SERVIZIO SANITARIO REGIONALE
EMILIA-ROMAGNA
Azienda Unità Sanitaria Locale della Romagna

Appropriatezza e tempestività nella diagnostica microbiologica

il progetto Emo Fast

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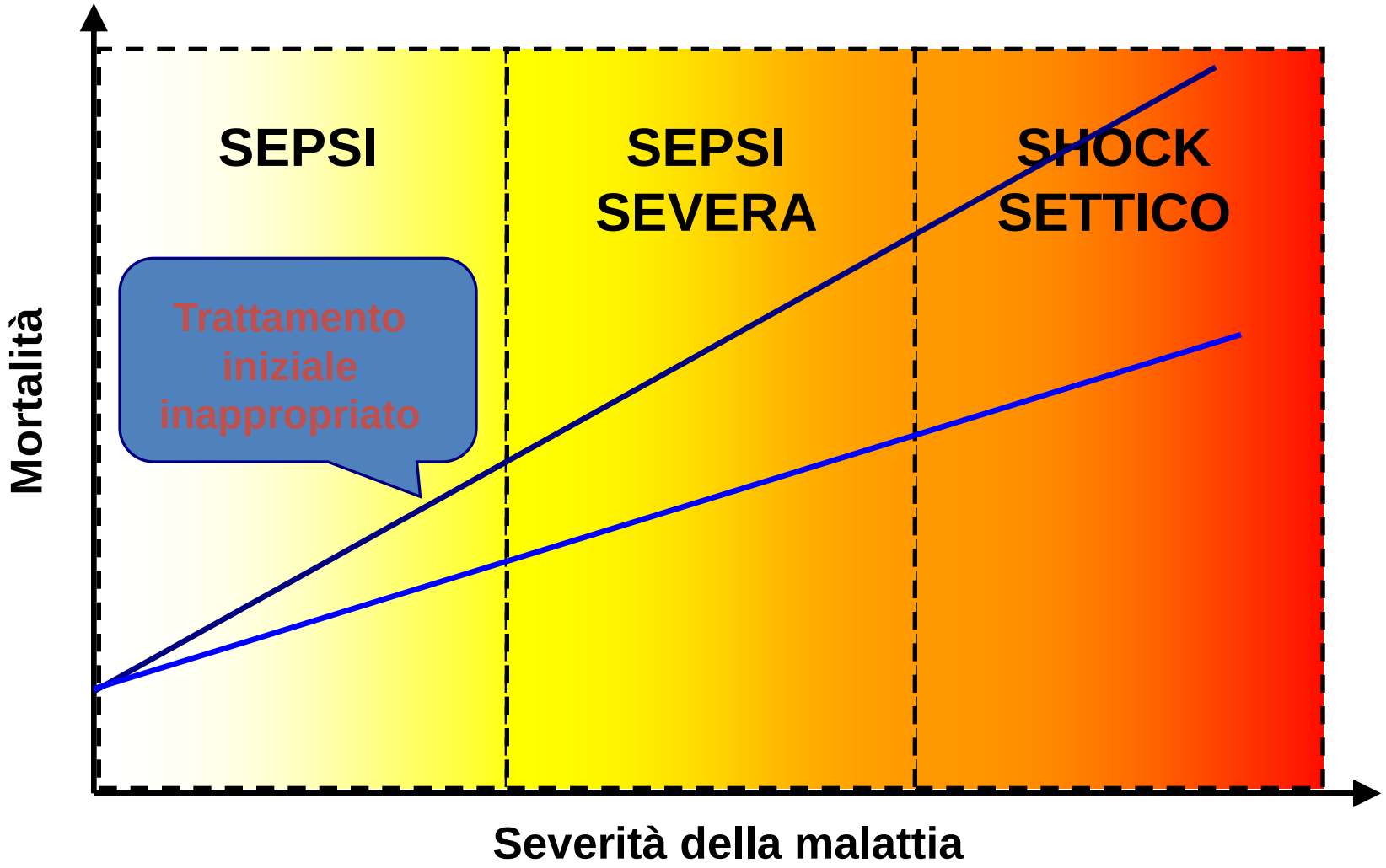
U.O. MICROBIOLOGIA
Pievesestina

