



UMC Utrecht

Decontamination of ESBL and carbapenem resistant gram-negative bacteria in ICU patients

On behalf of the R-GNOSIS ICU study group:

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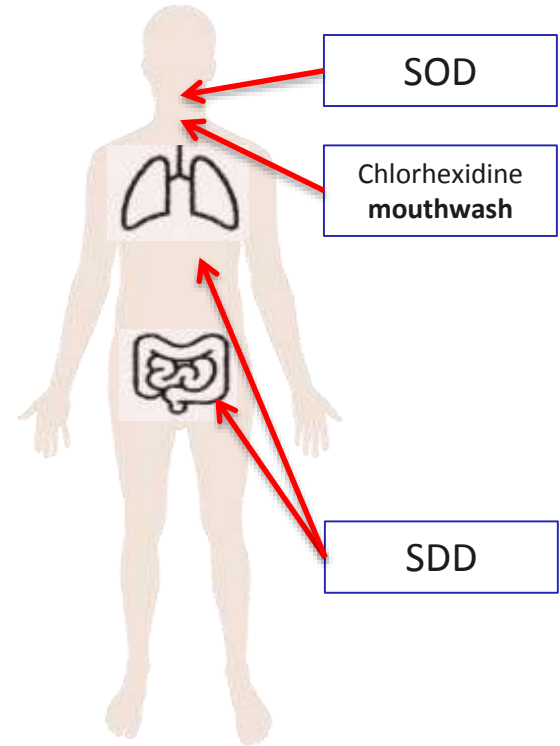
Transparency Declaration

- R-GNOSIS is funded by the European Union's 7th Framework Programme
 - Grant number 282512



Decontamination

- Loss of colonization (decolonization)
- Selective decontamination
 - Topical antibiotics
 - SDD: Colistin, tobramycin, nystatin
 - Mouthpaste & gastro-enteral suspension
 - SOD:
 - Mouthpaste only
 - Prevent overgrowth of pathogenic micro-organisms
 - *Staph. Aureus*, Yeast, Gram-negative bacteria
- Non-selective decontamination → antiseptics
 - Chlorhexidine digluconate 1% **oral gel**



Selective decontamination & resistant micro organisms

- SDD and SOD may eradicate resistant micro-organisms
 - Overall reduction in prevalence of resistant bacteria?
 - Measure to contain outbreak of resistant bacteria?
- Previous studies heterogeneous
 - Methods: control group, follow-up, target
 - No studies on chlorhexidine mouthwash
 - Results: effectiveness, sustainability of decolonisation



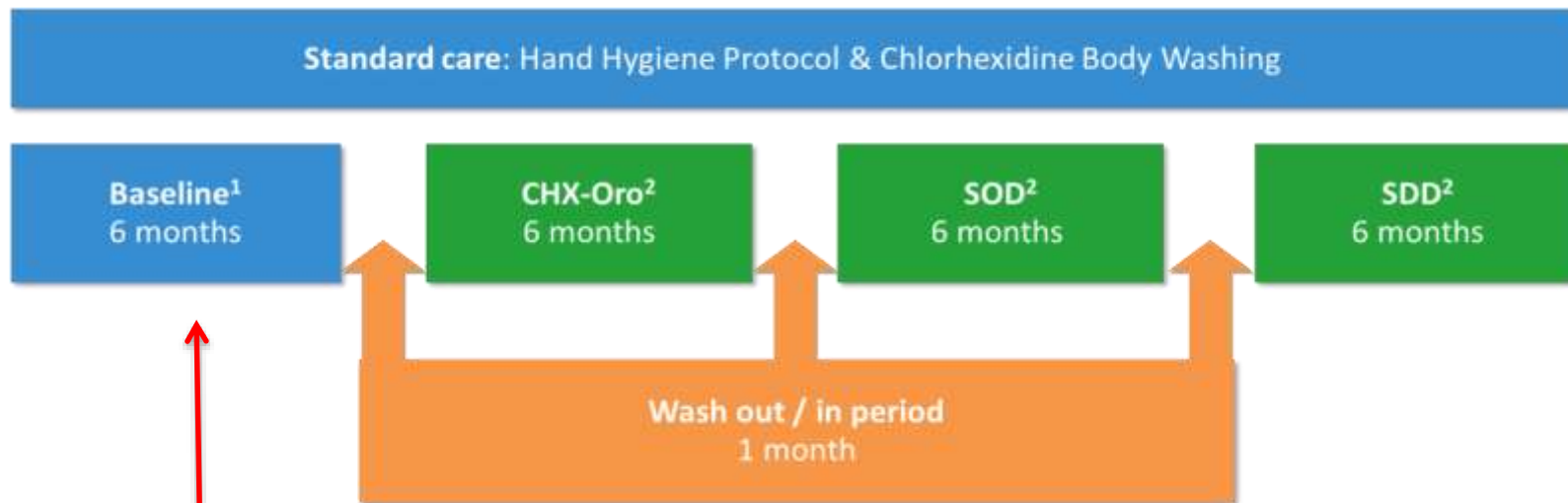
Research question

What is the effectiveness of:

