Mikrobiologi: Infeksjonar og resistens, globalt og lokalt

Fagdag 12.04.18

Reidar Hjetland

Agenda

- Globalt
- Særlege resistensforhold i fokus
  - MRSA
  - ESBL (ESBL-A og ESBL-CARBA)
  - VRE
- Resistens urinvegsisolat Noreg og SFj

A health threat anywhere is a health threat everywhere

Source: The Lancet 380:9857, 1-7 Dec 2012, pp. 1946-55. www.sciencedirect.com/science/article/pii/S0140673612611519

Estimates of Burden of Antibacterial Resistance

European Union
population 500m

25,000 deaths per year

2.5m extra hospital days

Overall societal costs
(€ 900 million, hosp. days)
Approx. €1.5 billion per year

Source: ECDC 2007

Thailand
population 70m

>38,000 deaths

>3.2m hospital days

Overall societal costs
US$ 84.6–202.8 mill. direct
>US$1.3 billion indirect

Source: Pumart et al 2012

United States
population 300m

>23,000 deaths

>2.0m illnesses

Overall societal costs
Up to $20 billion direct
Up to $35 billion indirect

Source: US CDC 2013

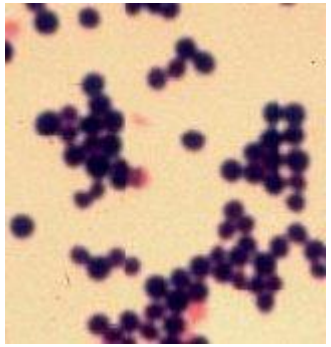
Global information is insufficient to show complete disease burden impact and costs

| Antimicrobial Resistance
Global Report on Surveillance 2014

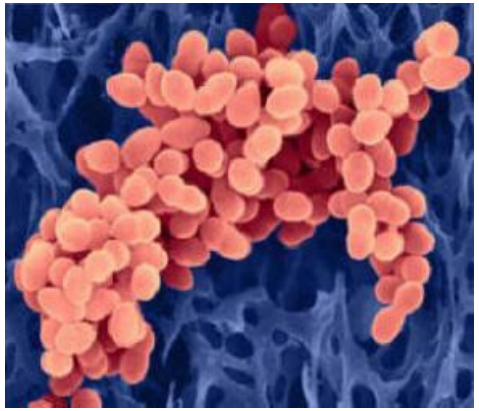
World Health Organization

MRSA

- Meticillinresistent Staphylococcus aureus
- Dvs. ein gul stafylokokk (S. aureus) som er blitt motstandsdyktig mot penicillinasestabile penicillinar.