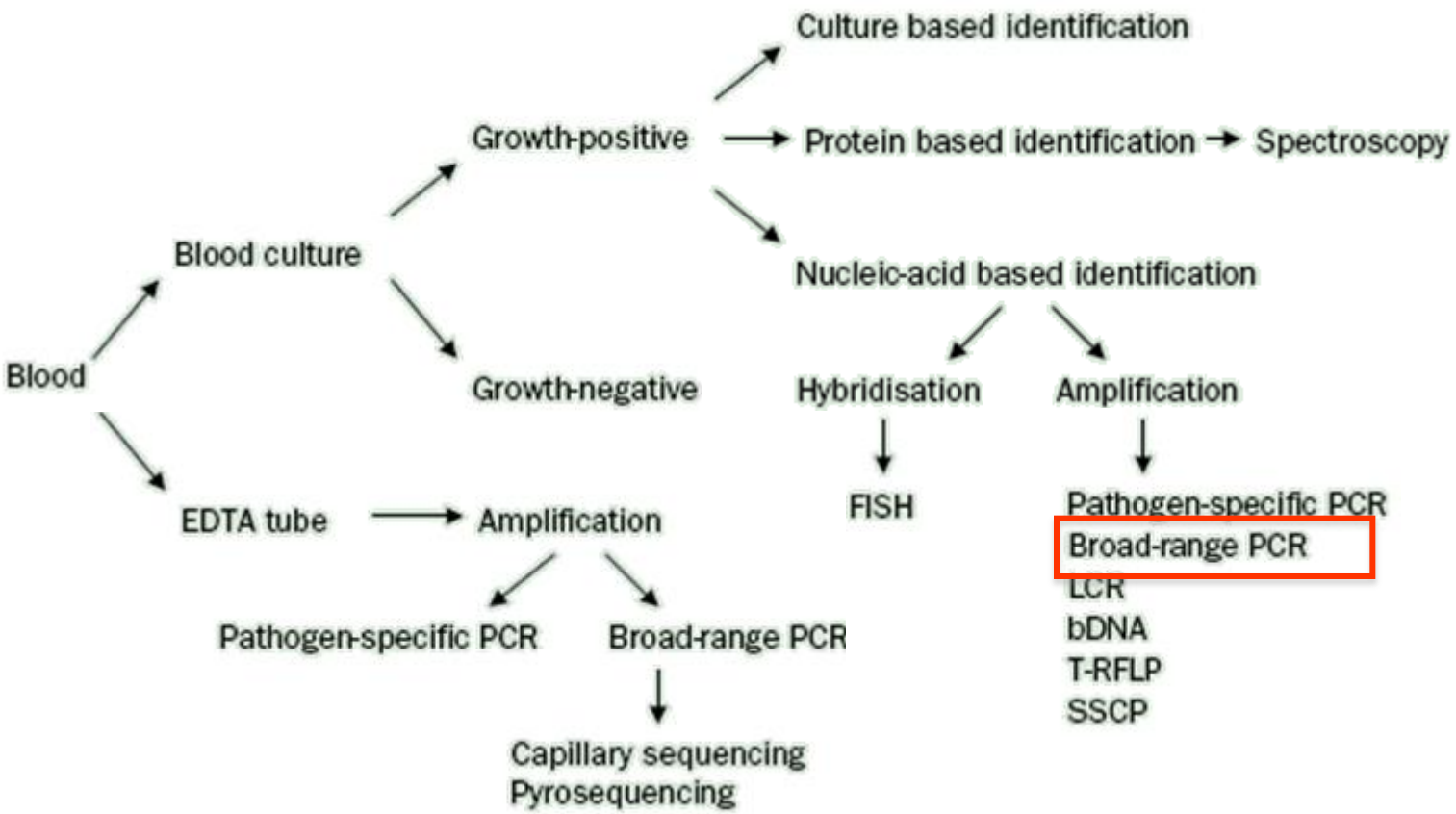
Rimini, 6 novembre 2014

Outcome clinico in pazienti settici



Diagnosi Microbiologica

Emocoltura – Biologia molecolare



Development of a Broad-Range 23S rDNA Real-Time PCR Assay for the Detection and Quantification of Pathogenic Bacteria in Human Whole Blood and Plasma Specimens

