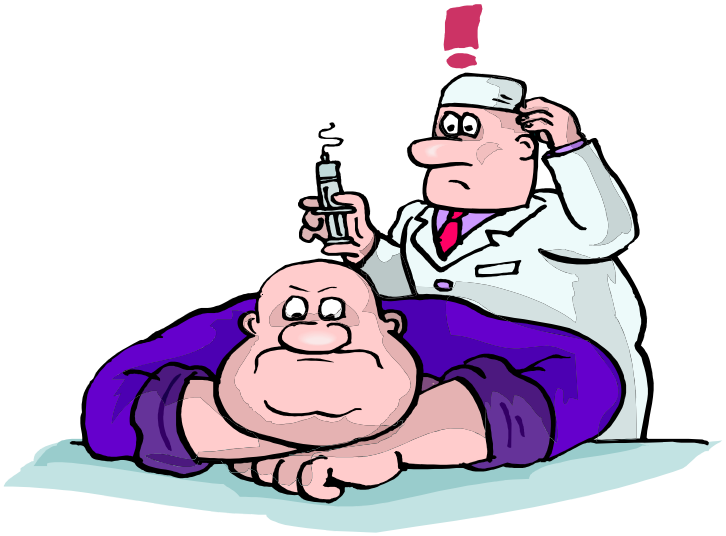
ISO 9001
ISO 15189
BUREAU VERITAS
Certification

Treat infection

not contamination or colonization

Naming a specific organism in a situation where it was unlikely to be a pathogen lead to inappropriate therapy…

Cunney RJ, Smyth EG. Antim Agents 2000;14: 13-19



Treat infection, not contamination or colonization

Treat bacteremia

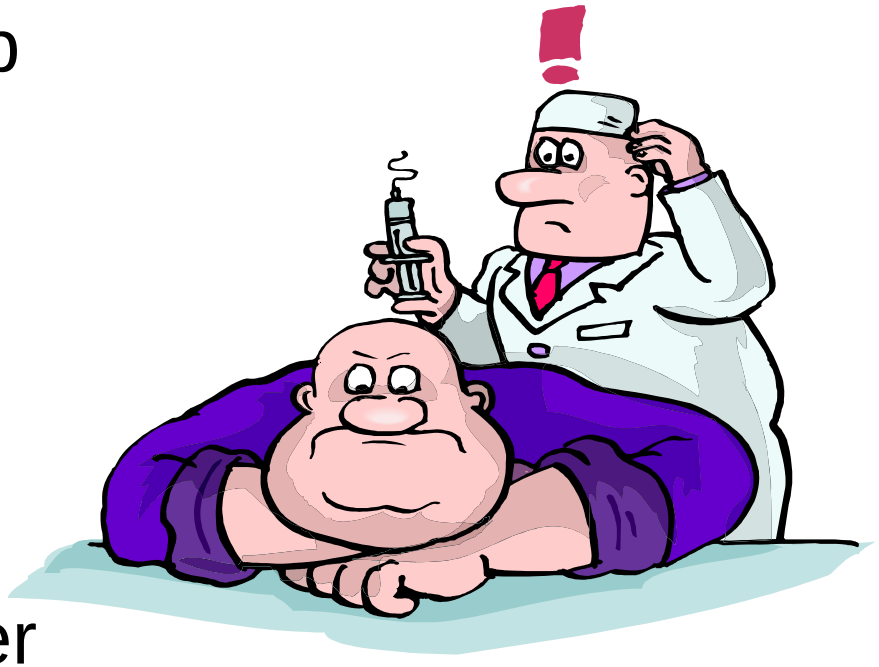
- not the catheter tip or hub
- not the skin flora

Treat pneumonia

- not the tracheal aspirate
- not endotracheal tube

Treat urinary tract infection

- not the indwelling catheter
- not simple bacteriuria



Australian Commission on Safety and Quality in Healthcare, 2011.
http://www.safetyandquality.gov.au

Appropriatezza e “forza” del referto

La “forza” dell’antibiogramma è paragonabile a una prescrizione medica.

Il laboratorio di microbiologia è un forte “induttore” di terapie antibiotiche, spesso inappropriate.

The Clinical Microbiology Services participate in a range of clinical AMS activities.

- Establish guidelines to limit unnecessary susceptibility testing and to relate results to the site of infection;
- update local antibiograms with pathogen-specific susceptibility data at least annually;
- use selective reporting of antimicrobial susceptibilities;
- implement new technologies to enable rapid analysis of specimens to either rule out or rule in infection.