www.bmb.leeds.ac.uk/ mbiology/ug/FAO/

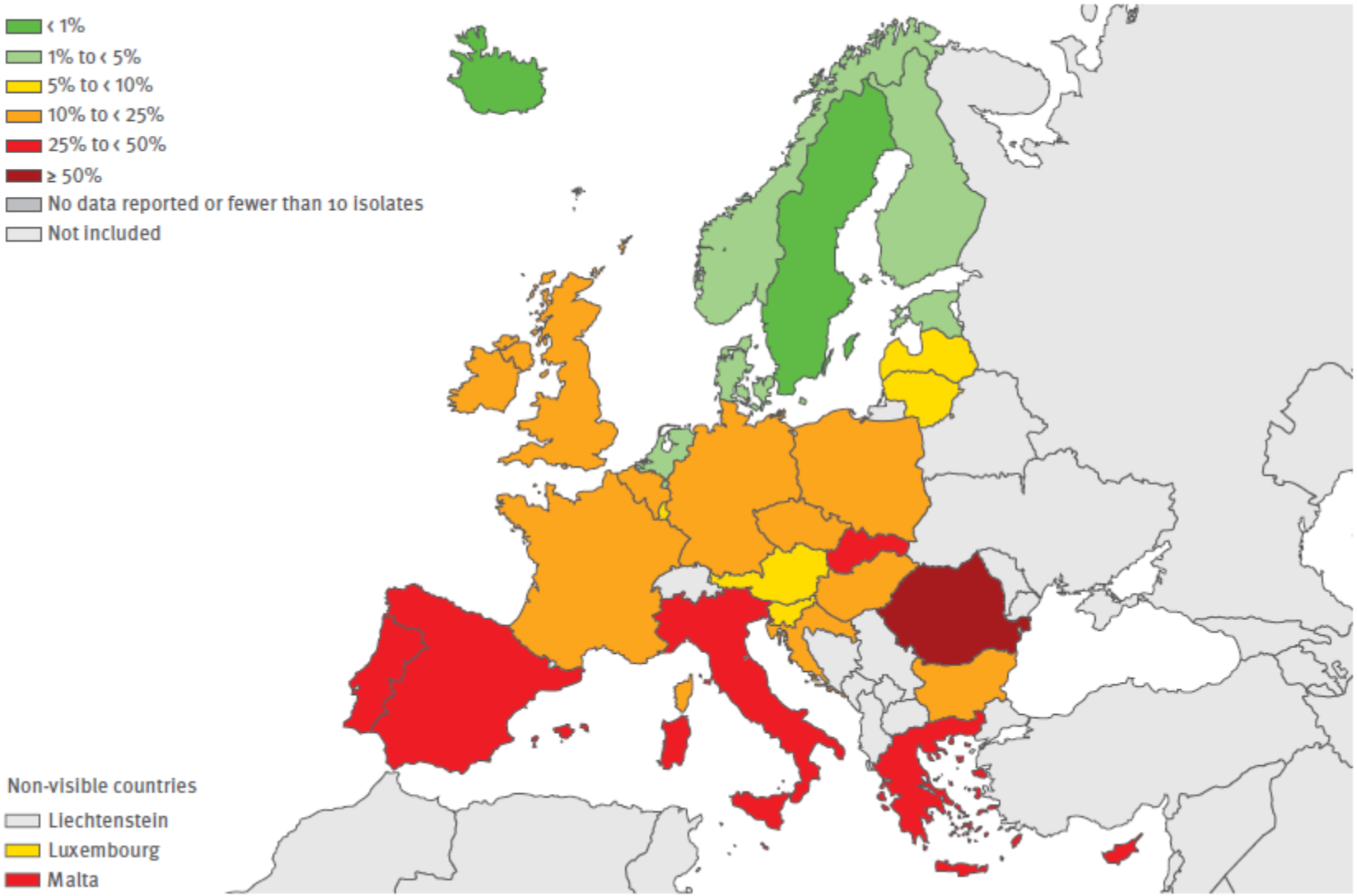


www.mrsaresources.com/

Antibiotikaresistens hos gule stafylokokkar

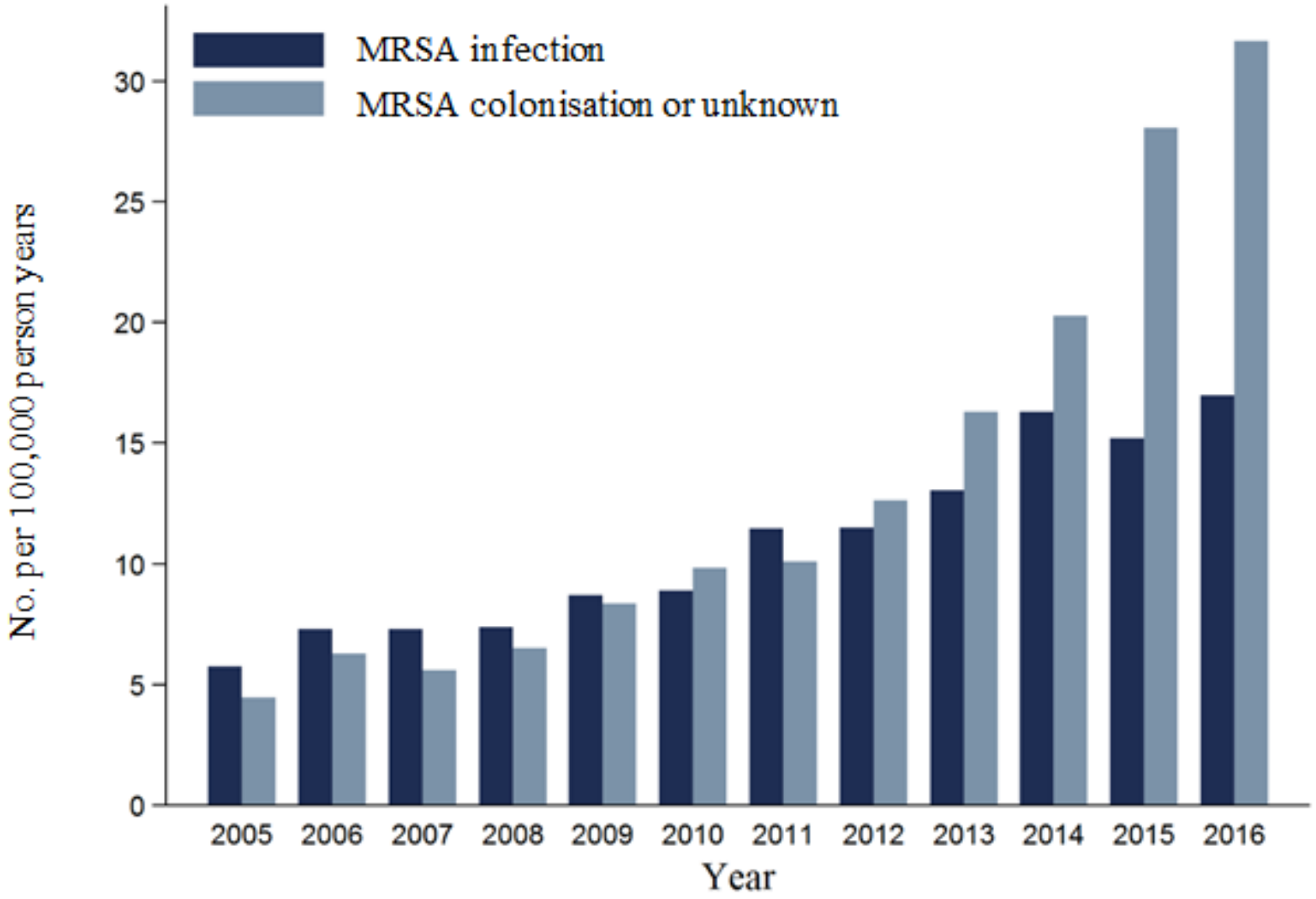
- 1945: Nesten alle følsome for vanleg penicillin
- Penicillinresistens deretter raskt aukande
  - Pga penicillinase (plasmid)
  - I dag 75% resistente mot vanleg penicillin
- 1960: Penicillinasestabile penicillinar utvikla
  - Verksame mot penicillinresistente stafylokokkar
- MRSA utviklast
  - I dag: MRSA utgjer 20-50% av gule stafylokokkar i mange land
  - I Noreg: ca. 1%

Figure 3.22. *Staphylococcus aureus*. Percentage (%) of invasive isolates with resistance to meticillin (MRSA), by country, EU/EEA countries, 2015

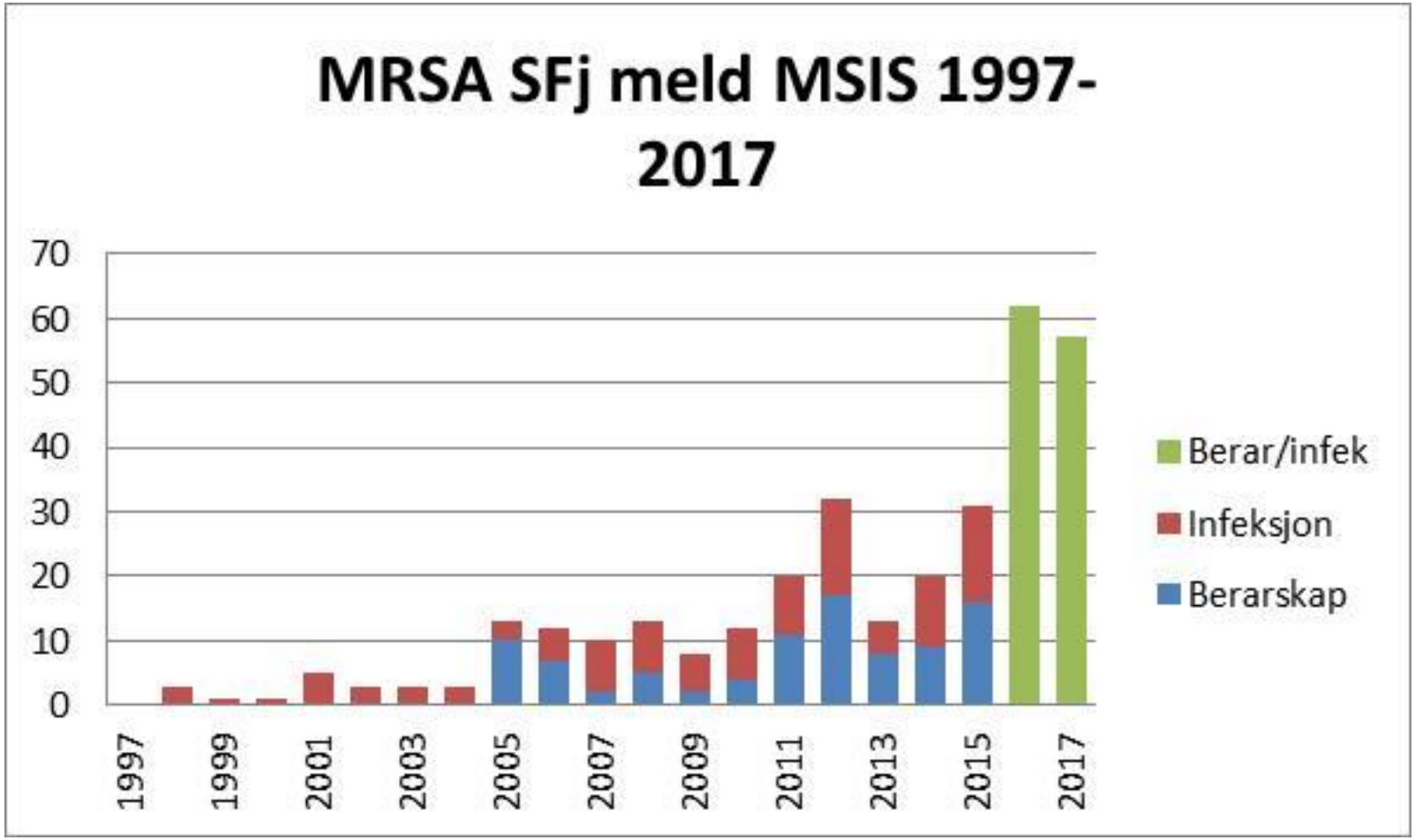


EARS-Net rapport 2015

MRSA i Noreg



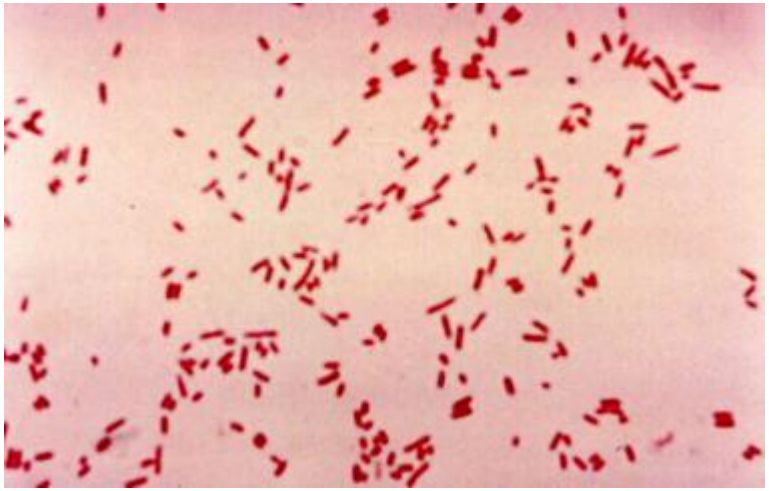
NORM-rapport 2016



(Før 2005: Kun infeksjonar meldepliktige
Frå 2016: MSIS presenterer ikkje lenger infeksjon og berarskap separat)