BioMed Research International
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http://dx.doi.org/10.1155/2013/264651

Paolo Gaibani,[1,2] Mara Mariconti,[3,4] Gloria Bua,[1] Sonia Bonora,[1] Davide Sassera,[3] Maria Paola Landini,[1] Patrizia Mulatto,[4] Stefano Novati,[4] Claudio Bandi,[3] and Vittorio Sambri[1]

Routine use of a real-time polymerase chain reaction method for detection of bloodstream infections in neutropaenic patients☆,☆☆

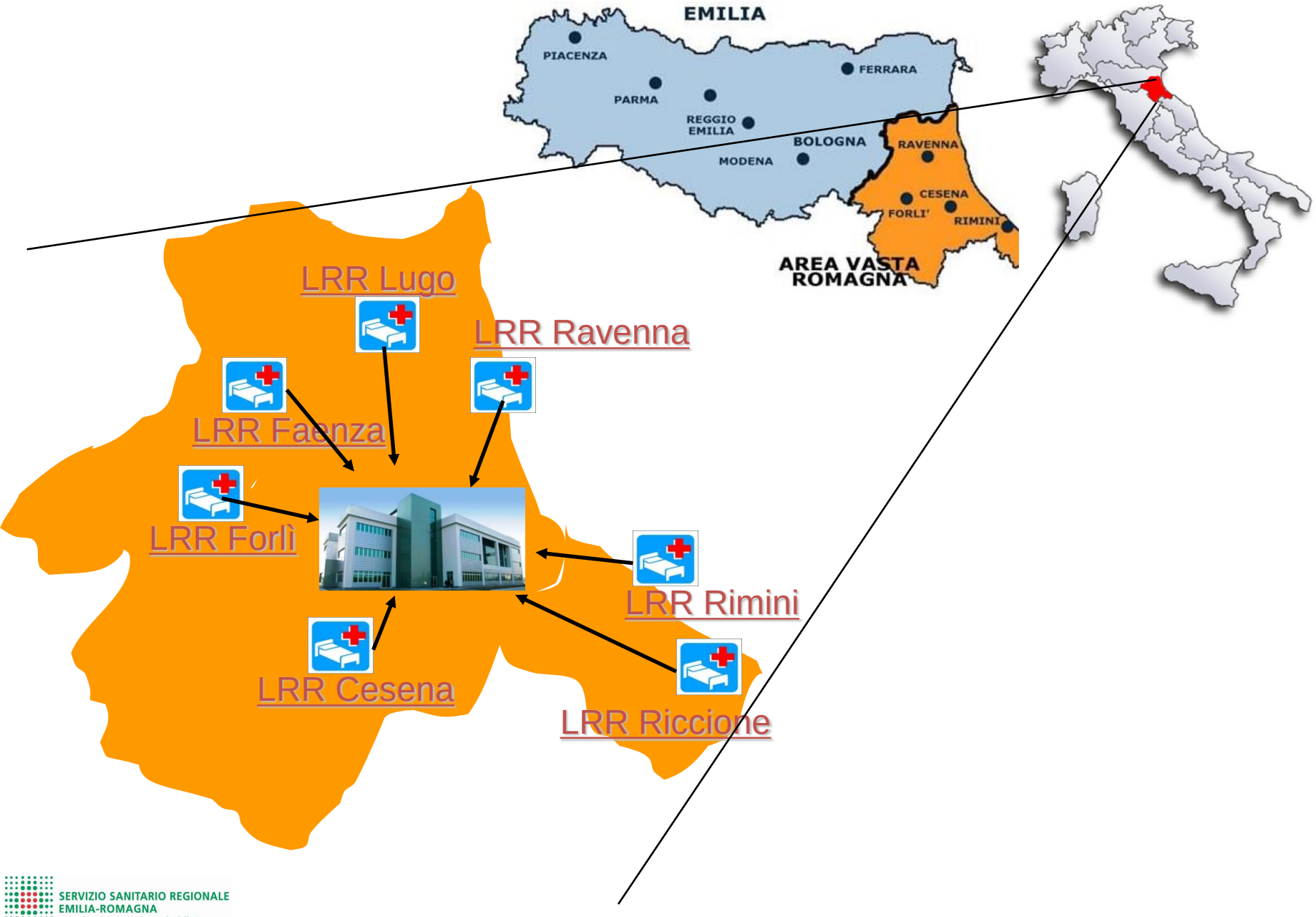
Michela Paolucci [a], Marta Stanzani [b], Fraia Melchionda [c], Giulia Tolomelli [b], Gastone Castellani [d], Maria Paola Landini [a], Stefania Varani [a], Russell E. Lewis [e], Vittorio Sambri [a,*]