Australian Commission on Safety and Quality in Healthcare, 2011.
http://www.safetyandquality.gov.au

Limit unnecessary susceptibility testing

- Vaginal specimens
- Mycoplasmas in genital specimens
- Co.neg. *Staphylococci*, viridans streptococci and *Streptococus agalactiae* in urethral and preputial specimens
- Local skin organisms, such as *Corynebacteria* spp, *Propionibacteria* spp, co.neg. *Staphylococci*, and viridans streptococci in superficial wounds and/or catheter exit sites
- *Staphylococcus aureus* throat and nasal colonization

Australian Commission on Safety and Quality in Healthcare, 2011.
http://www.safetyandquality.gov.au

Tampone vaginale, direttamente dalla Capitale…

Tipo campione: Tampone vaginale
Reparto ospedaliero: Non specificato
Provenienza corporea: Non specificato
Commenti campione:

Nome test	N isolato	Risultato
NMIC/ID-86	1	Completo
PMIC/ID-71	2	Completo

Nome organismo

1	Escherichia coli
2	Enterococcus faecalis

Commenti

Note del referto

1 Il breakpoint di cefuroxime si riferisce a un dosaggio di 1,5 g x 3/die.
2 Le combinazioni di aminoglicosidi con inibitori della parete cellulare (penicilline e glicopeptidi) sono sinergiche e battericide contro isolati sensibili agli inibitori della parete cellulare e non evidenziano resistenza ad aminoglicosidi di alto livello.

Antibiotico	1		2	
	MIC/*Conc.*	SIR	MIC/*Conc.*	SIR
Acido fusidico			4	R
Amikacina	<=4	S		
Amoxicillina-clavulanato	4/2	S		
Ampicillina	<=2	S	<=2	S
Aztreonam	<=1	S		
Cefepime	<=1	S		
Cefotaxime	<=1	S		
Cefoxitina			>8	R
Ceftazidime	<=0.5	S		
Cefuroxime	4	S		
Ciprofloxacina	<=0.125	S		
Clindamicina			>1	R
Colistina	<=1	S		
Ertapenem	<=0.25	S		
Fosfomicina c/G6P	<=16	S		
Gentamicina	<=1	S	2	R
Gentamicina-			<=500	S
Imipenem	<=1	S	<=2	S

Firma: _____

Dal giorno 8 Novembre 2011 l'antibiogramma verra' eseguito secondo gli standard interpretativi EUCAST.

N accesso: 11022992
Tipo campione: Tampone vaginale
Reparto ospedaliero: Non specificato
Provenienza corporea: Non specificato
Commenti campione:

Antibiotico	1		2	
	MIC/*Conc.*	SIR	MIC/*Conc.*	SIR
Levofloxacina	<=0.5	S		
Linezolid			1	S
Meropenem	<=1	S		
Piperacillina	<=4	S		
Piperacillina-tazobactam	<=4/4	S		
Teicoplanina			<=0.5	S
Tobramicina	<=1	S	4	R
Trimetoprim-sulfametoxazolo	<=1/19	S	<=1/19	R
Vancomicina			2	S

