Surveillance EARS : l'Europe des nations

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Surveillance de la résistance en Europe (European Union/European Economic Area) (EU/EEA)

- Principaux commensaux et saprophytes : EARSS (commission européenne DG Santé) 1999 → Ears-net (ECDC) 2010

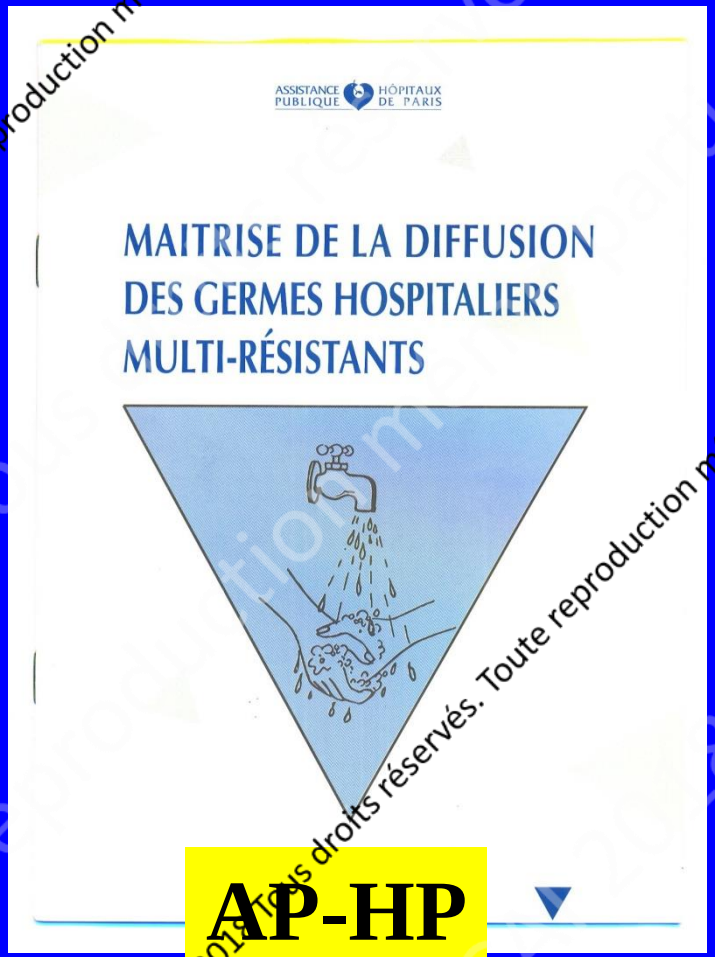
- Gonocoque : ECDC 2009 → European Gonococ. Antimicrob. Surv. Progr. (Euro-GASP, ECDC) 2016

- *M.tuberculosis :* EURO-TB 1996 → ECDC/WHO 2008

EARSS – Ears-net : inclusion des espèces

- *S.aureus, S. pneumoniae : 1999*
- *E.coli, Enterococci : 2001*
- *K.pneumoniae, P.aeruginosa : 2005*
- *Acinetobacter 2014*

Recommandations françaises pour contrôler la diffusion des bactéries résistantes (SARM, EBLSE



AP-HP 1993

National 1999

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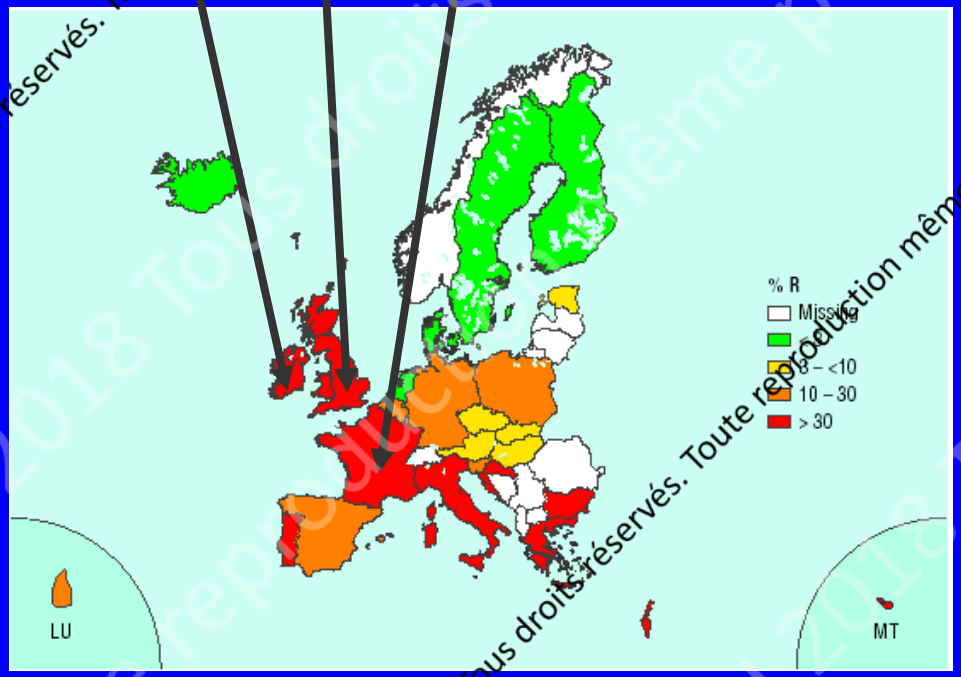
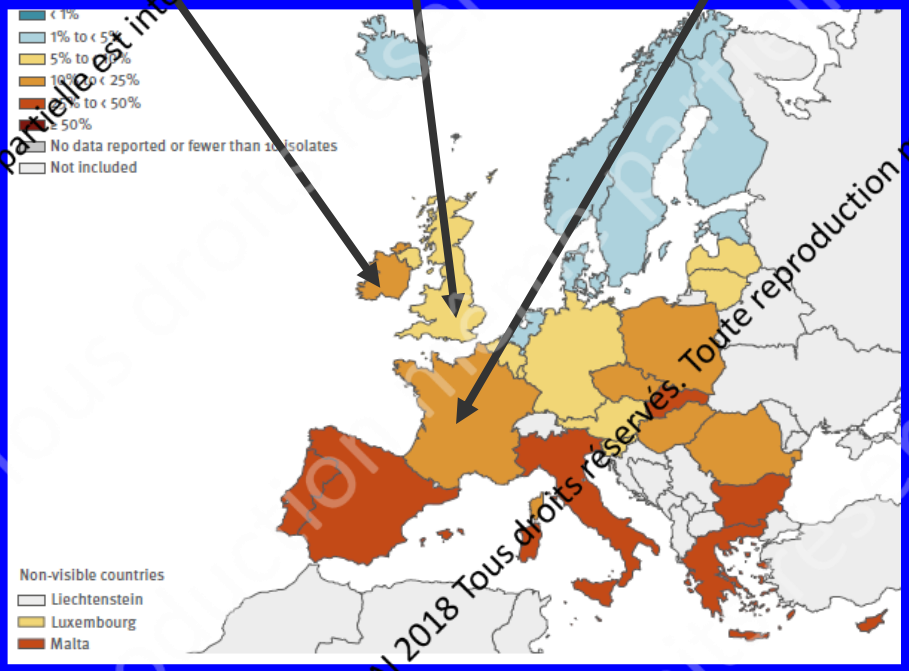
% MRSA in *S.aureus* in bacteremias Europe - EARS-net 2001-2017



2001



2017

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Evolution of MRSA % in *S.aureus* in Europe
Bacteraemias, EARS-net 2001-2017

Country	N° *S.aureus*/Y	2001	2011	2017	2001-17
UK	2000-3000	**45**	**14**	**7**	**- 85%**
France	4000- 5000	**33**	**20**	**13**	**- 61%**
Belgium	1000-1300	**23**	**17**	**9**	**- 61%**
Germany	1000-1900	**17**	**16**	**9**	**- 47%**
Italy	1200-1500	**41**	**38**	**34**	**- 17%**
Spain	1400-1900	**23**	**23**	**25**	**#**
Greece	350-750	**39**	**39**	**38**	**#**
Poland	200-1000	**15**	**24**	**15**	**#**
Romania	100-500	**46**	**50**	**44**	**#**
Czek rep	1500-1800	**6**	**15**	**13**	**x 2**
Hungary	1000-1700	**5**	**26**	**24**	**x 5**
Portugal	1000-3000	**32**	**55**	**39**	**+ 22%**