Diagnostic Microbiology and Infectious Disease 75 (2013) 130–134

Real-time PCR test performance analysed by blood culture result.

Blood culture results	Sensitivity[a] (95% CI)	Specificity[a] (95% CI)	Positive predictive value[a] (95% CI)	Negative predictive value[a] (95% CI)
Gram positive ($n = 49$)	0.39 (0.25–0.53)	0.96 (0.92–0.98)	0.67 (0.48–0.83)	0.87 (0.82–0.91)
Gram negative ($n = 27$)	0.74 (0.53–0.88)	0.96 (0.92–0.98)	0.67 (0.47–0.82)	0.97 (0.94–0.99)
Fungi ($n = 2$)	0.50 (0.03–0.97)	0.99 (0.97–1.00)	0.5 (0.03–0.97)	0.99 (0.97–1.00)
Mixed pathogens ($n = 3$)	0.67 (0.13–0.98)	0.97 (0.93–0.98)	0.18 (0.03–0.52)	0.99 (0.97–1.00)
All pathogens ($n = 81$)	0.52 (0.41–0.63)	0.89 (0.84–0.92)	0.59 (0.47–0.70)	0.86 (0.81–0.90)

We examined the performance of a real-time polymerase chain reaction (PCR) test (Septi*Fast*) for early detection of bloodstream infection in febrile neutropaenic patients. Blood samples from 201 patients were screened for pathogens by blood culture and by PCR on the first day of fever. PCR results were available earlier (median 3 days for bacteria, 5 days fungal pathogens; $P \leq 0.01$). The sensitivity (0.74) and specificity (0.96) of the PCR test were acceptable for Gram negatives when culture was considered the gold standard, but sensitivity of the test was poorer for Gram-positive organisms (0.39). The PCR assay also led to 22.9% of invalid results. Septi*fast* speeds the microbiological diagnosis of bloodstream infection in neutropaenic patients. However, the frequent failure of instrumental control procedures, the relatively poor sensitivity of the test, and the lack of phenotypic data on antimicrobial susceptibility associated with its high costs suggest that this assay cannot replace the blood cultures.


EMILIA
PIACENZA
FERRARA
PARMA
REGGIO EMILIA
BOLOGNA
MODENA
RAVENNA
CESENA
FORLI'
RIMINI
AREA VASTA ROMAGNA
LRR Lugo
LRR Ravenna
LRR Faenza
LRR Forlì
LRR Rimini
LRR Cesena
LRR Riccione


Laboratorio Unico
LRR Lugo
LRR Faenza
LRR Ravenna
LRIF Pievesestina
Corelab
Microbiologia
Genetica Medica
LRR Forlì
LRR Rimini
LRR Cesena
LRR Riccione