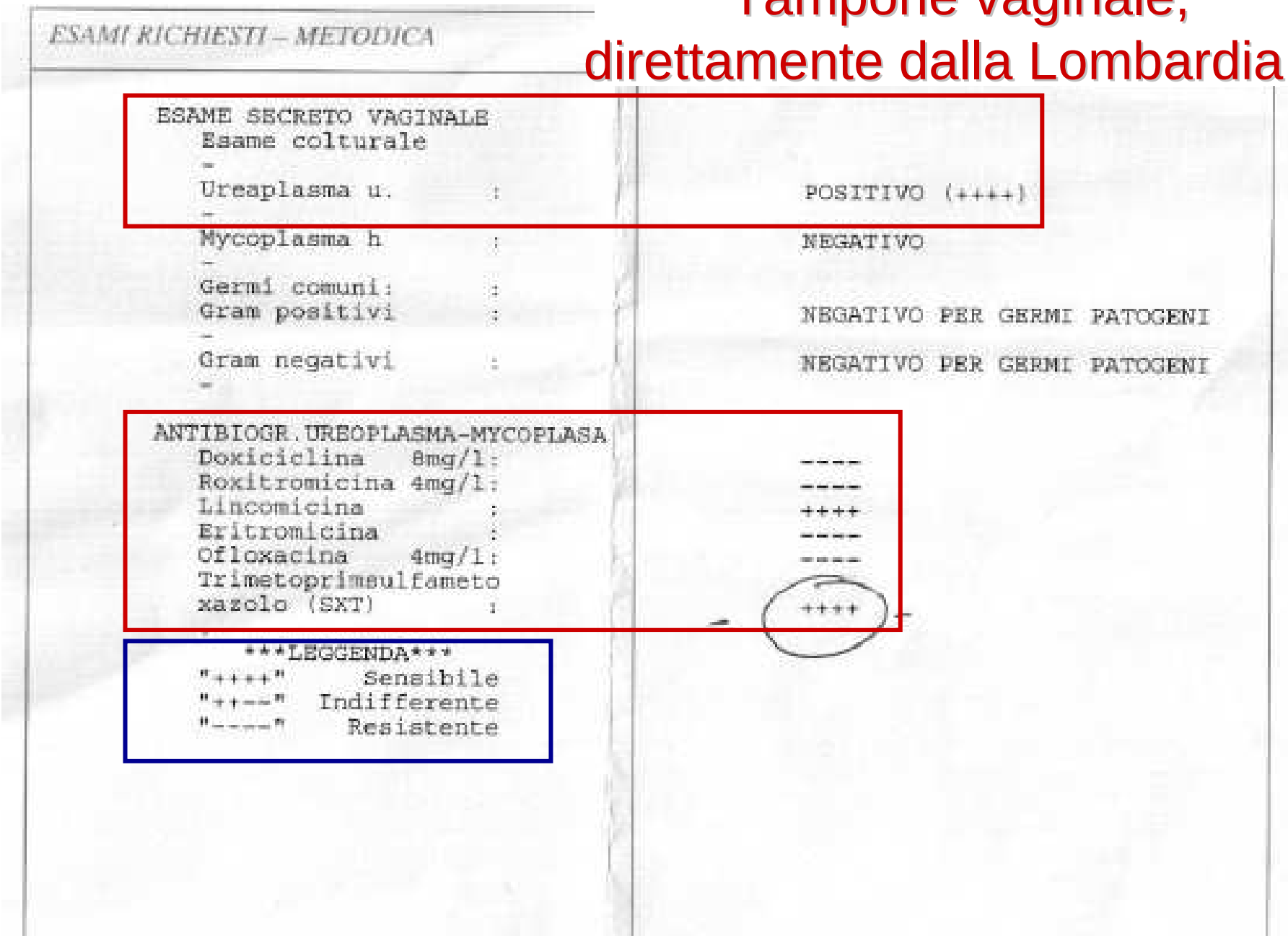
Tampone vaginale, direttamente dalla Lombardia…

INDAGINE RICHIESTA		
ES. BATTER. da TAMPONE VAGINALE		
Escherichia coli		negativo
Proteus sp.		negativo
Pseudomonas sp.		negativo
Gardnerella vaginalis		negativo
Staphylococcus aureus		negativo
Streptococcus faecalis (enterococco)		negativo
Neisseria gonorrheae		negativo
Streptococcus agalactiae (gruppo B)		negativo
Candida sp.		negativo
Trichomonas vaginalis		negativo
Mycoplasma hominis		negativo
Ureaplasma urealyticum		POSITIVO (discreto sviluppo)
Ricerca della CLAMYDIA		
Campione analizzato	IFA	TAMPONE VAGINALE
Esito		NEGATIVA
ANTIBIOGRAMMA MICOPLASMI		
Tetraciclina		resistente
Pefloxacina		SENSIBILE
Ofloxacina		resistente
Doxiciclina		resistente
Eritromicina		intermedio
Claritromicina		intermedio
Minociclina		intermedio
Josamicina		resistente
Clindamicina		resistente

M. parvum o *U.urealyticum*?

Azitromicina?