- Decontamination strategies (SDD / SOD / CHX) on
- Decolonization of ESBL* and carbapenem resistant GNB from
 - Rectum
 - Respiratory tract
- Compared to no decontamination strategy
- In mechanically ventilated ICU patients

* 3rd gen cephalosporin resistant enterobacteriaceae





¹ May include CHX 0.12/0.20% mouthwashes if this was standard care before

² Randomised order per ICU



- 6/13 hospitals included in this sub-analysis
 - Completed all study periods
- Patients ventilated > 24 hours were included
- Surveillance cultures 2/week, selective media (chrom-ID[®], bioMérieux)
 - Rectum
 - Respiratory tract

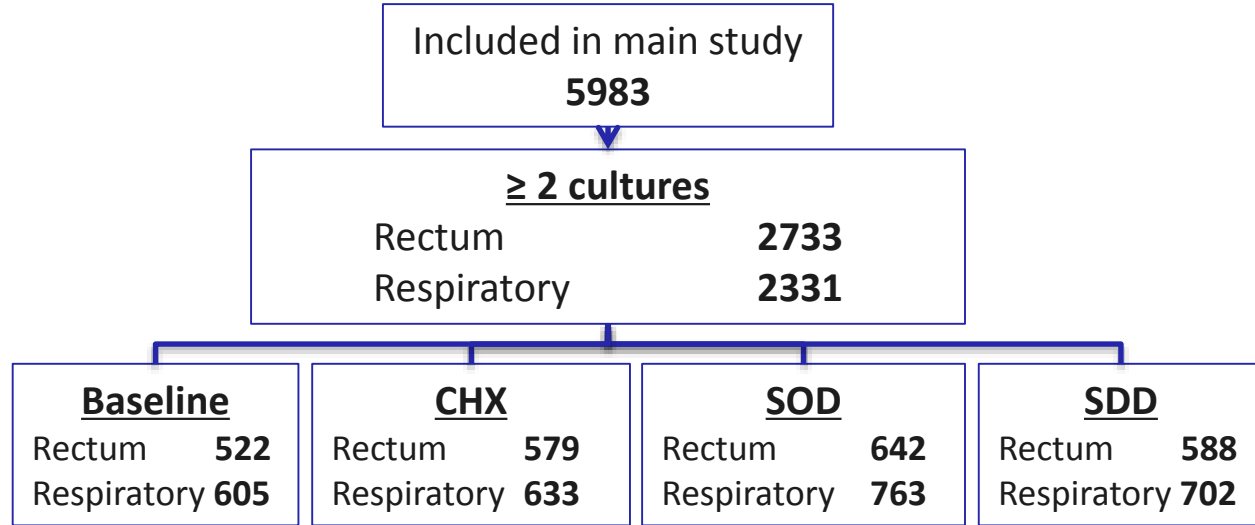


Methods – definition

- ESBL = 3rd gen. cephalosporin R enterobacteriaceae
 - I/R for Cefotaxime, Ceftriaxone or Ceftazidime
- Carbapenem resistant gram negative bacteria
 - I/R for Meropenem, Imipenem or Doripenem
- At risk if positive culture on day 1-5 of ICU stay, until
 - Decolonisation:
 - negative culture until ICU discharge or
 - susceptible GNB until ICU discharge or
 - Discharge



Results – flow chart



Cohort sub-analysis

3GCR rectum	83	(16%)	88	(15%)	88	(14%)	76	(13%)
3GCR respiratory	42	(7%)	41	(6%)	40	(5%)	40	(6%)
CR-GNB rectum	27	(5%)	22	(4%)	15	(2%)	19	(3%)
CR-GNB respiratory	18	(3%)	13	(2%)	16	(2%)	20	(3%)