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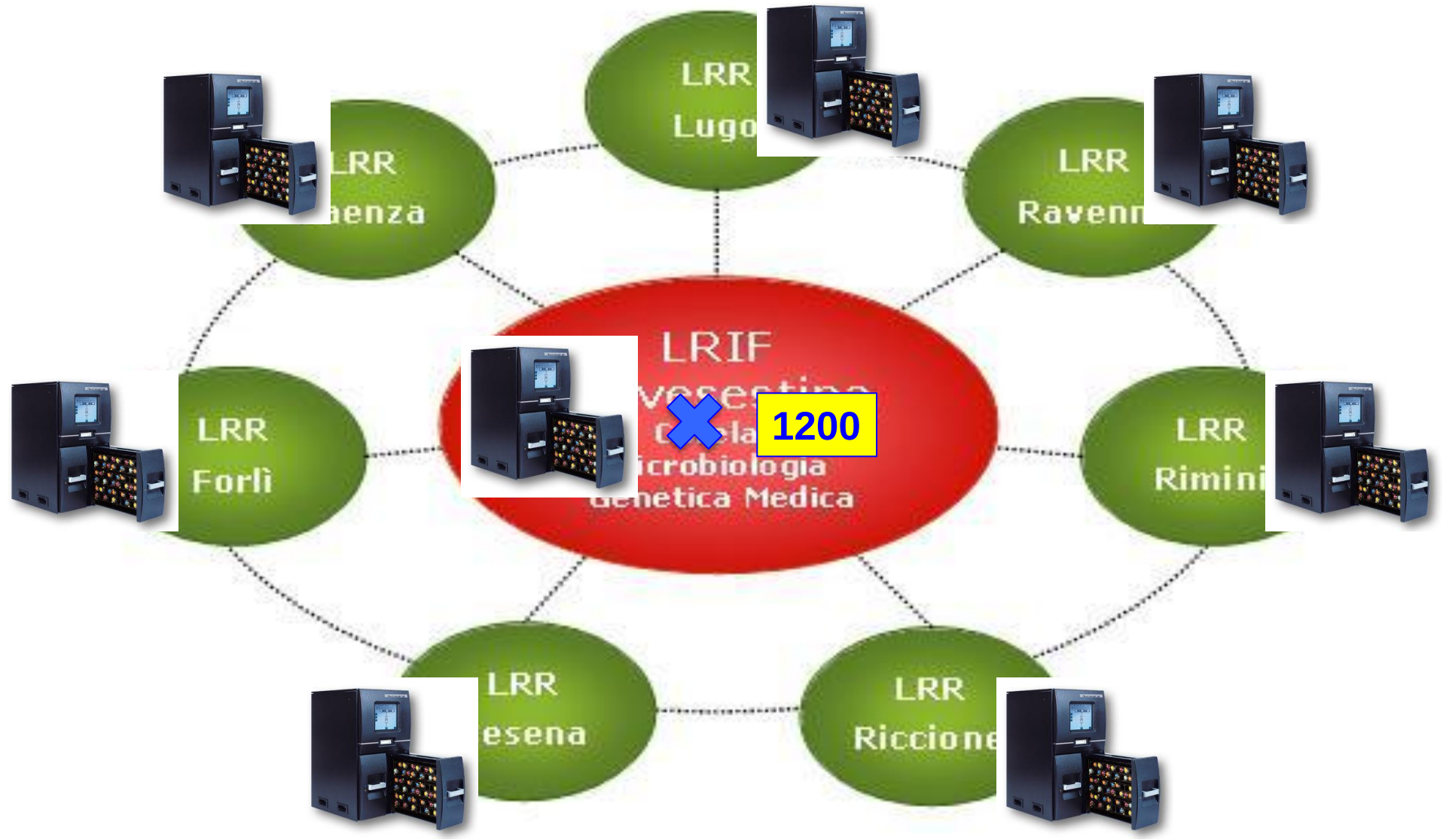
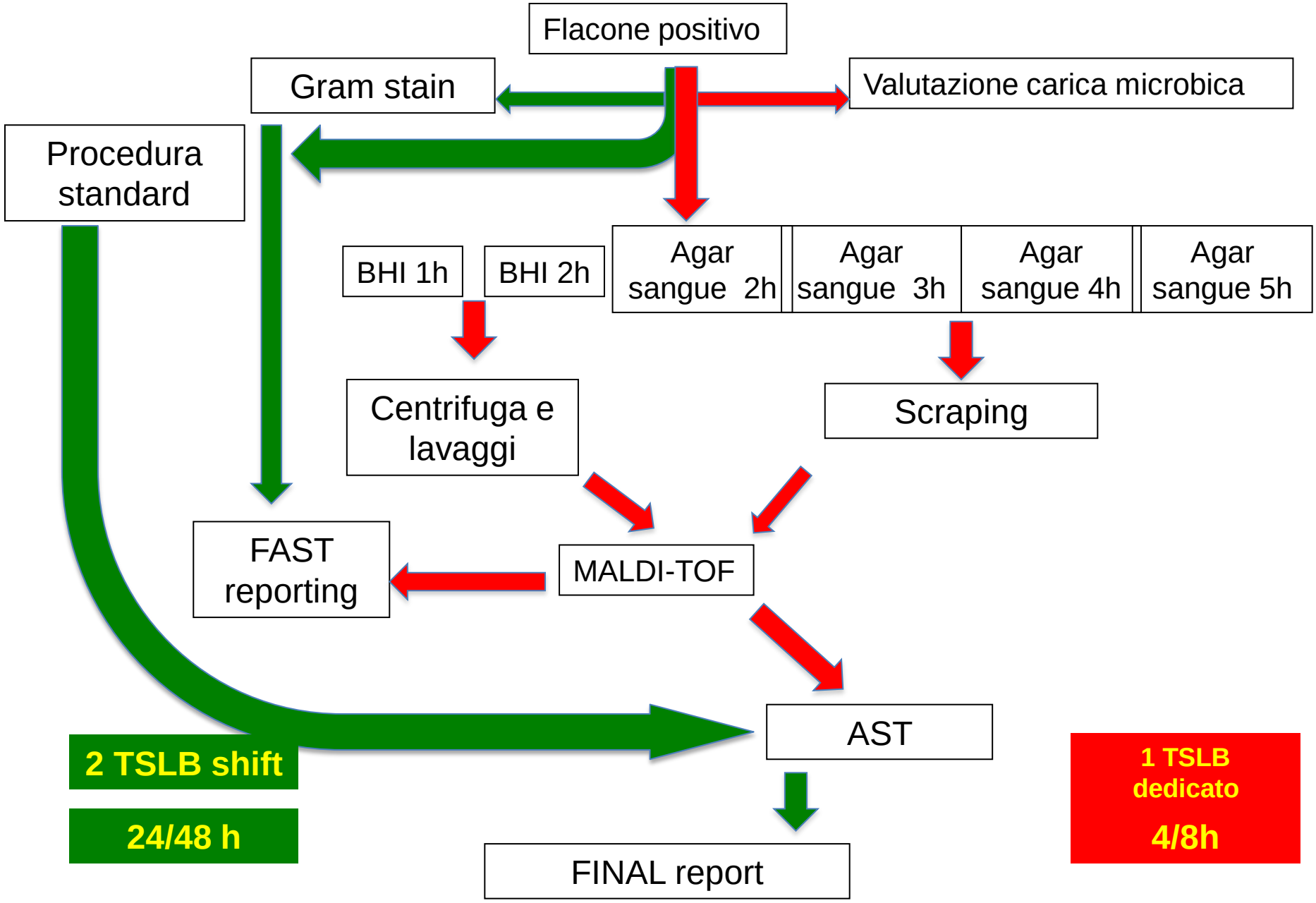