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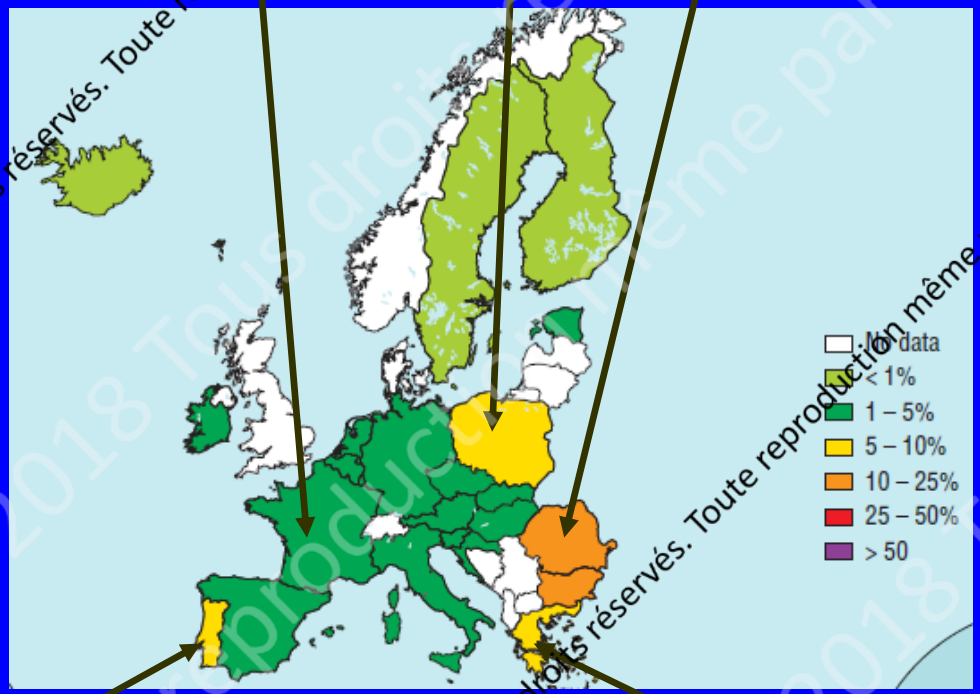
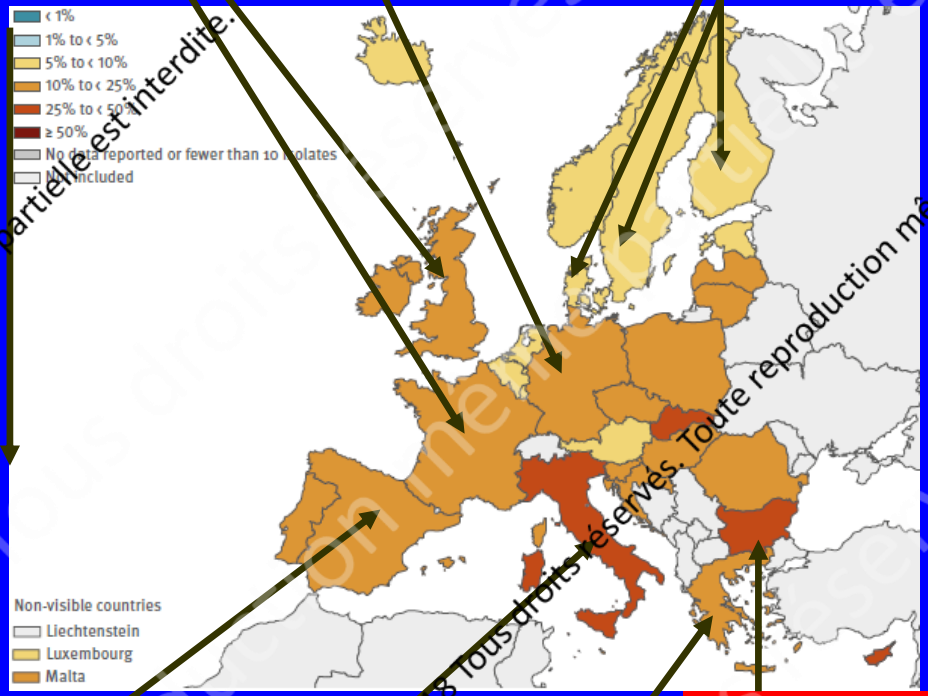
% resistance to 3rd gen. cephalosporins in *E.coli* in bacteremias Europe - EARS-net 2002-2017



2002



2017

1% 6% 18% 10% 12% 7%

6% 6% 13% 30% 18% 41%

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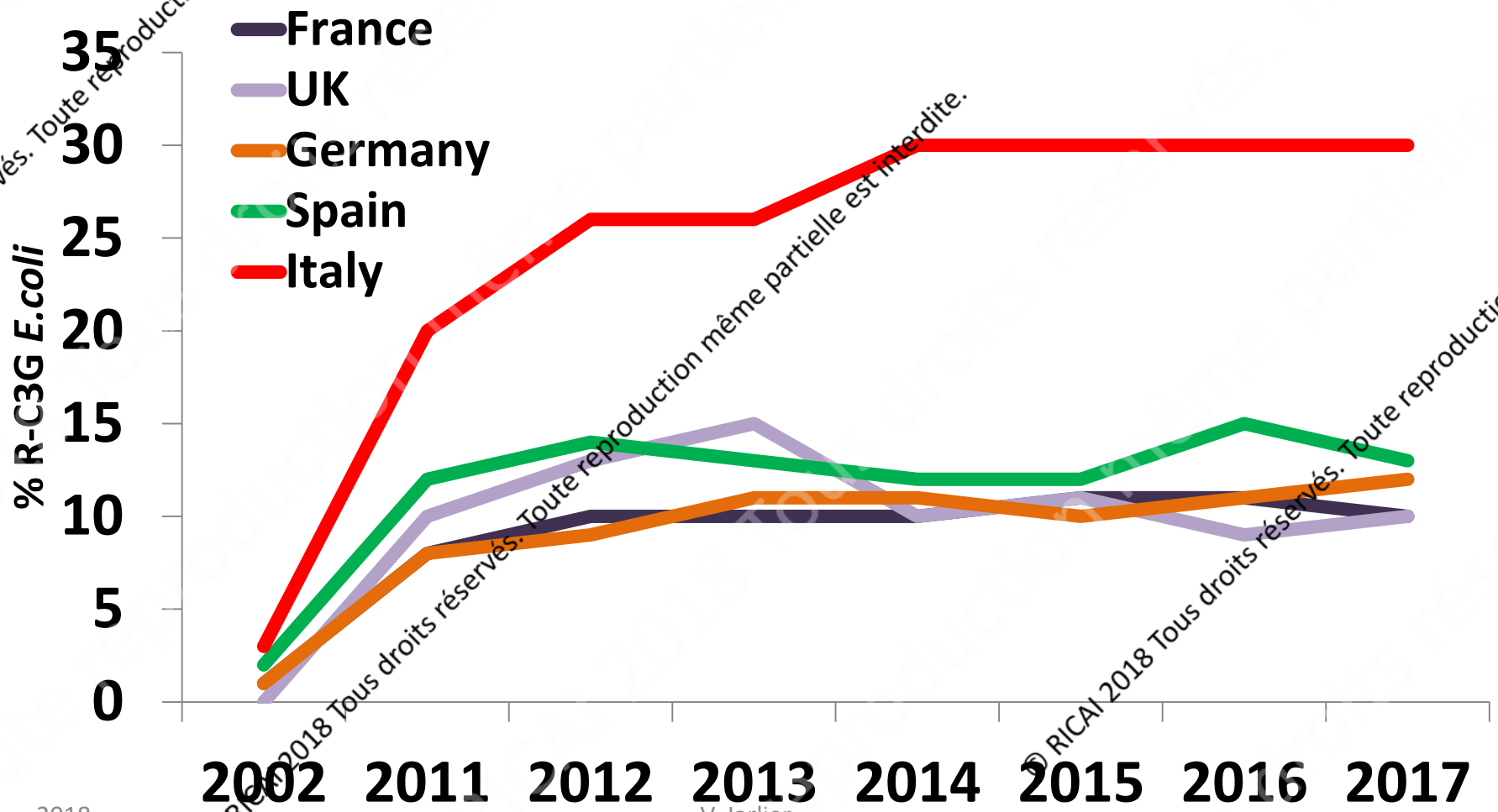
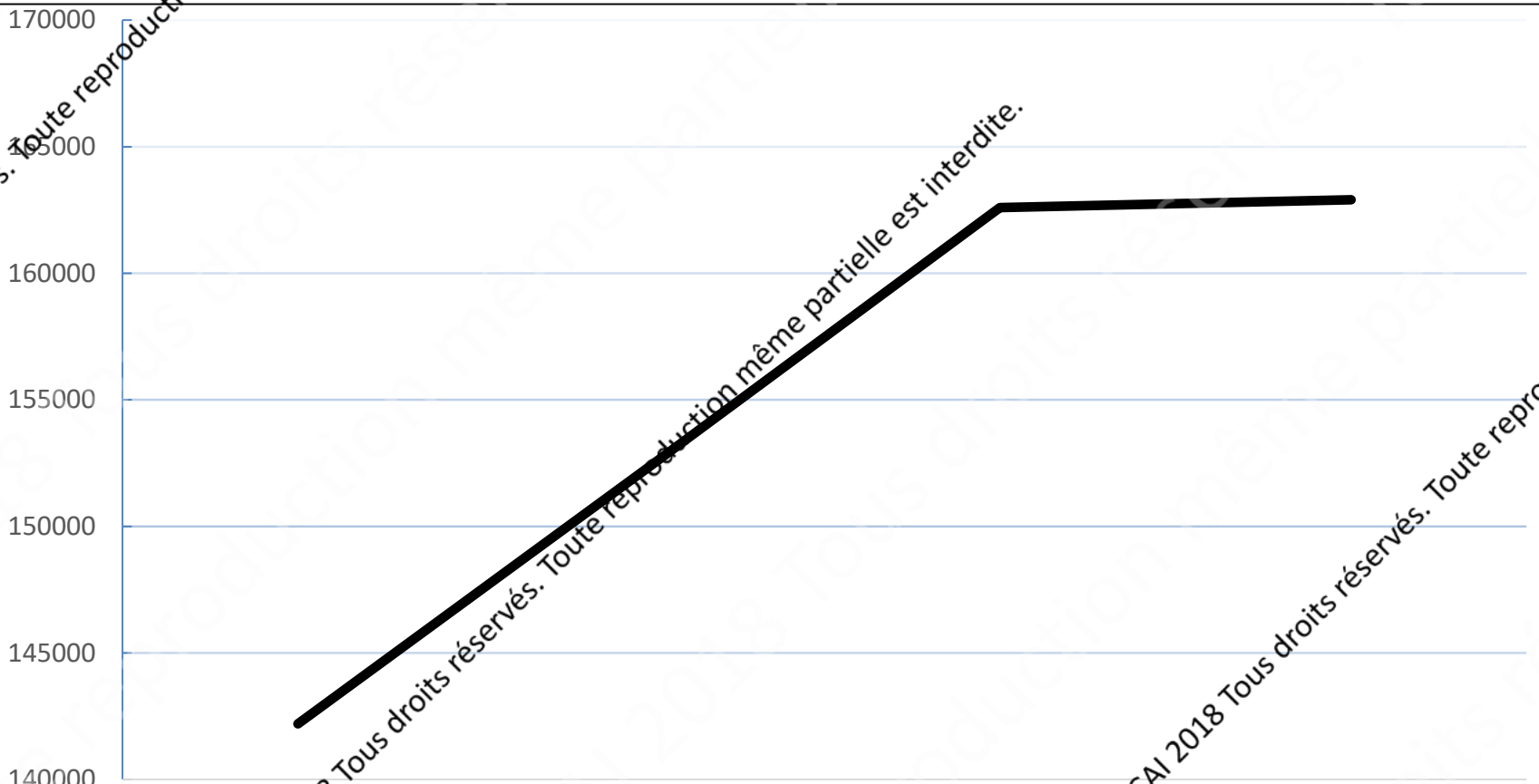
% R-C3G chez *E.coli*
EARSS-Ears-net 2002 2017