Tampone vaginale, direttamente dalla Lombardia…



ESAMI RICHIESTI – METODICA

ESAME SECRETO VAGINALE		
Esame colturale		
Ureaplasma u.	:	POSITIVO (++++)
Mycoplasma h	:	NEGATIVO
Germi comuni:	:	
Gram positivi	:	NEGATIVO PER GERMI PATOGENI
Gram negativi	:	NEGATIVO PER GERMI PATOGENI
ANTIBIOGR.UREOPLASMA-MYCOPLASA		
Doxiciclina 8mg/l	:	----
Roxitromicina 4mg/l	:	----
Lincomicina	:	++++
Eritromicina	:	----
Ofloxacina 4mg/l	:	----
Trimetoprimsulfameto xazolo (SXT)	:	++++

LEGGENDA

"++++" Sensibile
"++--" Indifferente
"----" Resistente

Use selective reporting of antimicrobial susceptibilities and relate results to the site of infection

- Respiratory tract infections
- Urinary tract infections
- Bacteriemia and systemic infections
- Bone and soft tissue infections
- Gram positive MDR infections
- Gram negative MDR infections

Implement new technologies to enable rapid analysis

The advance of molecular diagnostics allows the identification of difficult-to-culture pathogens, potentially avoiding the need for extended courses of broad-spectrum empirical therapy.

Dellit TH, et al. CID, 2007.

Implement new technologies to enable rapid analysis

The development of rapid testing will facilitate the surveillance of organisms, such as MRSA and *C.difficile*, allowing the more rapid implementation of infection control measures to prevent secondary spread.

Dellit TH, et al. CID, 2007.

The Clinical Microbiology Services participate in a range of clinical AMS activities.

Ensure reports with a range of comments:

- ✓that interpret isolate significance;
- ✓that help clinicians distinguish infection from contamination or colonisation;
- ✓that educate about not treating positive cultures in the absence of symptoms;
- ✓that provide specific directed treatment advice to direct antimicrobial therapy appropriately and to advise clinicians of relevant treatment guidelines (national and local) and optimal dosing.

Australian Commission on Safety and Quality in Healthcare, 2011.
http://www.safetyandquality.gov.au

The inclusion of interpretative comments can compensate for confusing reporting practices and produce more clinically relevant reports.

The lack of such interpretation may account for the mediocre impact of microbiology reports.

Cunney RJ, Smyth EG. Antim Agents 2000;14: 13-19

Trends in Blood Culture Contamination

A College of American Pathologists Q-Tracks Study of 356 Institutions

Leonas G. Bekeris, MD; Joseph A. Tworek, MD; Molly K. Walsh, PhD; Paul N. Valenstein, MD

Arch Pathol Lab Med—Vol 129, October 2005

Blood culture contamination is a common occurrence and may lead to confusion regarding the significance of a "positive" blood culture.

Example microbiology report comments that interpret isolate significance

Specimen type	Indication	Reporting comment
Blood	Isolate of potential contaminant organism(s) from non-ICU patient — mixed or isolated after prolonged incubation (> 1 day), not present in multiple sets	This isolate most likely represents contamination. To avoid contamination during blood culture collection, ensure: • collection is not done through pre-existing or new intravascular lines • hand hygiene is performed with alcohol-based hand rub prior to procedure, and wear protective eyewear • the skin site and blood culture bottle caps are disinfected with alcohol (applied for at least 1 minute) • sterile gloves and the no-touch technique for venipuncture are used • needle exchange prior to inoculation of bottle(s) is avoided.

Australian Commission on Safety and Quality in Healthcare, 2011.
http://www.safetyandquality.gov.au

Example microbiology report comments that interpret isolate significance

Specimen type	Indication	Reporting comment
Nonsterile site isolate	Antimicrobial susceptibility reported for information rather than to recommend treatment	The reporting of antimicrobial susceptibility does not imply that treatment with antimicrobials is necessary. Colonisation (as opposed to infection) does not require antimicrobial treatment.
Pus or sterile site aspirate, or tissue culture	Anaerobic isolates	Agents that are predictably active against gram-negative anaerobes (such as *Bacteroides* and *Prevotella* spp.) include metronidazole (12-hourly dosage recommended), lincomycin, clindamycin, amoxycillin/clavulanate, piperacillin/tazobactam, or ticarcillin/clavulanate. [*modify as per local formulary*]

Australian Commission on Safety and Quality in Healthcare, 2011.
http://www.safetyandquality.gov.au

There are several barriers to the wide implementation of a program to generate narrative interpretations in the clinical laboratory.