Flacone positivo
Gram stain
Valutazione carica microbica
Procedura standard
BHI 1h
BHI 2h
Agar sangue 2h
Agar sangue 3h
Agar sangue 4h
Agar sangue 5h
Centrifuga e lavaggi
Scraping
FAST reporting
MALDI-TOF
AST
2 TSLB shift
24/48 h
1 TSLB dedicato
4/8h
FINAL report

- Flaconi positivi/giorno: 60-120 (88)
- MALDI TOF:
  - Almeno 2/4(6)
  - Monomicrobica (Gram)
  - Flaconi con resina
  - Selezione Clinica del paziente (?)
  - Contaminazione (?)

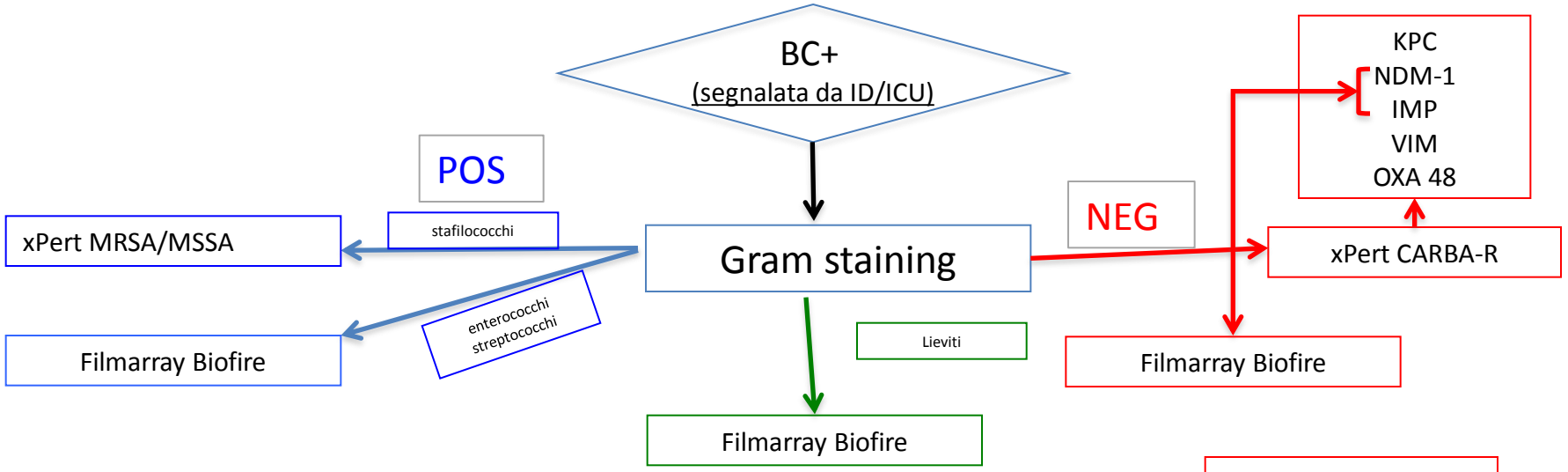
PROBLEMI APERTI

- Emocolture
  - Incubazione h 24/7 nei LRR
  - Trasporto dei SOLI positivi su HUB
  - Discrepanza di orario HUB/SPOKE (sabato pomeriggio…..lunedi mattina)
  - **Requisito di accreditamento** RER ("evidenza di misure che impediscano la interruzione dei flussi diagnostici")

PROBLEMI APERTI: SOLUZIONI

- Emocolture
  - Migliorare la gestione dell'incubazione (sia in HUB che negli spoke)
  - MALDI ToF
  - Algoritmo EMO FAST
  - Biologia Molecolare negli spoke
  - Apertura Domenicale….


Laboratorio Unico
LRR
Lugo
LRR
Ravenn
LRR
Forlì
LRIF
1200
LRR
Rimini
LRR
esena
LRR
Riccione



xPert CARBA-R:
CPR ma non ID batterica

xPert MRSA/MSSA: MRSA/MSSA e CoNS

Filmarray Biofire:
- *S.aureus*
- CoNS
- *Enterococcus* spp.
  Streptococcus spp.
- *S.pneumoniae*
- *S.pyogenes*
- *S.agalactiae*
- *L. monocytogenes*
- Meticillina resistenza
- Vancomicina resistenza