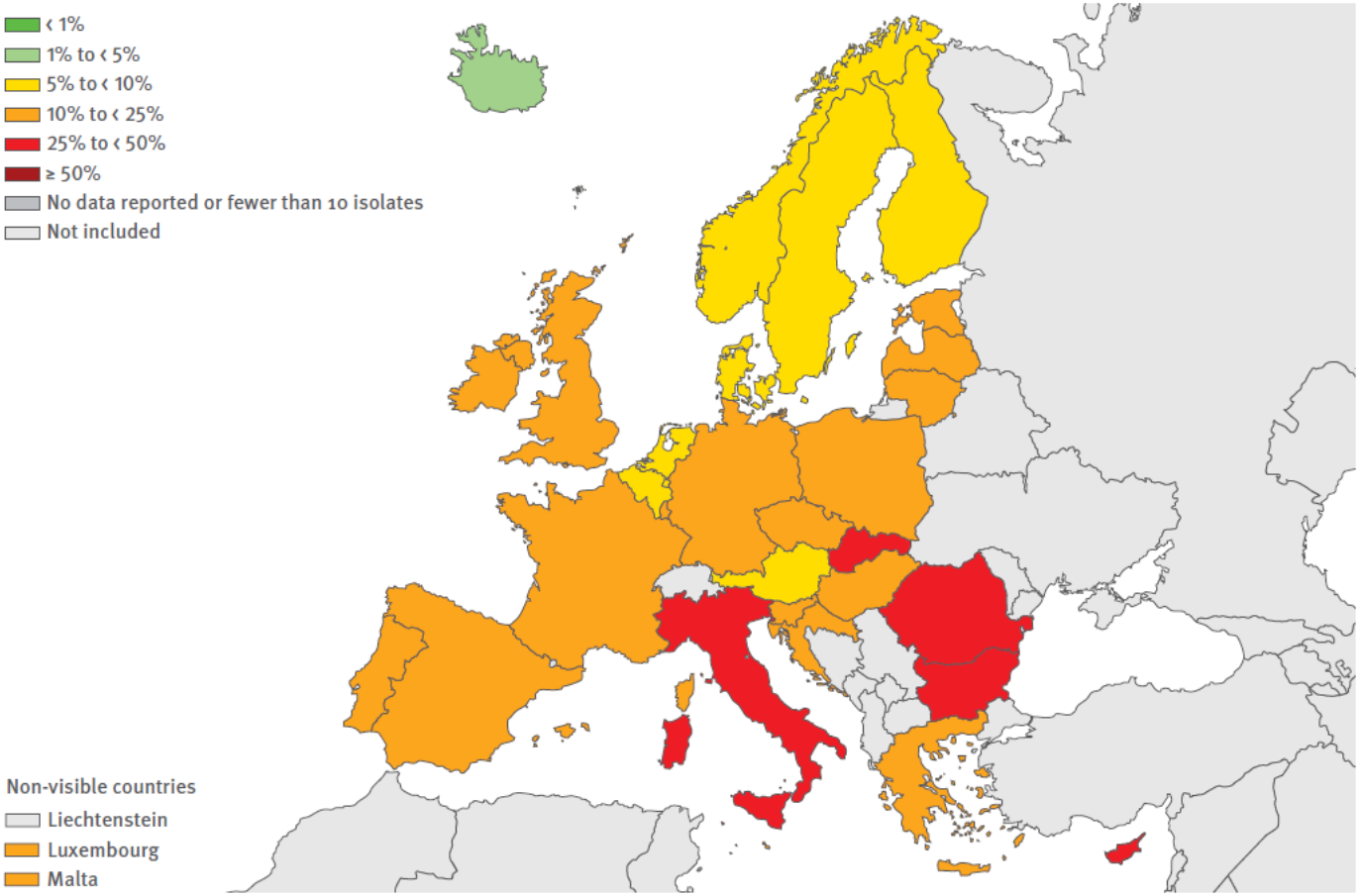
ESBL

- Extended spectrum betalactamase = resistens mot 3. generasjons cefalosporinar og evt. karbapenemar
- Sjåast først og fremst hos tarmbakteriar (E. coli, Klebsiella, m.v.
- ESBL-A: Resistens mot 3. gen. cefalosporinar
- ESBL-CARBA: Resistens (også) mot karbapenem-antibiotika



emedicine.medscape.com-

Figure 3.2. *Escherichia coli*. Percentage (%) of invasive isolates with resistance to third-generation cephalosporins, by country, EU/EEA countries, 2015



EARS-Net rapport 2015

ESBL i Noreg

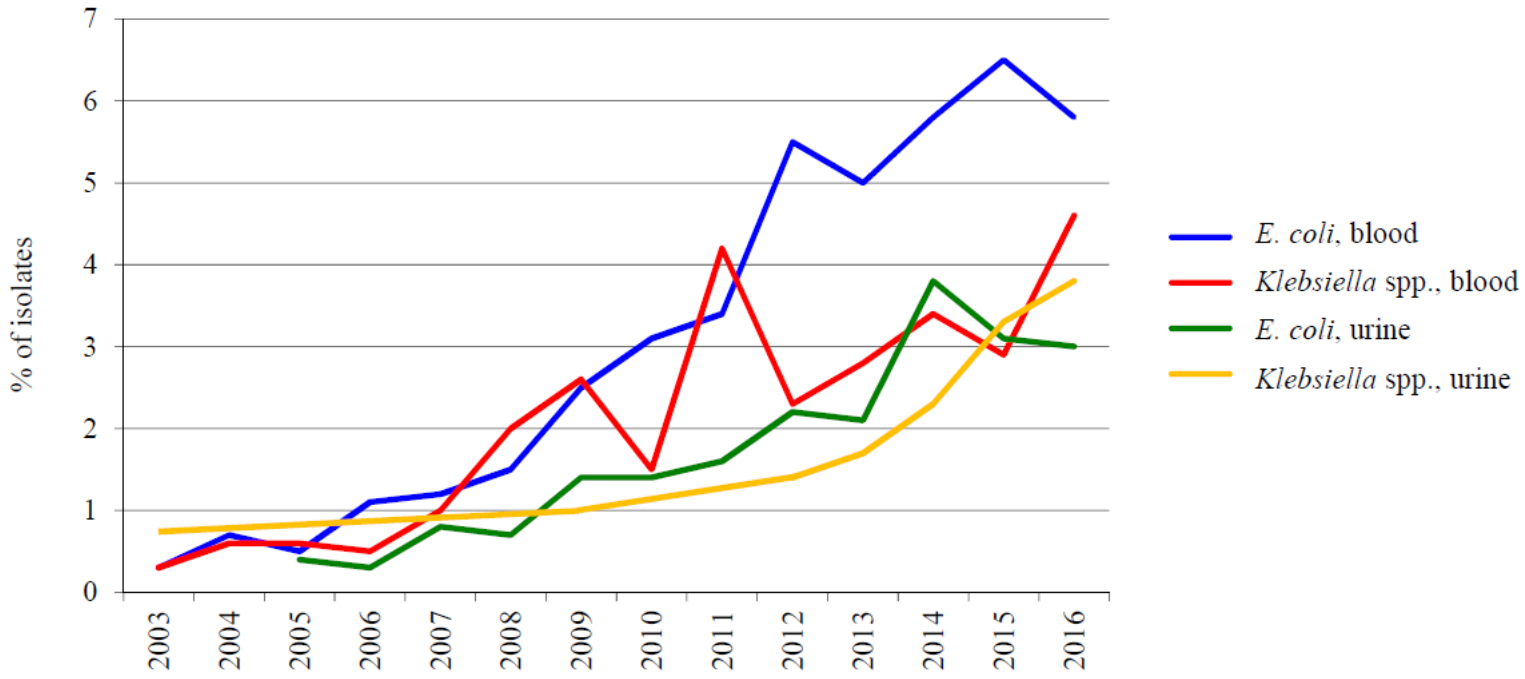


FIGURE 66. Prevalence of ESBL production among *Escherichia coli* and *Klebsiella* spp. isolates from blood and urine 2003-2016.