NB total de bactériémie à *E.coli* EARSS-Ears-net 2014 2017

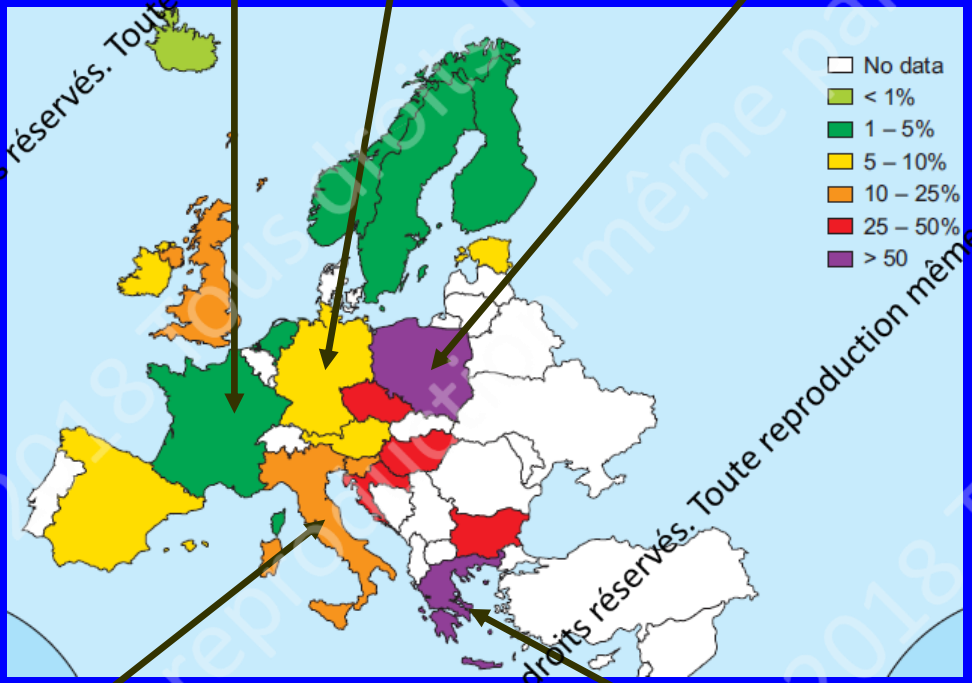


% resistance to 3rd gen. cephalosporins in *K. pneumoniae* in bacteremias Europe - EARS-net 2005-2017

4%

6%

66%



20%

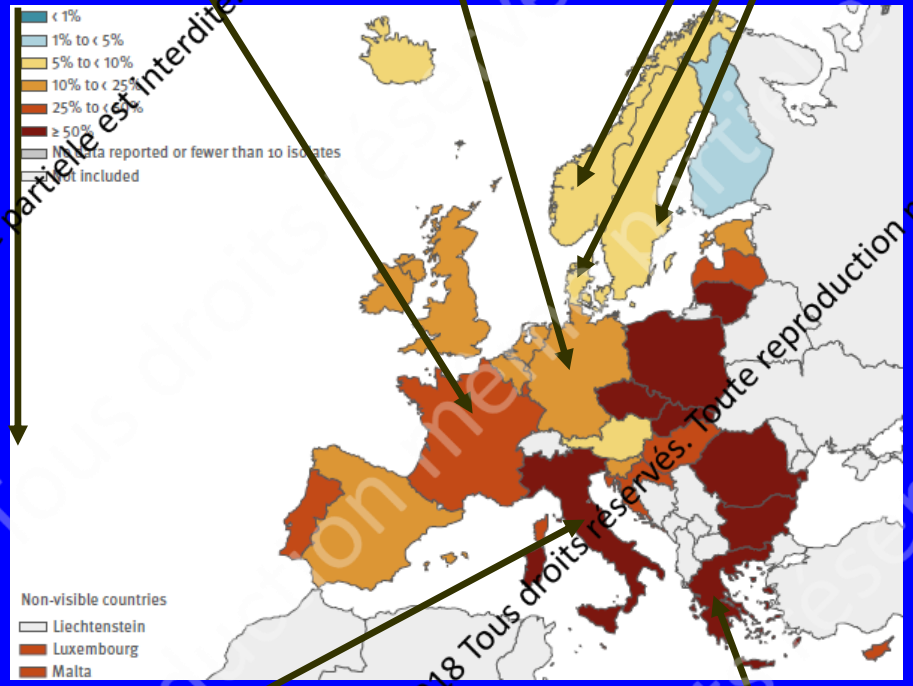
2005

61%

29%

15%

5 -7%



55%

2017

70%

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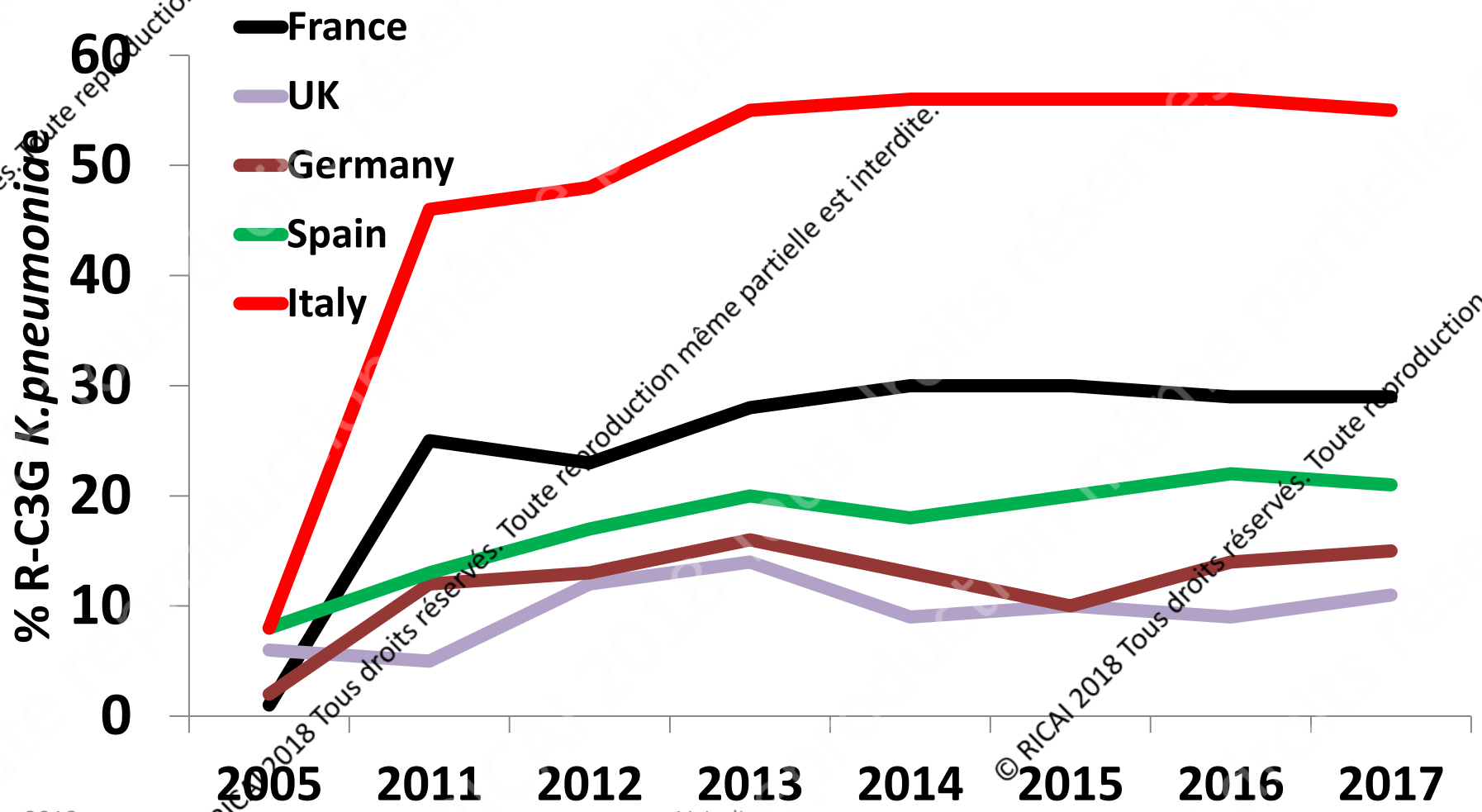
% R-C3G chez K.pneumoniae EARSS-Ears-net 2005 2017



EARSS-France
évolution du % de résistance et du rang en Europe

- SARM 2001→ 2017

  33% → 15%

  20ème /26* → 16ème /30 **+ 4 places**

- **E.coli** R C3G 2002 → 2017

  1% → 11%

  7ème /25* → 6ème /30 **≈ stabilité**

- **K.pneumoniae** R C3G 2005 → 2017

  4% → 29%

  5ème /24* → 16ème /30 **- 11 places**

*
Manquent :
Lituanie
Lettonie
Norvège…

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Why MRSA measures (isolation procedures) are not sufficient for controlling ESBL

	MRSA (chromosomal)	**ESBL (plasmidic)**
Human reservoir	**nose , throat** (abscesses)	**Digestive tract** (urines)
Bacterial load	**~10^8**	10^8 / gram of feces **~10^{10} /day**
Spreadable	**+**	**+++**
Measure for control	**Isolation procedures**	**Reinforced measures Sanitation**

Et les bactéries hautement résistantes émergentes (BHRe) ?