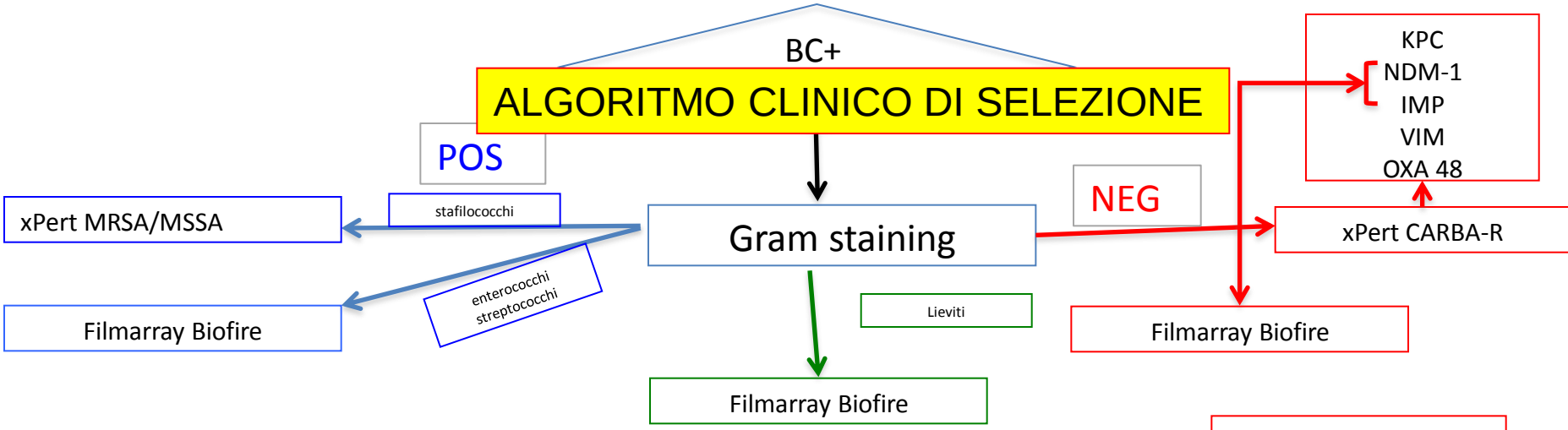
Filmarray Biofire:
- *C.albicans*
- *C.glabrata*
- *C.krusei*
- *C.parapsilosis*
- *C.tropicalis*

Filmarray Biofire:
- *Acinetobacter baumanni*
- Enterobacteriaceae
- *Enterobacter cloacae*
- *Proteus* spp.
- *E.coli*
- *K.pneumoniae*
- *K.oxytoca*
- *P.aeruginosa*
- *Serratia* spp.
- *N.meningitidis*
- *H.influenzae*
- KPC

EMO FAST 1.0

- 28 segnalazioni (!!!!)
  - 14 positivi
  - 14 negativi
  - 13 identificati correttamente (Capnocytofaga canimorsus)
  - 3 infezioni miste
  - TAT medio 2 ore (da positività)

EMO FAST 2.0



xPert MRSA/MSSA: MRSA/MSSA e CoNS

xPert CARBA-R:
CPR ma non ID batterica

Filmarray Biofire:
- *S.aureus*
- CoNS
- *Enterococcus* spp.
  Streptococcus spp.
- *S.pneumoniae*
- *S.pyogenes*
- *S.agalactiae*
- *L. monocytogenes*
- Meticillina resistenza
- Vancomicina resistenza

Filmarray Biofire:
- *C.albicans*
- *C.glabrata*
- *C.krusei*
- *C.parapsilosis*
- *C.tropicalis*

Filmarray Biofire:
- *Acinetobacter baumanni*
- Enterobacteriaceae
- *Enterobacter cloacae*
- *Proteus* spp.
- *E.coli*
- *K.pneumoniae*
- *K.oxytoca*
- *P.aeruginosa*
- *Serratia* spp.
- *N.meningitidis*
- *H.influenzae*
- KPC

EMO FAST 3.0

ALGORITMO CLINICO DI SELEZIONE