NORM-rapport 2016

ESBL E. coli blodkultur pr helseregion

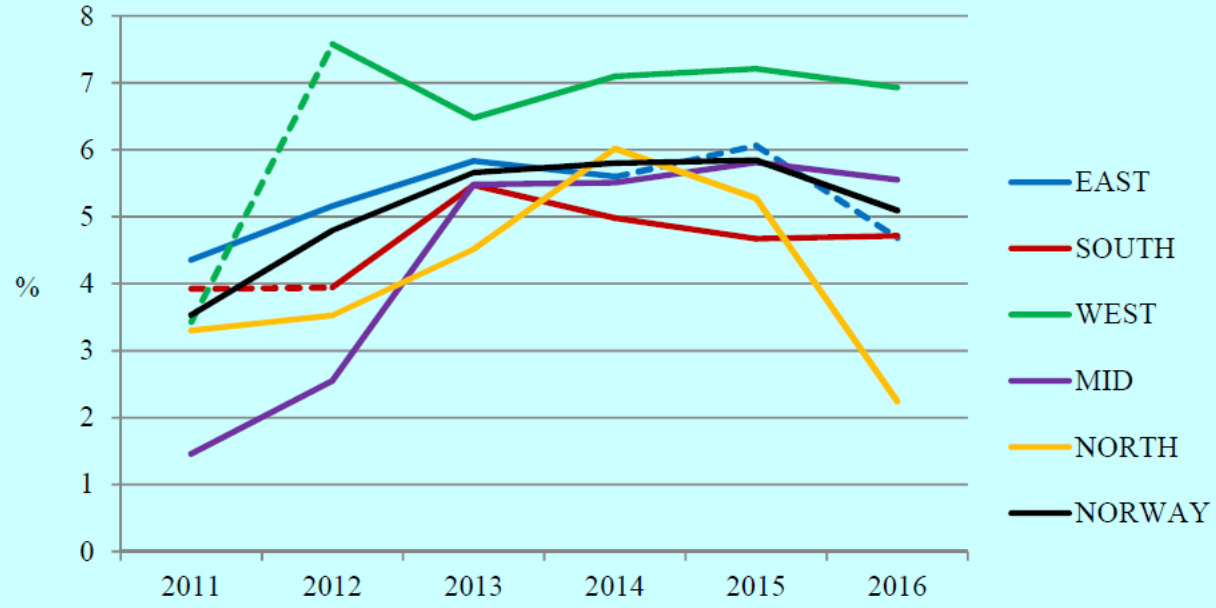


FIGURE 69. Proportion of *Escherichia coli* blood culture isolates reported as cefotaxime resistant in Norway 2011-2016 by health region. Dotted line indicates variation in number of reporting laboratories within a region.

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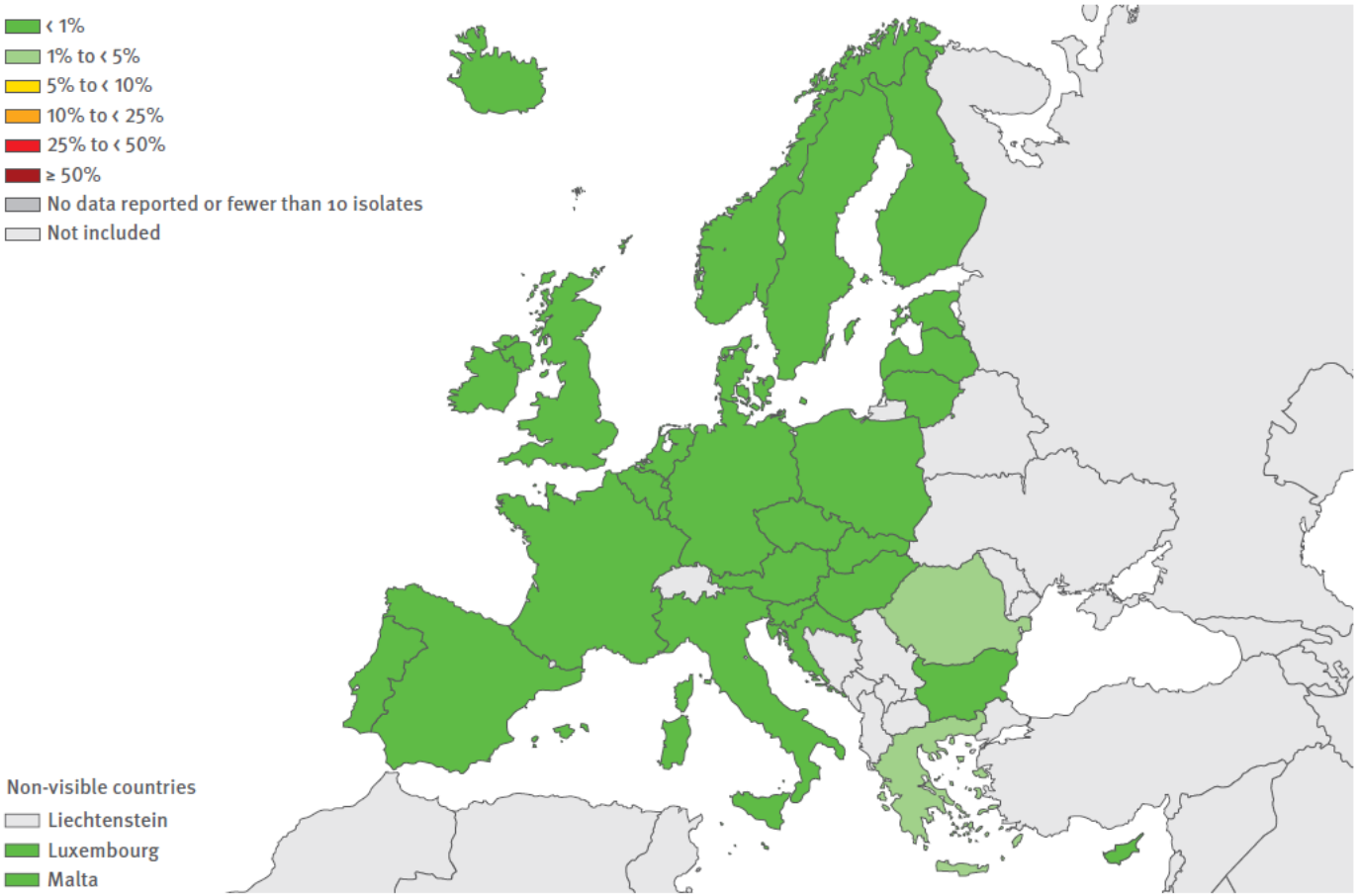
ESBL-Carba

Figure 3.4. *Escherichia coli*. Percentage (%) of invasive isolates with resistance to carbapenems, by country, EU/EEA countries, 2015