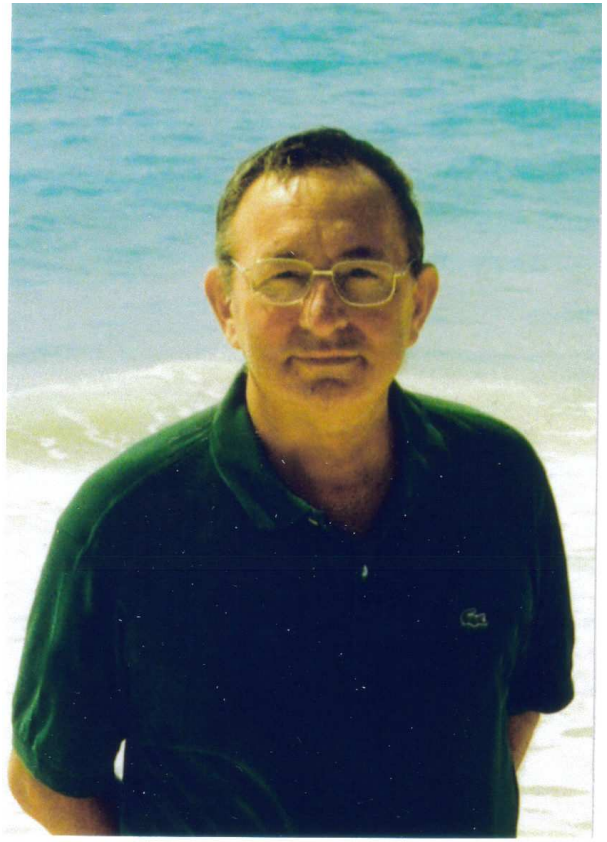
- The largest barriers is the lack of sufficient specialists to provide interpretations.

- As a second barrier…many laboratory directors are fearful of a subspecialist response that would be perceived as an invasion of “clinical turf”.

Laposata M. Clin Chem 2004; 50(3): 471-472

The microbiologist needs expertise in the pathophysiology of infectious diseases, pharmacokinetics, epidemiology and infection control.

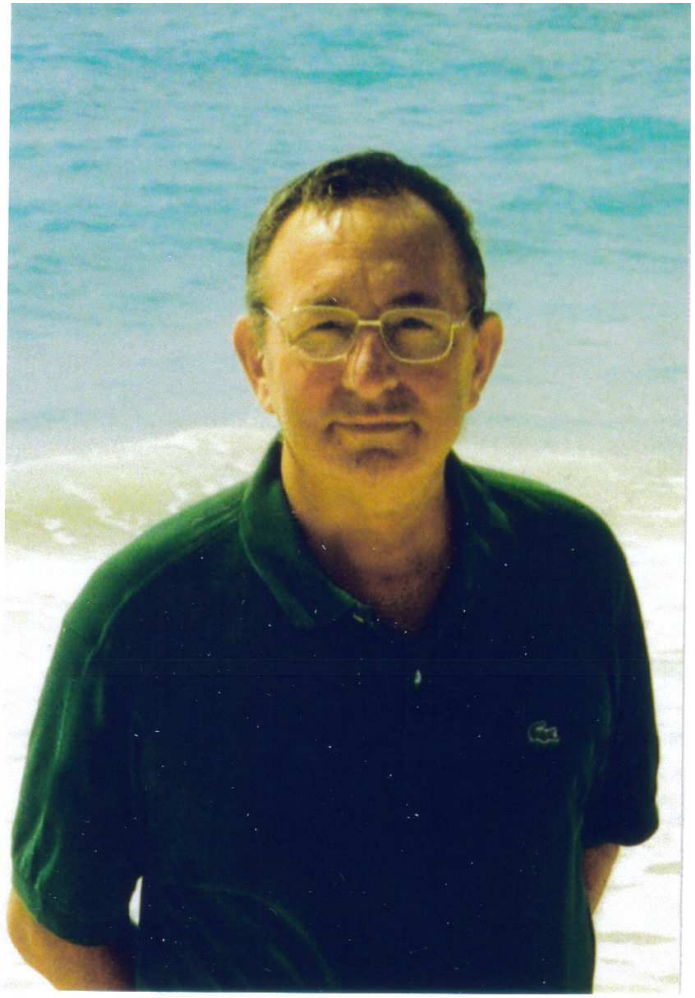
To remain competitive, future training programs need to teach expertise in all of these areas.



Robison A. J Clin Microbiol 1999; 37:883-889

Only individuals with the appropriate knowledge base, teaching skills and credentials will be accepted as true partners on the modern medical team.

American Academy of Microbiology 1998, www.asm.org



Vi ringrazio per l'attenzione

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