Recommandations françaises pour contrôler la diffusion des bactéries hautement résistantes émergentes (BHRe)

- 2006
- 2010
- 2013

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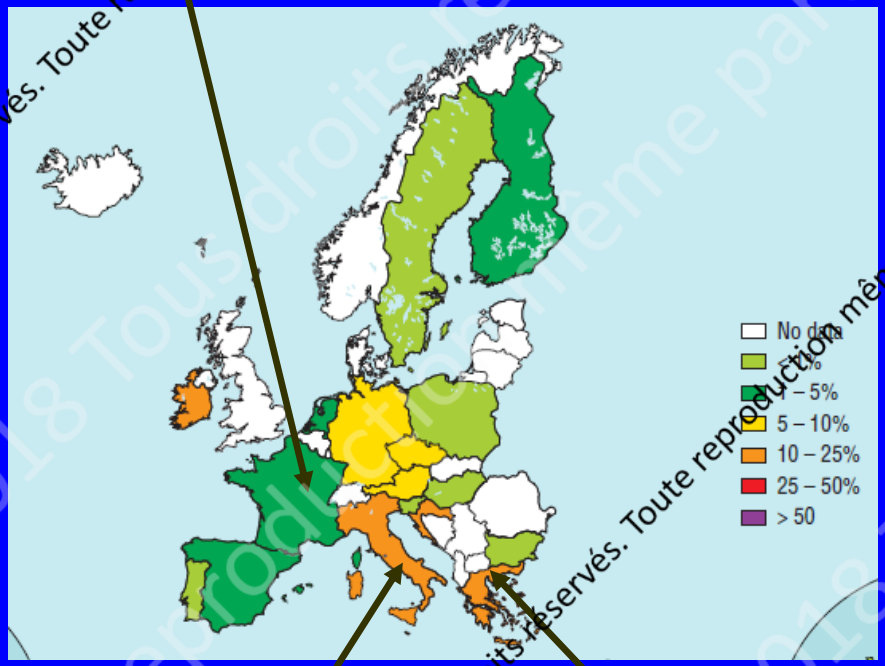
% VRE in *E.faecium* in bacteremias Europe - EARS-net 2002-2017

2% (5% in 2004)

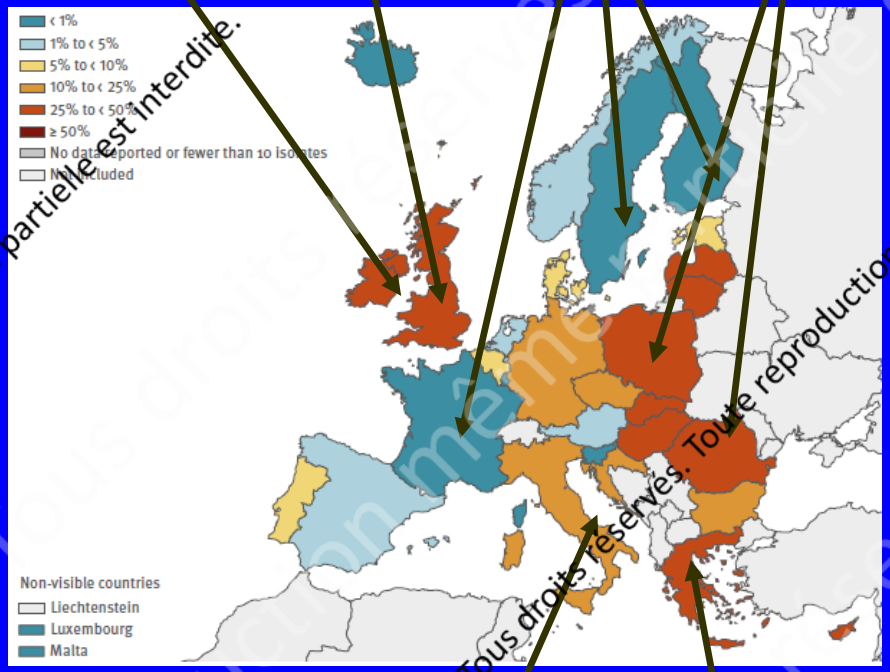


2002

21%

19%

38% **26%** **< 1%** **34%**



2017

15%

31%

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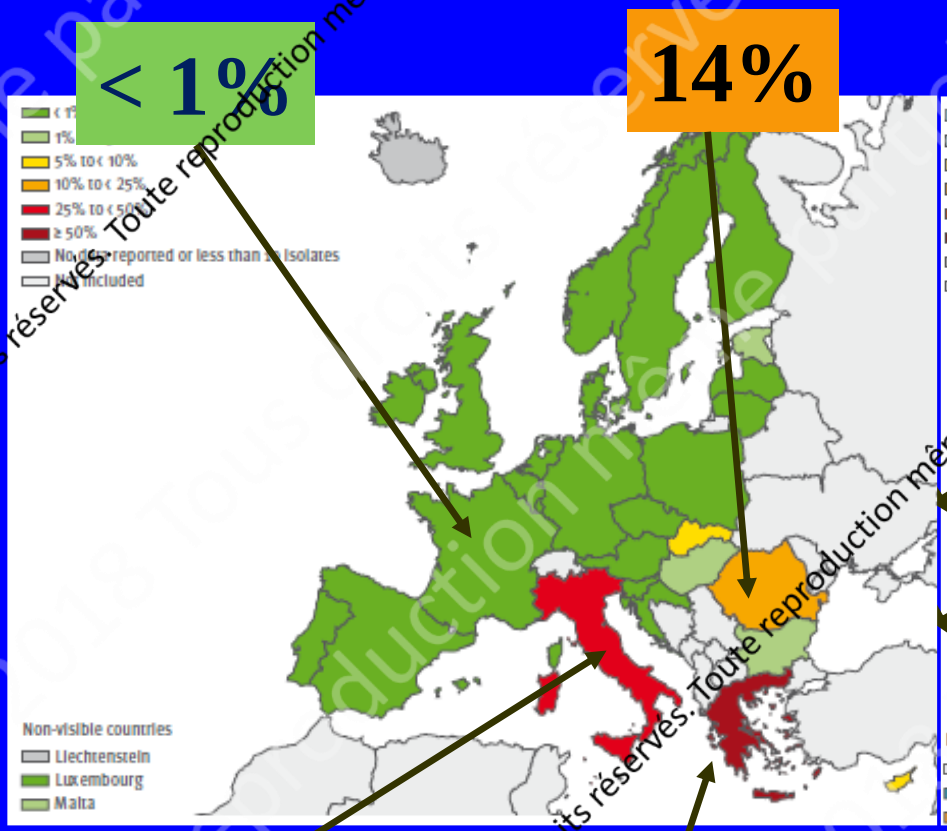
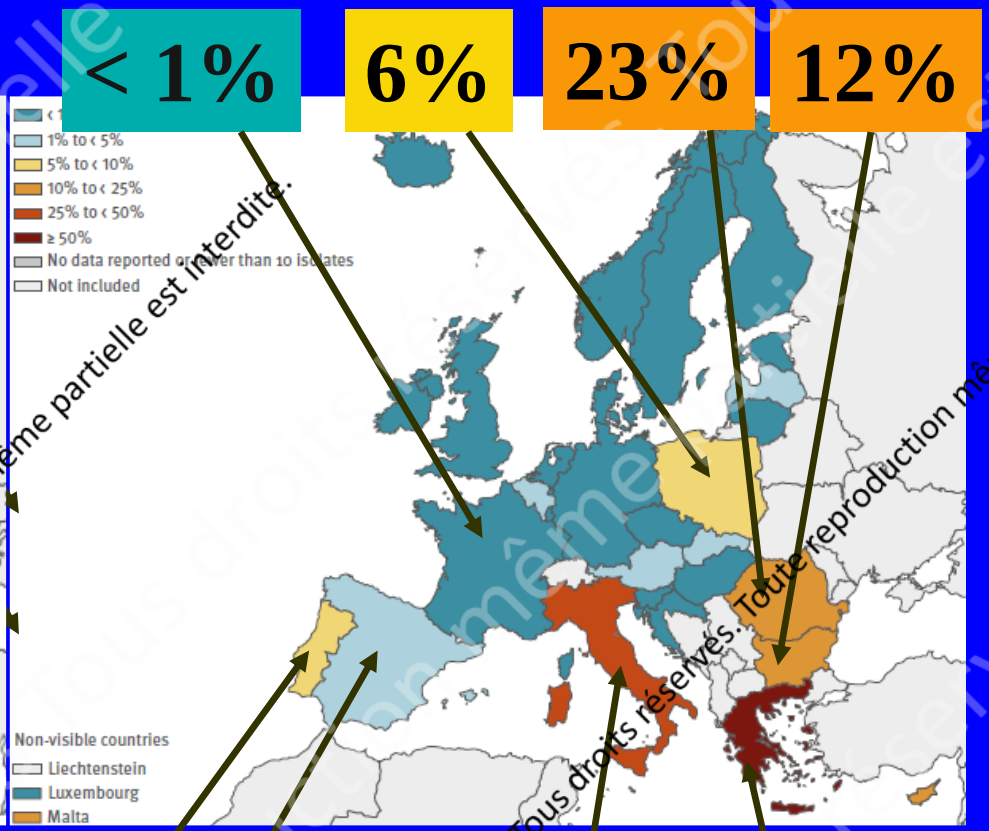
% CRE in *Klebsiella pneumoniae* in **bacteremias** Europe - EARS-net **2012-2017**





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% resistance to carbapenems in *K.pneumoniae* vs. R to 3CG in *E.coli*
Bacteremias - EARS-net data 2017

Lowest *E.coli* R. rates countries		
	% 3GC-R *E.coli*	% Carb-R *K.pneumoniae*
Iceland	6	0
Netherland	6	0
Finland	7	0.3
Sweden	7	0.1
Denmark	7	0
Norway	6	0

Highest *E.coli* R. rates countries		
	% 3GC-R *E.coli*	% Carb-R *K.pneumoniae*
Greece	18	65
Roman.	19	23
Cyprus	31	16
Slovenia	31	*4*
Italy	30	30
Bulgaria	41	12