EARS-Net rapport 2015

ESBL-Carba i Noreg

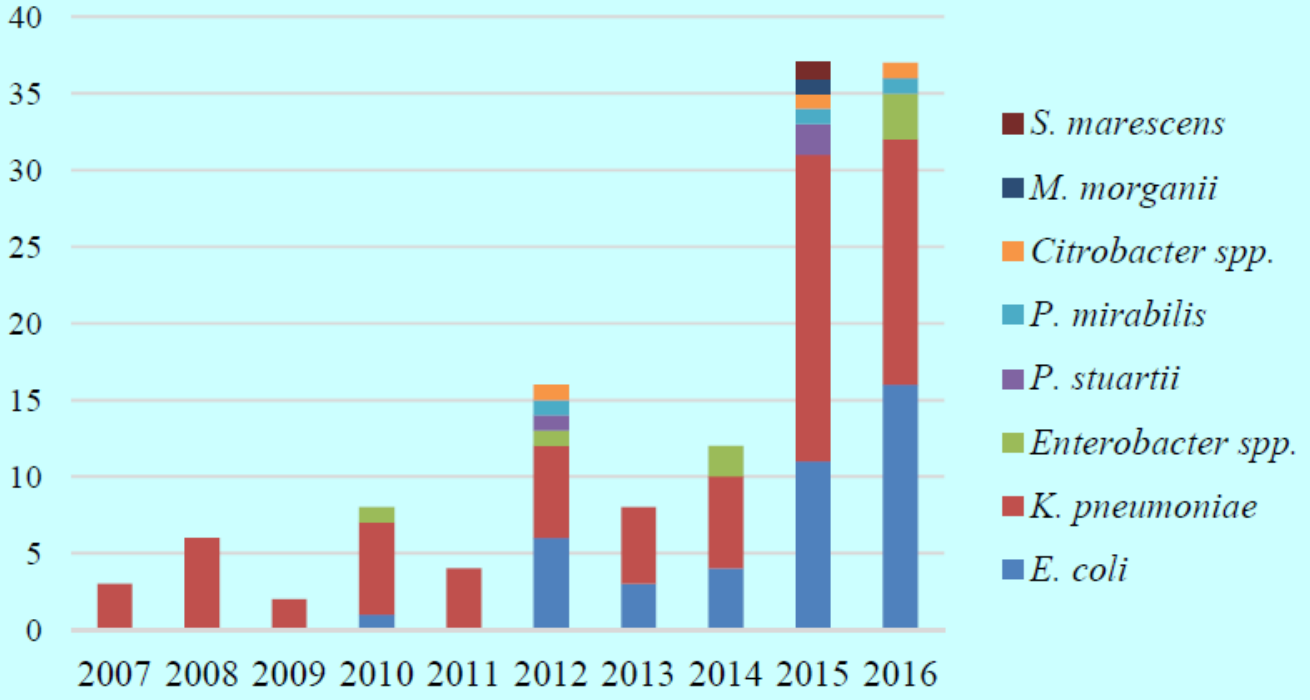


FIGURE 71. Carbapenemase-producing *Enterobacteriaceae* 2007-2016 according to species.

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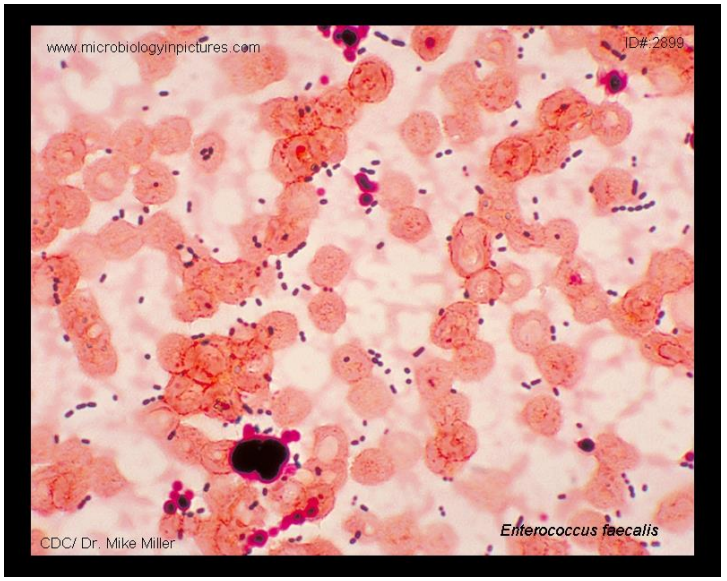
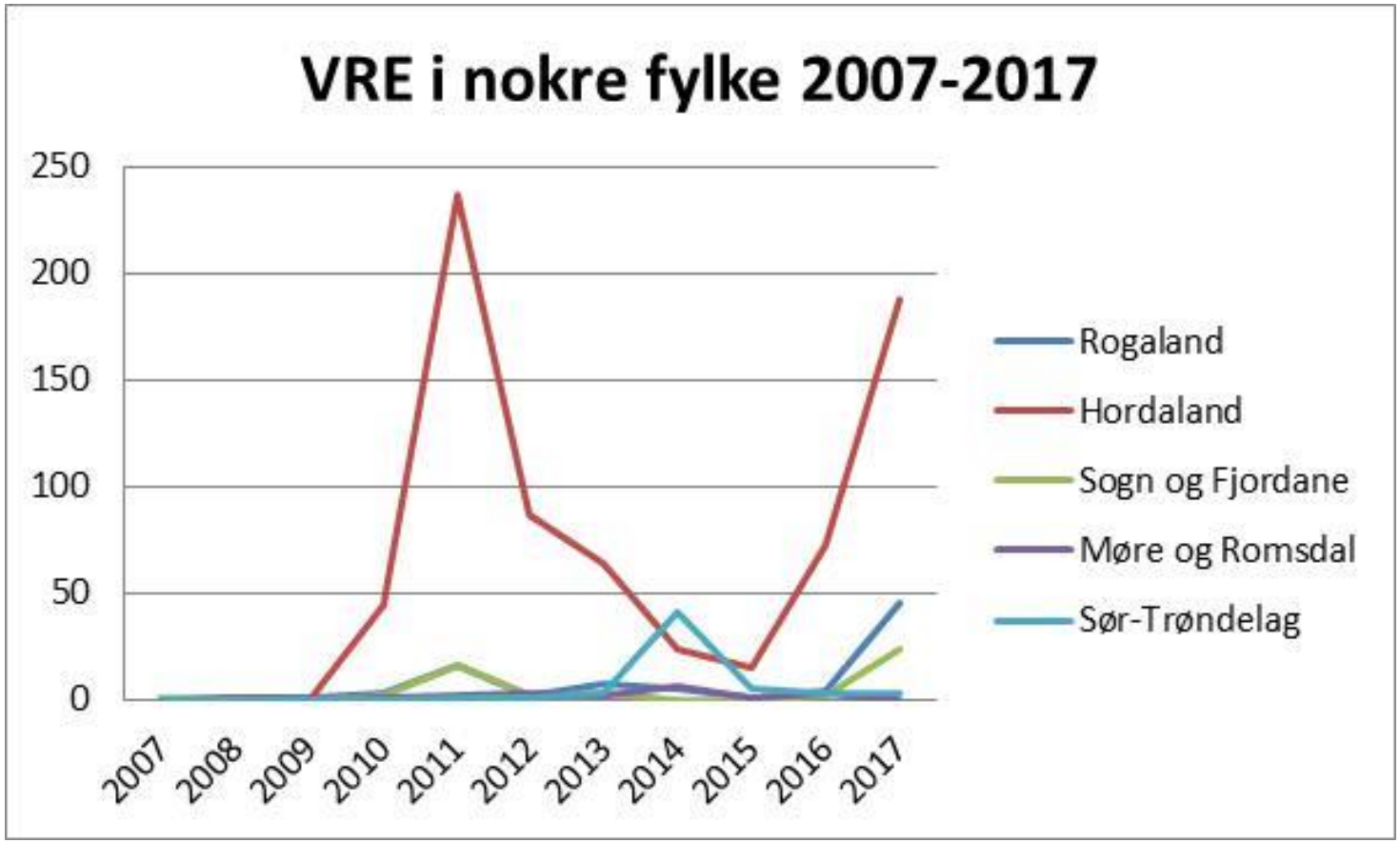
Kva er VRE?

- = vankomycin-resistente enterokokkar
- Ein tarmbakterie som kan vere vanskeleg å behandle, men som vanlegvis er følsom for vankomycin
- Det er fleire ulike typar enterokokkar, og fleire ulike resistensmekanismar for vankomycin

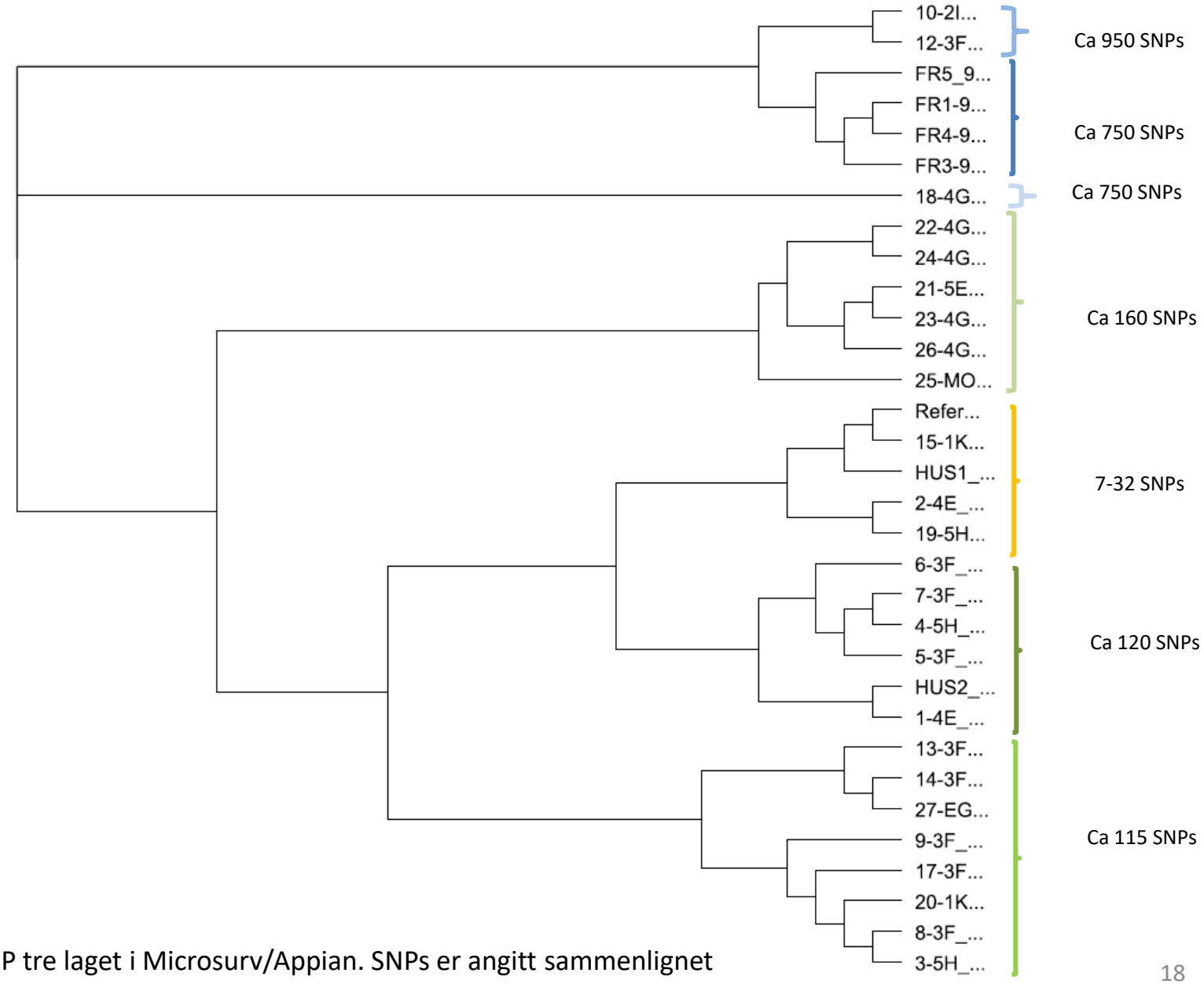


VRE

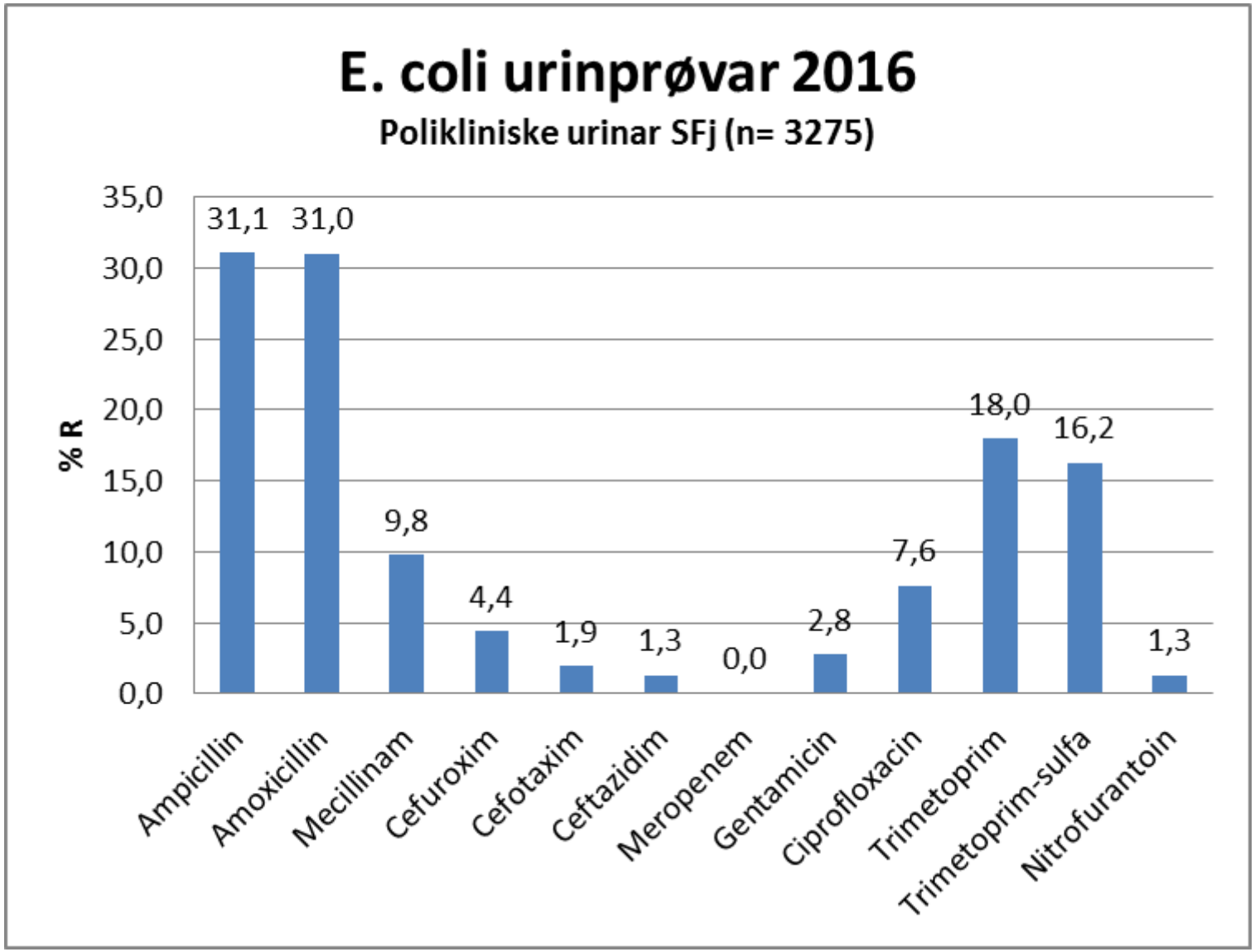


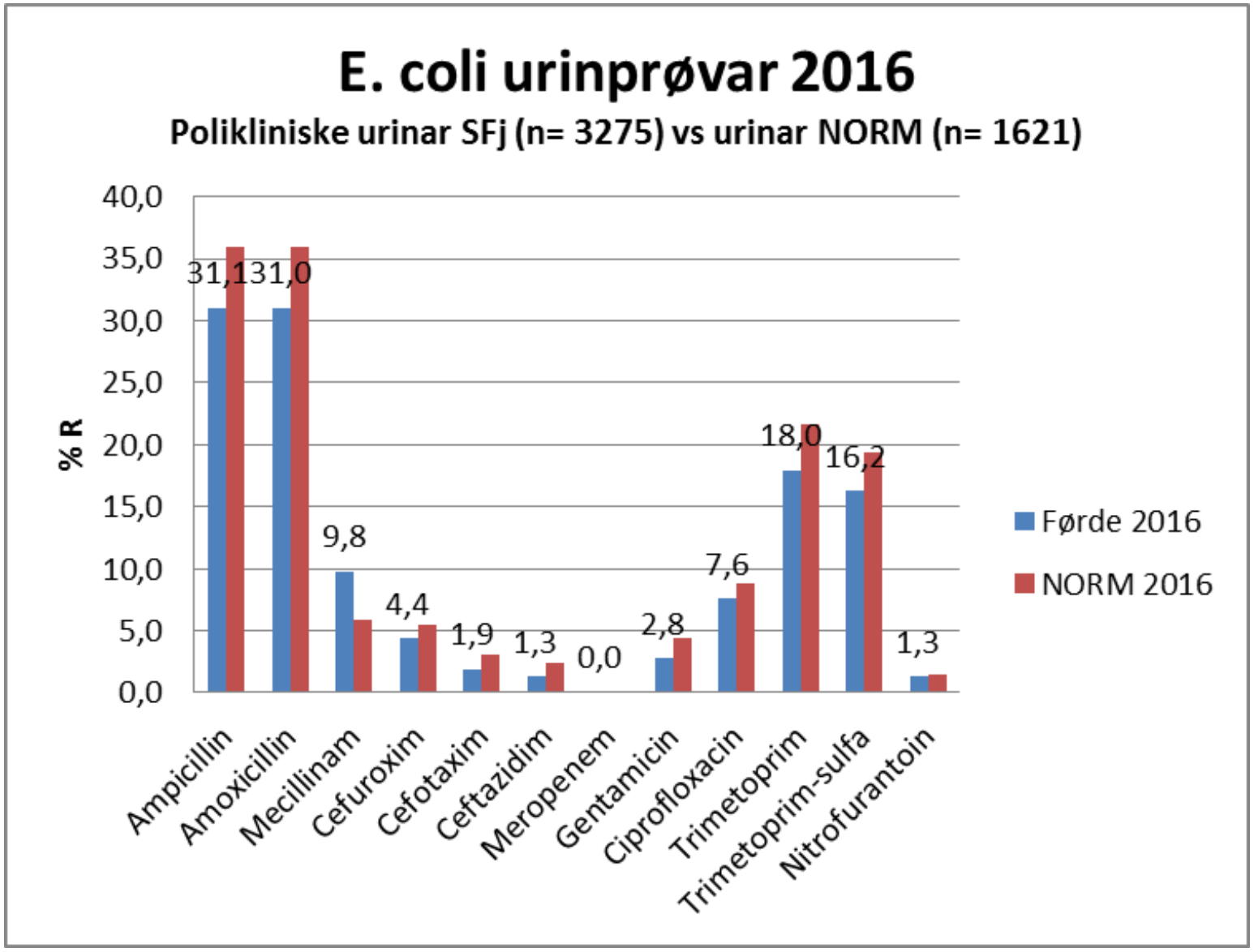