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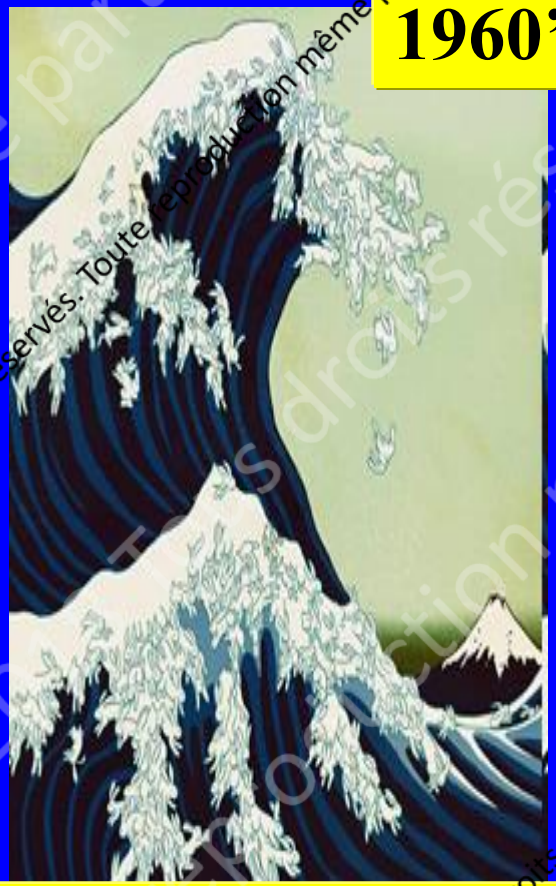
The 3 waves of plasmid-mediated β-lactam resistance in enterobacteria (Hokusai's vision)



1960's

Penicillinases (TEM-1…)
Amox-R

Same ways of spread (strains, plasmids…) between humans, animals, environment:
digestive tracts → wastes → agriculture → food (& back)
"the new fecal threat"

1980's

ESBLs
Amox-3GC-R

→ 3GC use

2000's

Carbapemenases
Amox-3GC-Carb-R

→ Carb use

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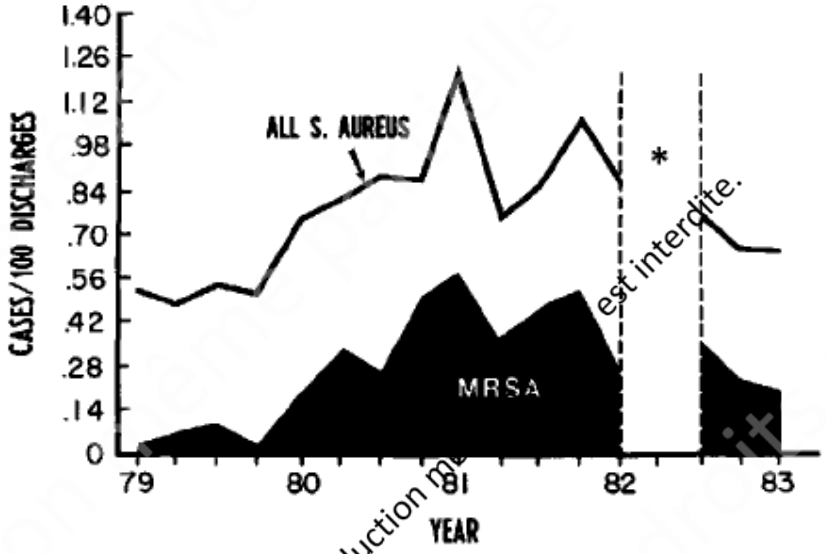
La résistance “crée” t-elle des cas ?

JOHN M. BOYCE, REBECCA L. WHITE,
EMILY Y. SPRUILL
Department of Infection Control, University of Mississippi Medical Center, Jackson, Mississippi



Legend. Incidence of nosocomial *Staphylococcus aureus* infections at the University of Mississippi Medical Center, January 1979–March 1983. Standard criteria for defining nosocomial infections and for identifying *S aureus* were used throughout the study period and no changes were made in surveillance techniques. Hospital-wide prevalence surveys to identify patients with *S aureus* were not conducted. The asterisk indicates the period not surveyed. MRSA = methicillin-resistant *S aureus*.

Boyce JID 1983

THE JOURNAL OF INFECTIOUS DISEASES • VOL. 148, NO. 4 • OCTOBER 1983

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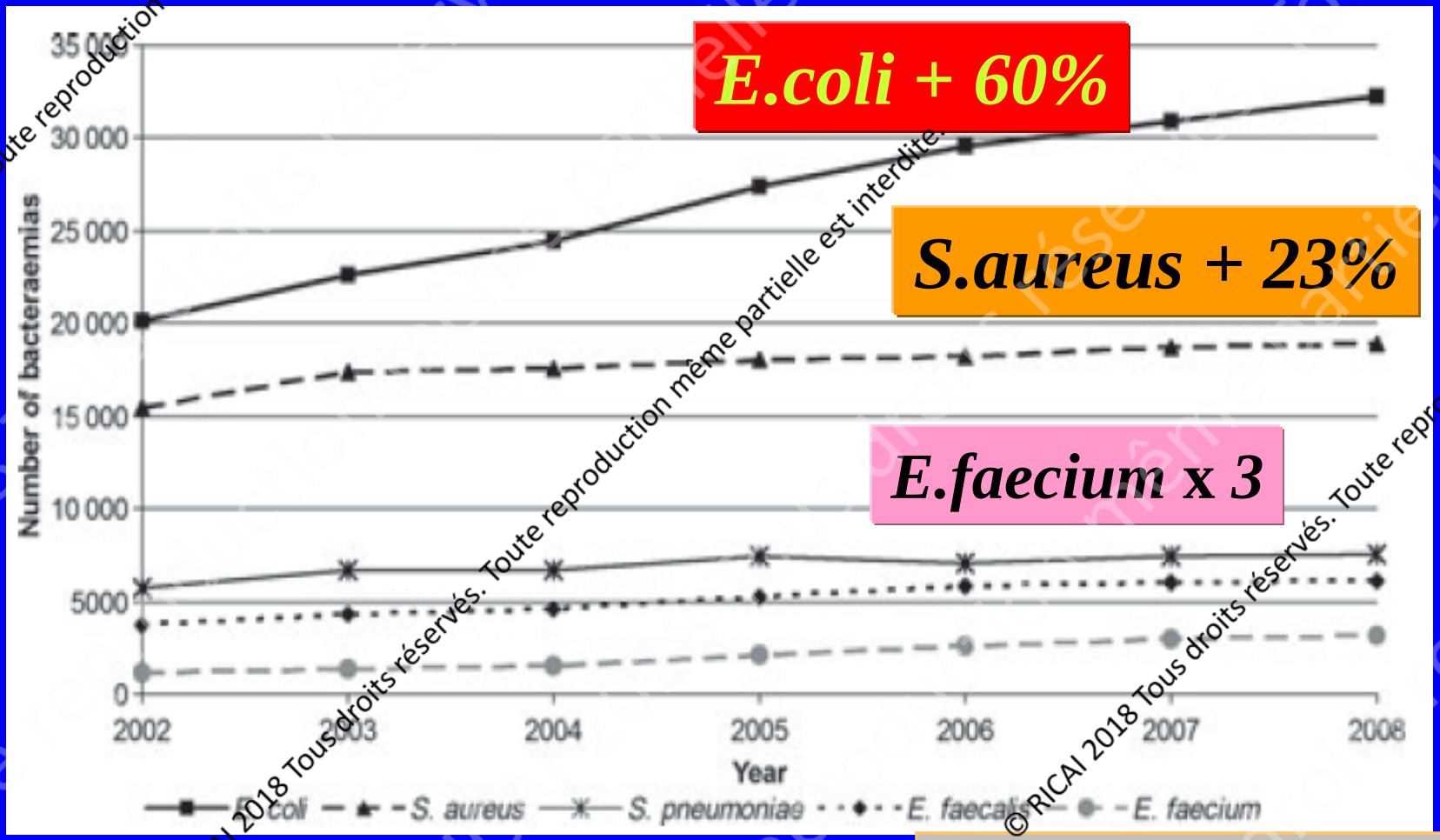
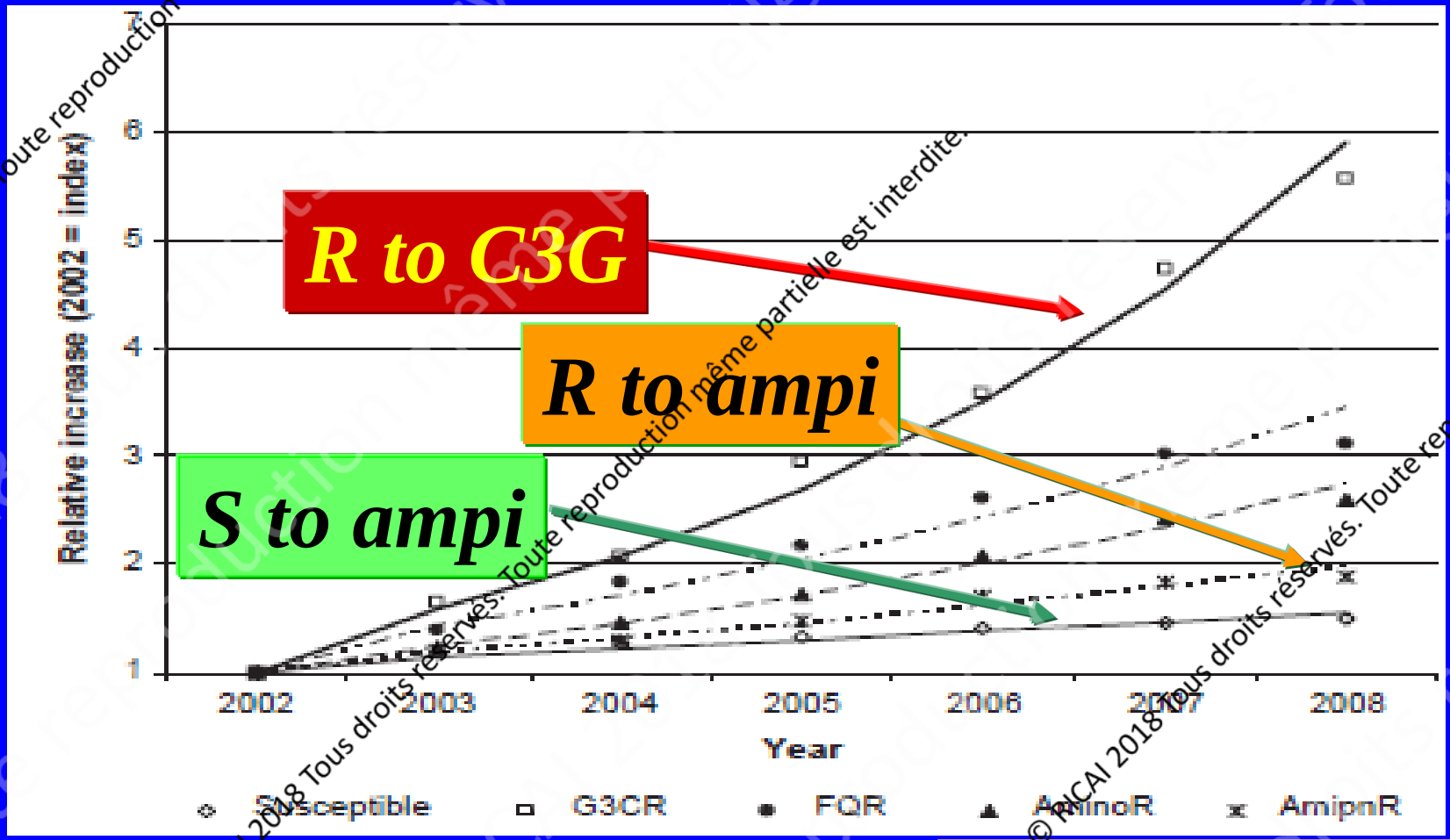
Trends in bacteremias in Europe (labs **constently** reporting 2002-08)