2017: VRE-utbrot ved ei avdeling i Helse Førde

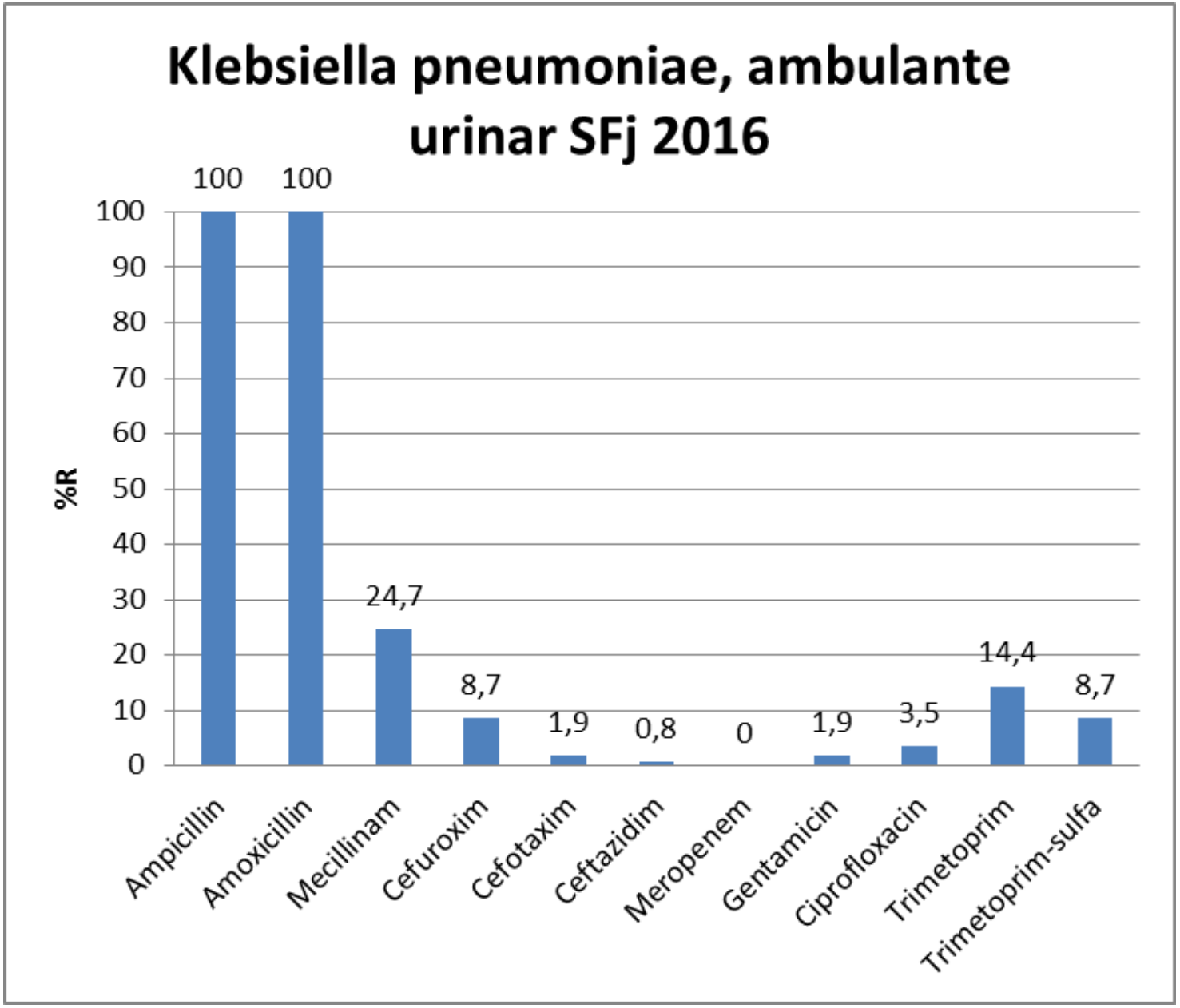
VRE (ST117) utbrudd i Helse Vest sommeren 2017.