Kraker, Jarlier CMI 2012

Trends (relative increase) of *E.coli* bacteraemias by pattern of resistance in Europe (labs consistently reporting 2002-08)



Kraker, Jarlier CMI 2012

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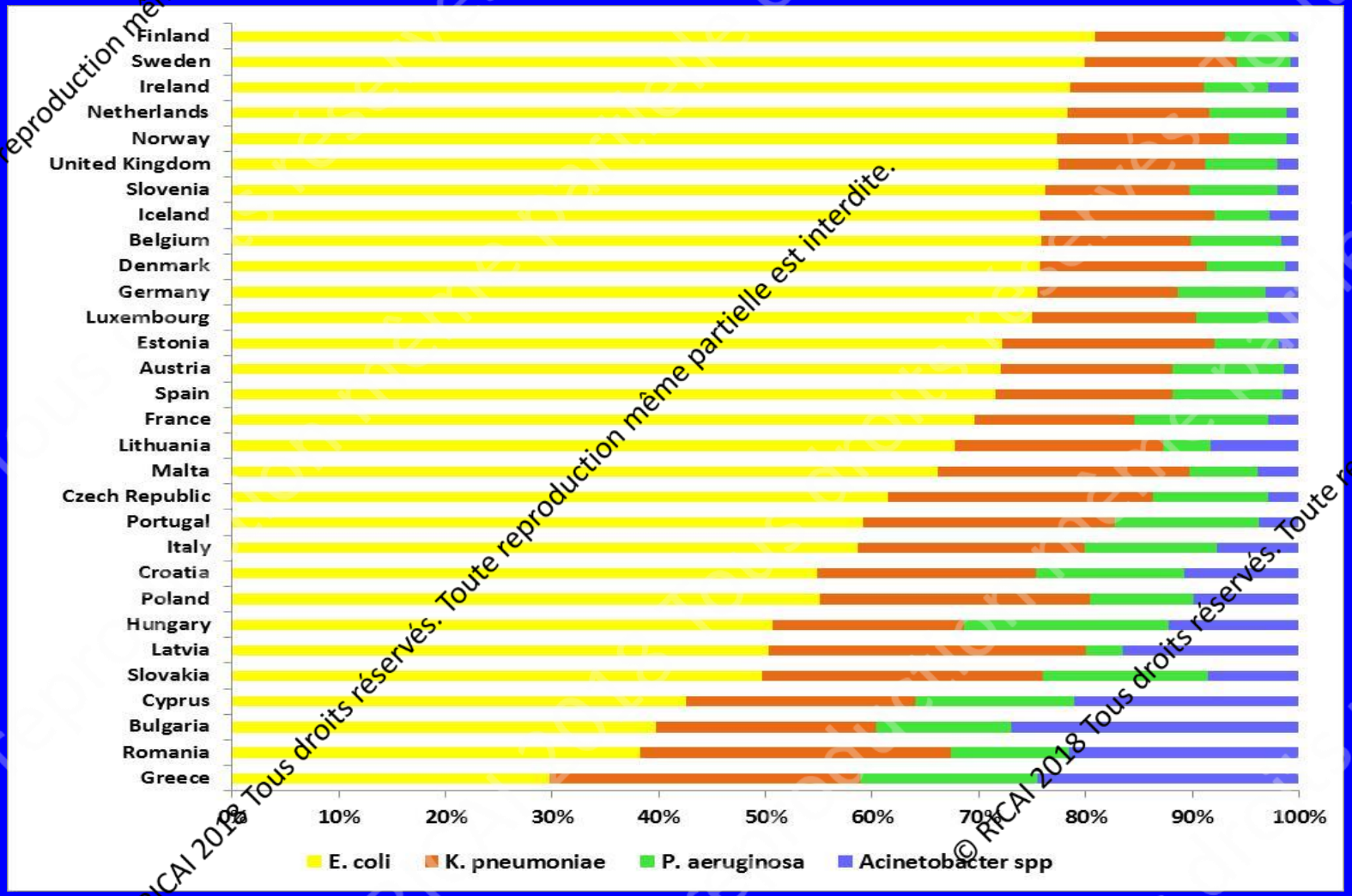
Lien entre résistance naturelle et résistance acquise ?

Résistance naturelle chez les BGN

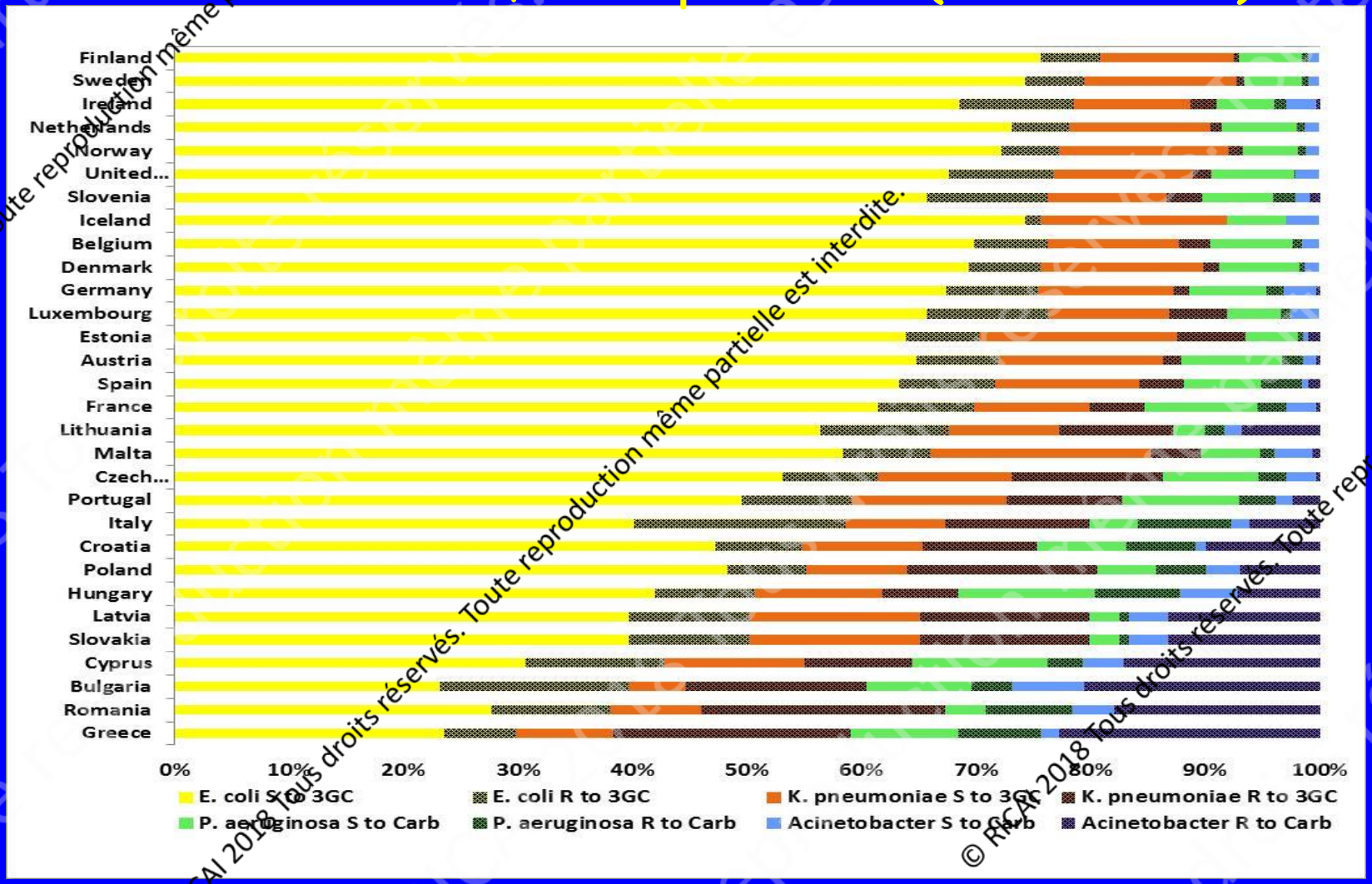
	Amino-penicil	Carb/Ureido-penicil	1GC 2GC	3GC	Nalidixic acid	Trimetop Tetracycl
E.coli						
K.pne	**R**	**R**				
P.aeru	**R**		**R**	**(CTX)**	**R**	**R**
Acinet	**R**		**R**	**(CTX)**	**R**	**R**

Distribution (%) des 4 espèces majeures de bacilles à Gram négatif dans les bactériémies, Europe 2015 (EARS-net)



Jarlier et al 2018 soumis à Eurosurveillance

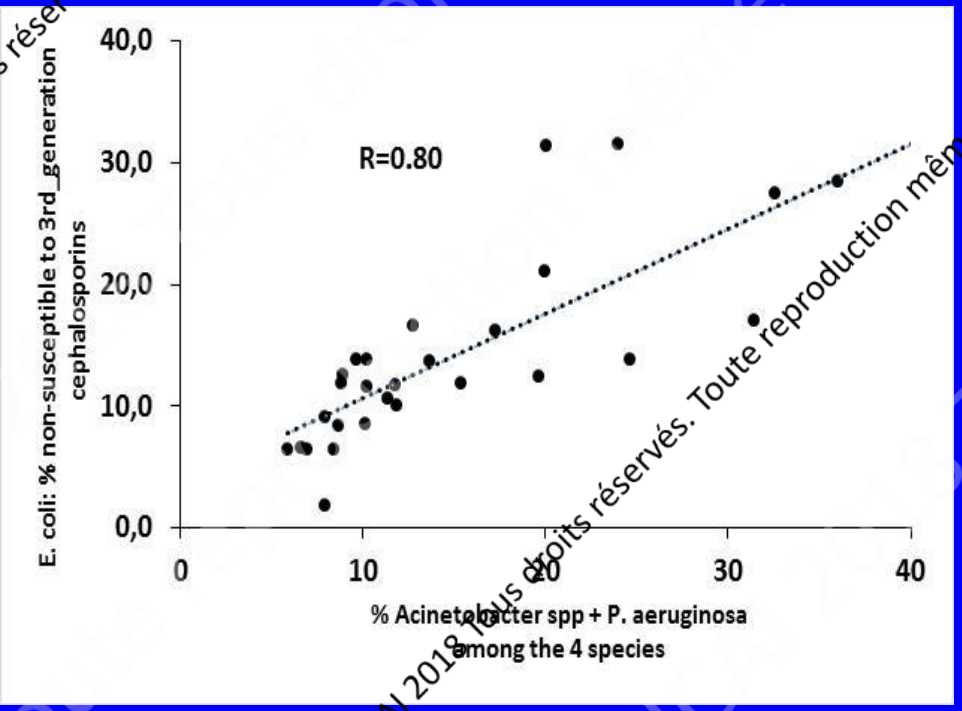
Distribution (%) of the 4 mains Gram- bacilli species and resistance to broad spectrum B-lactams Bactaeremias, Europe 2015 (EARS-net)



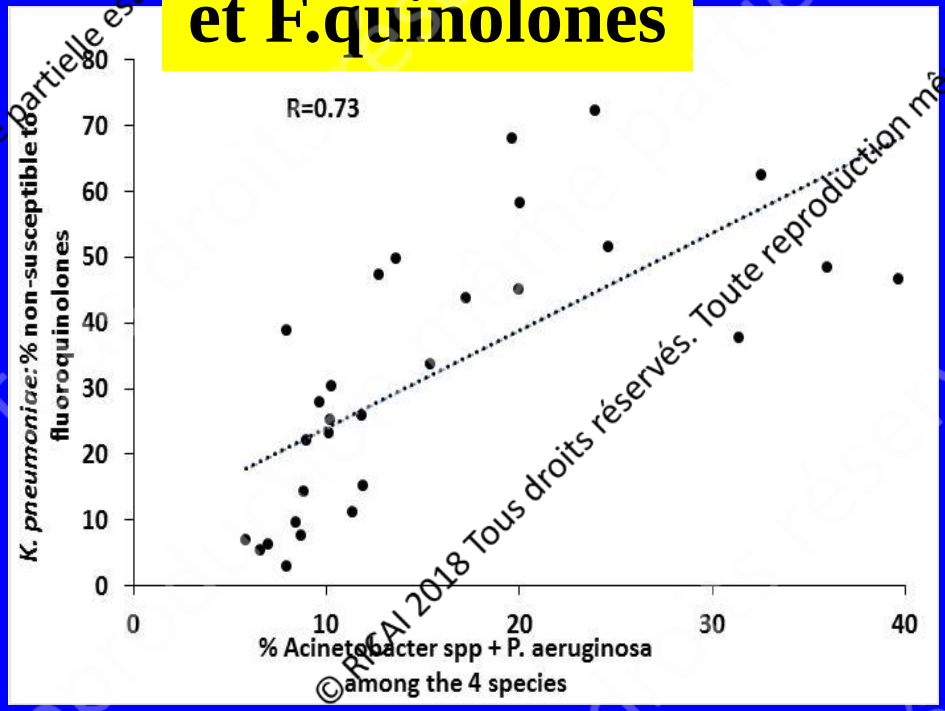
Jarlier et al 2018 submitted

Relation entre la proportion de *P.aeruginosa* + *Acinetobacter* et la résistances acquise chez *E.coli* et *K.pneumoniae* Bactériémies, Europe 2015 (EARS-net)

E. coli et C3G



K. pneumoniae et F.quinolones



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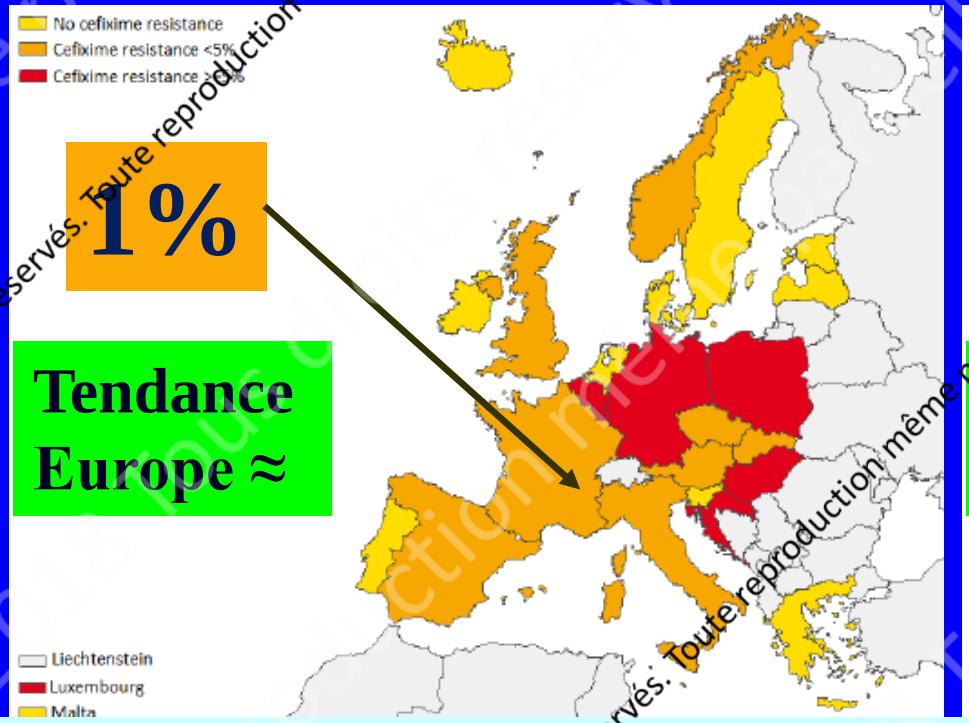
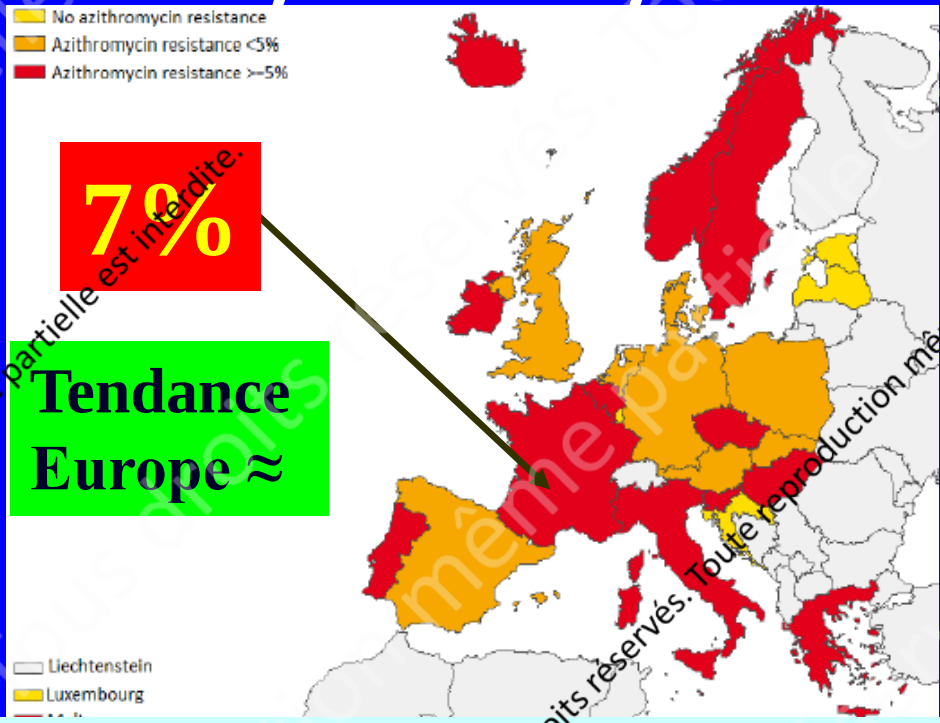
… et quelques autres bactéries