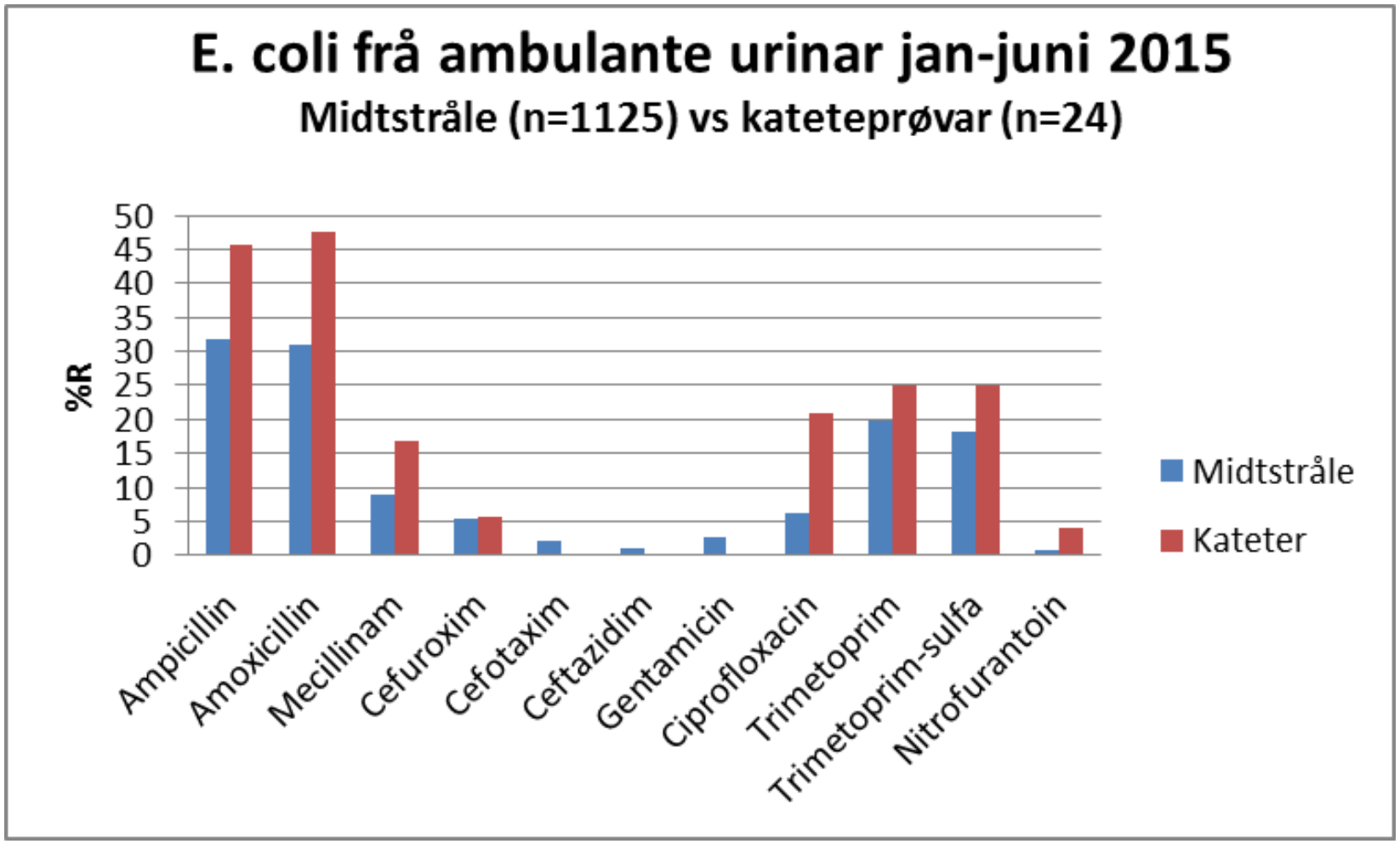


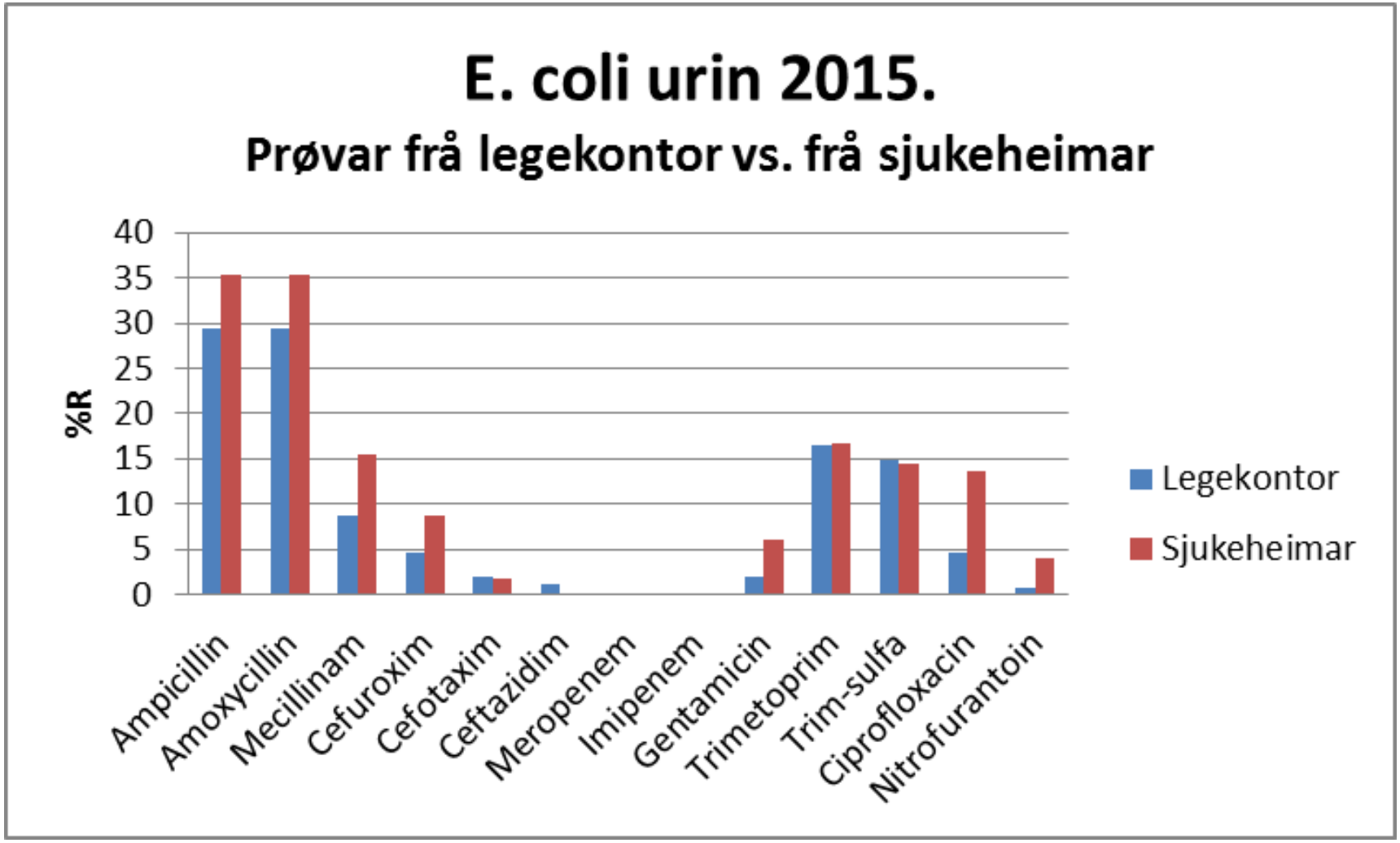
SNP tre laget i Microsurv/Appian. SNPs er angitt sammenlignet med referansegenomet (=HUS1)


E. coli urinprøvar 2016
Polikliniske urinar SFj (n= 3275)
% R
35,0
30,0
25,0
20,0
15,0
10,0
5,0
0,0
31,1
31,0
9,8
4,4
1,9
1,3
0,0
2,8
7,6
18,0
16,2
1,3
Ampicillin
Amoxicillin
Mecillinam
Cefuroxim
Cefotaxim
Ceftazidim
Meropenem
Gentamicin
Ciprofloxacin
Trimetoprim
Trimetoprim-sulfa
Nitrofurantoin


E. coli urinprøvar 2016
Polikliniske urinar SFj (n= 3275) vs urinar NORM (n= 1621)
% R
40,0
35,0
30,0
25,0
20,0
15,0
10,0
5,0
0,0
31,1
31,0
9,8
4,4
1,9
1,3
0,0
2,8
7,6
18,0
16,2
1,3
Ampicillin
Amoxicillin
Mecillinam
Cefuroxim
Cefotaxim
Ceftazidim
Meropenem
Gentamicin
Ciprofloxacin
Trimetoprim
Trimetoprim-sulfa
Nitrofurantoin
Førde 2016
NORM 2016


Klebsiella pneumoniae, ambulante urinar SFj 2016
%R
100
90
80
70
60
50
40
30
20
10
0
100
100
24,7
8,7
1,9
0,8
0
1,9
3,5
14,4
8,7
Ampicillin
Amoxicillin
Mecillinam
Cefuroxim
Cefotaxim
Ceftazidim
Meropenem
Gentamicin
Ciprofloxacin
Trimetoprim
Trimetoprim-sulfa


E. coli frå ambulante urinar jan-juni 2015
Midtstråle (n=1125) vs kateteprøvar (n=24)
%R
50
45
40
35
30
25
20
15
10
5
0
Ampicillin
Amoxicillin
Mecillinam
Cefuroxim
Cefotaxim
Ceftazidim
Gentamicin
Ciprofloxacin
Trimetoprim
Trimetoprim-sulfa
Nitrofurantoin
Midtstråle
Kateter


E. coli urin 2015.
Prøvar frå legekontor vs. frå sjukeheimar
%R
40
35
30
25
20
15
10
5
0
Ampicillin
Amoxycillin
Mecillinam
Cefuroxim
Cefotaxim
Ceftazidim
Meropenem
Imipenem
Gentamicin
Trimetoprim
Trim-sulfa
Ciprofloxacin
Nitrofurantoin
Legekontor
Sjukeheimar

Spørsmål?