Résistance chez le gonocoque
EURO-GASP (ECDC) 2016

céfixime



azythromycine

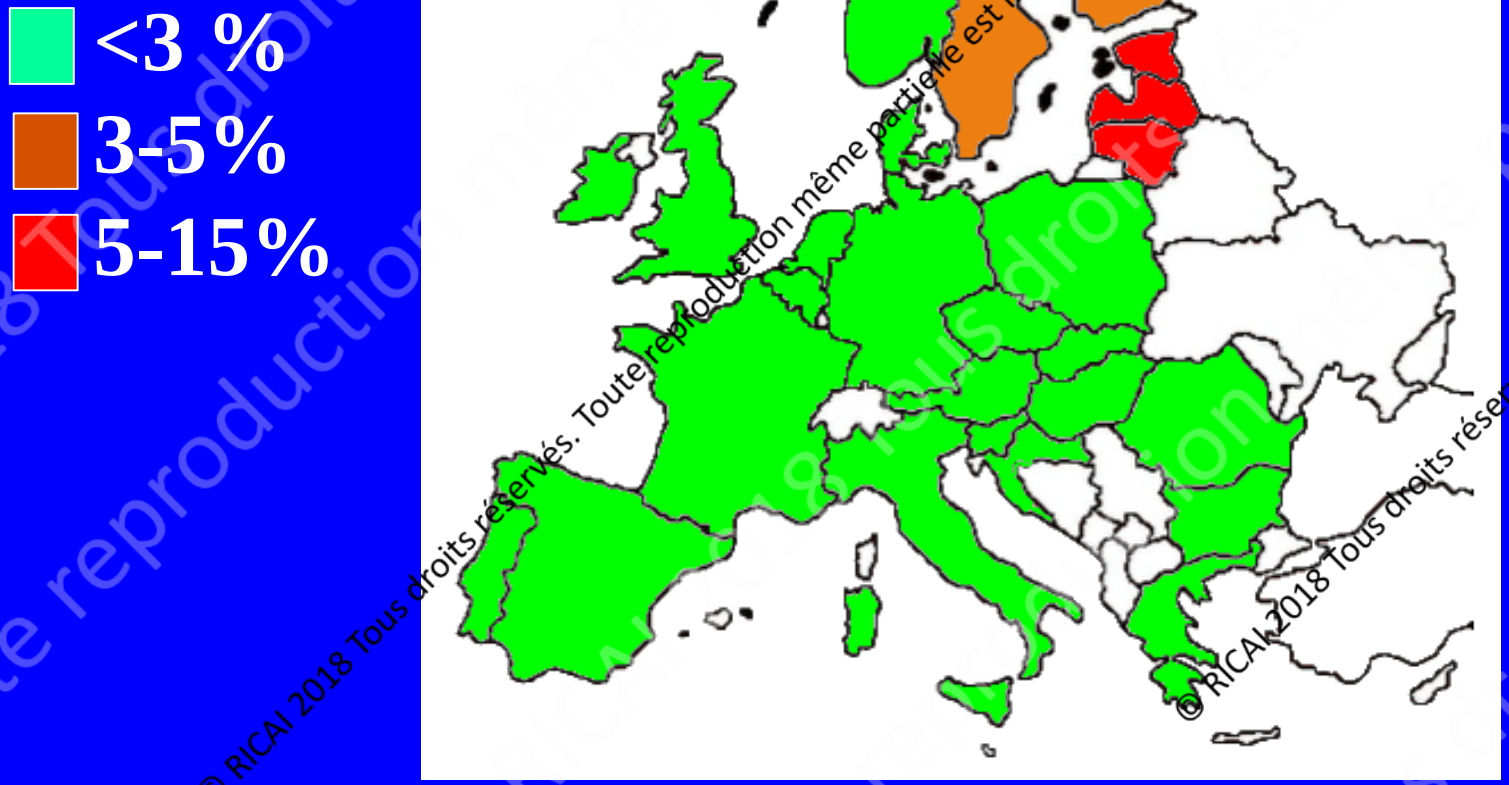


~100 souches / pays ; Europe : 2256 (1366 en 2009)

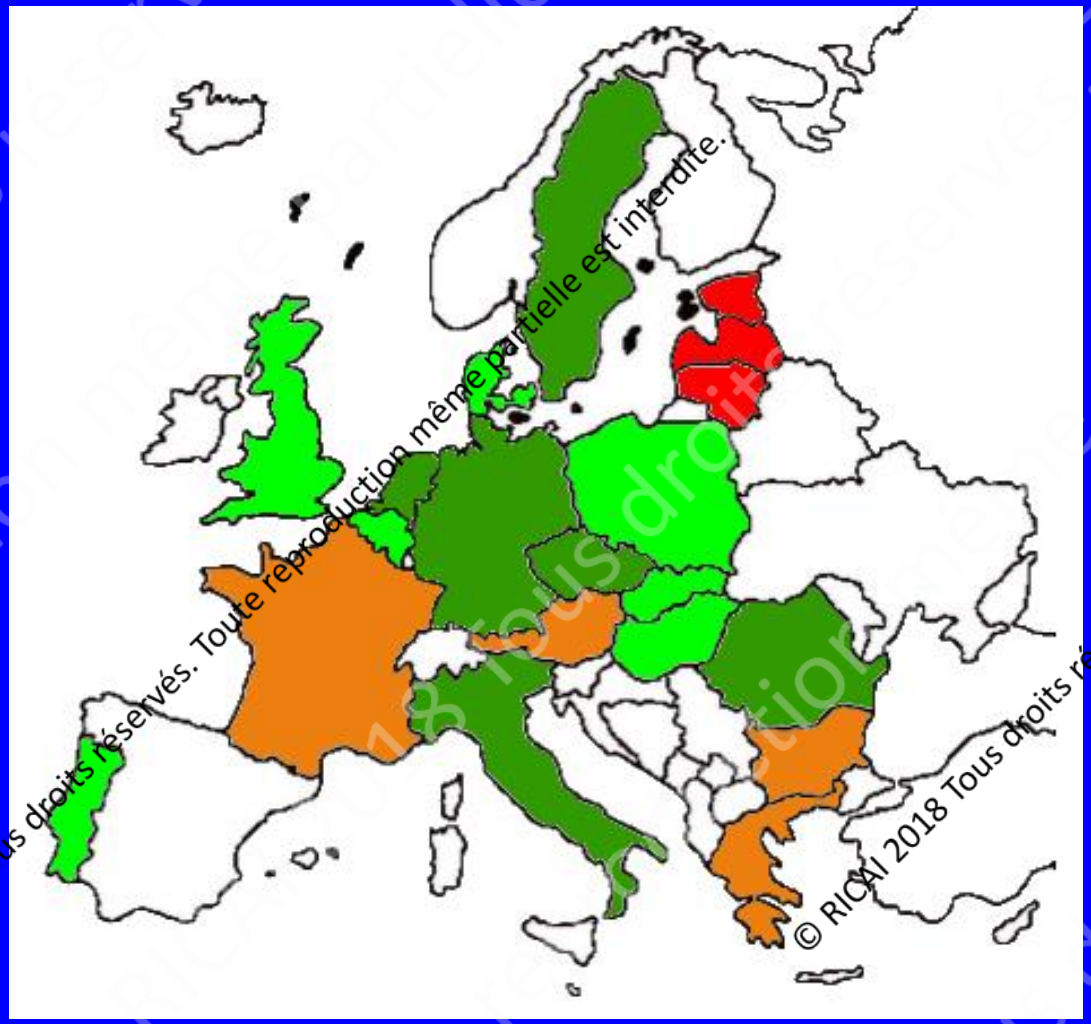
Ciprofloxacine : France 37%

Europe : 47% (extrêmes 20-70%), tendance ↘

% MDR chez *M.tuberculosis* (nouveaux cas) ECDC / OMS Europe



% MDR chez M.tuberculosis (antécédents de traitement) ECDC / OMS Europe



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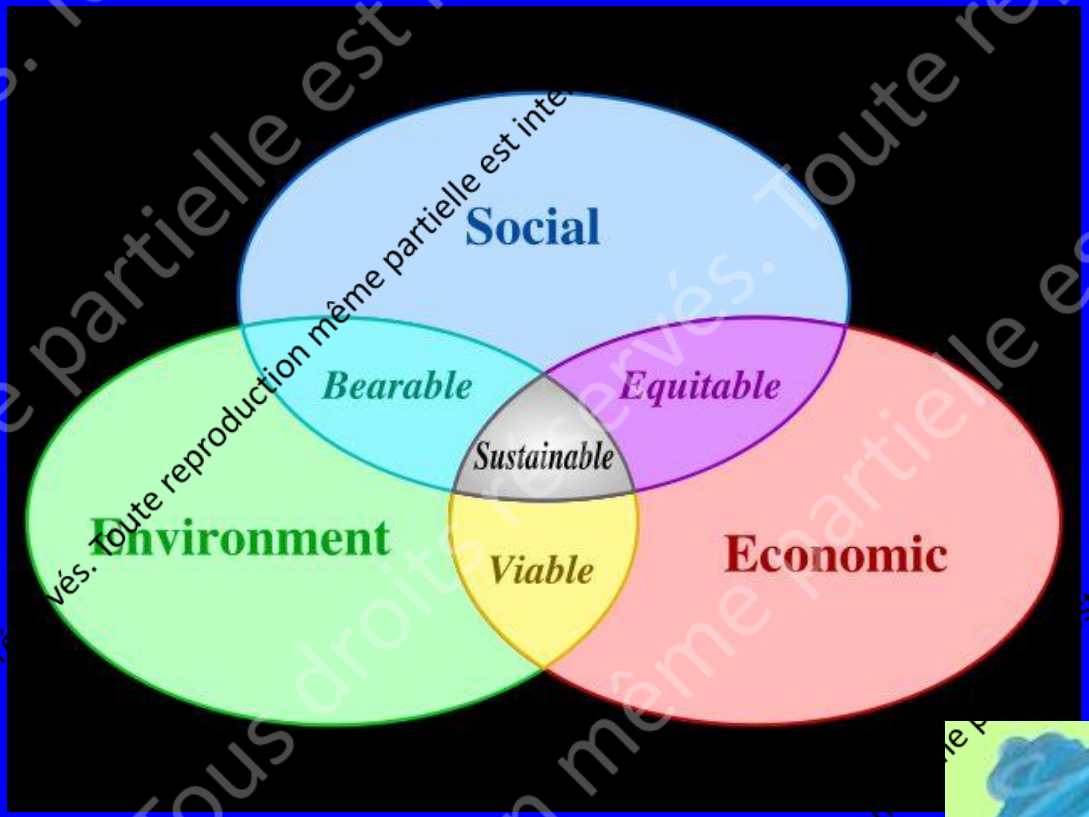

Développement durable

- Eau
- Forêts
- Réchauffement
- Antibiotiques

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% resistance to 3rd gen. cephalosporins in *E.coli* in bacteremias Europe - EARS-net 2011-2017

	France	UK	Germany	Spain	Italy
2002	1	6 (2005)	1	2	3
2011	8	10	8	12	20
2012	10	13	9	14	26
2013	10	15	11	13	26
2014	10	10	11	12	30
2015	11	11	10	12	30
2016	11	9	11	15	30
2017	10	10	12	13	30

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% resistance to 3rd gen. cephalosporins in *K.pneumoniae* in bacteremias Europe - EARS-net 2005-2017

	France	UK	Germany	Spain	Italy
2005	1	6	2	8	8
2011	25	5	12	13	46
2012	23	12	13	17	48
2013	28	14	16	20	55
2014	30	9	13	18	56
2015	30	10	10	20	56
2016	29	9	14	22	56
2017	29	11	15	21	55

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