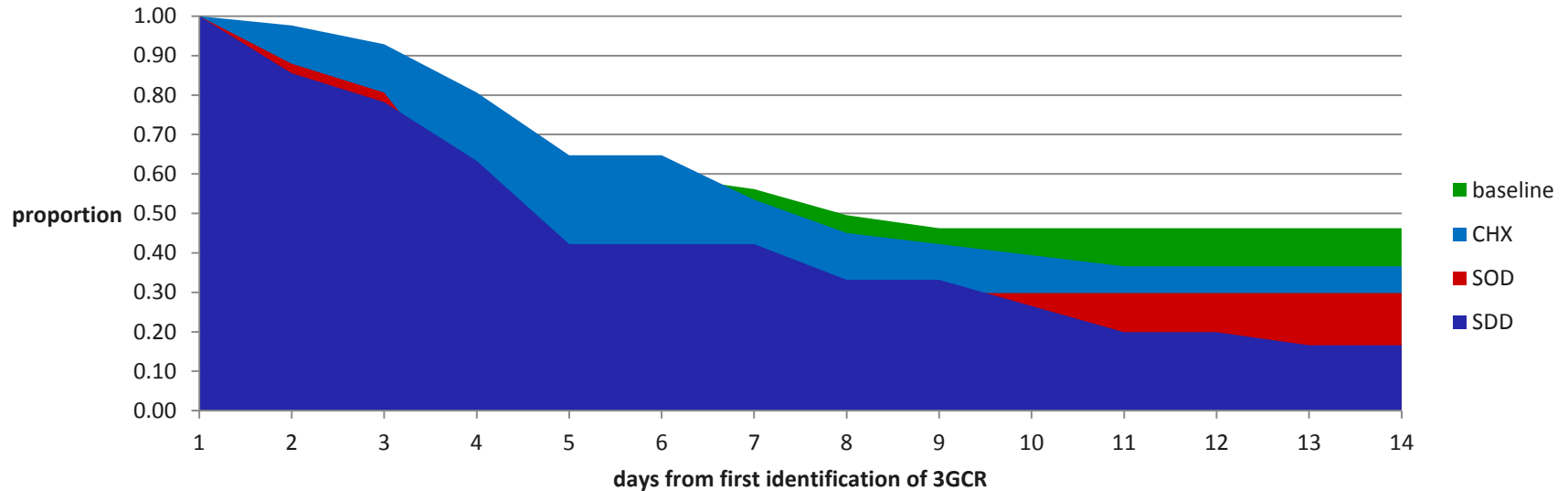
Number colonized (%) with indicated MDR-GNB at inclusion



Colonization over time - respiratory



proportion colonized with 3GCR respiratory tract



Results – respiratory tract

Decolonisation rate ratios (95% CI)

More decontamination of ESBL during SOD and SDD



	Baseline	CHX	SOD	SDD
	rate ratio*	rate ratio* 95% CI	rate ratio* 95% CI	rate ratio* 95% CI
3rd gen. cephalosporin R. EB	1	0,91 (0,50-1,64)	2,24 (1,26-4,03)	2,08 (1,19-3,86)
Carbapenem resistant GNB	1	0,49 (0,11-1,71)	1,18 (0,41-3,33)	0,62 (0,23-1,67)

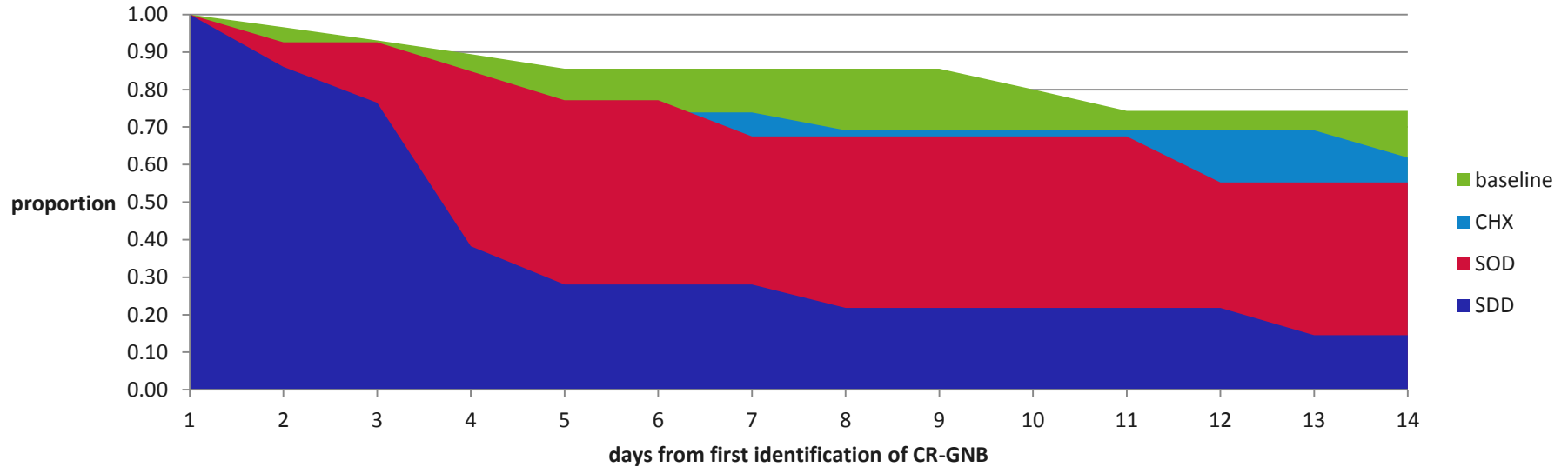
* compared to baseline, rate per 1000 days at risk



Colonization over time - rectum



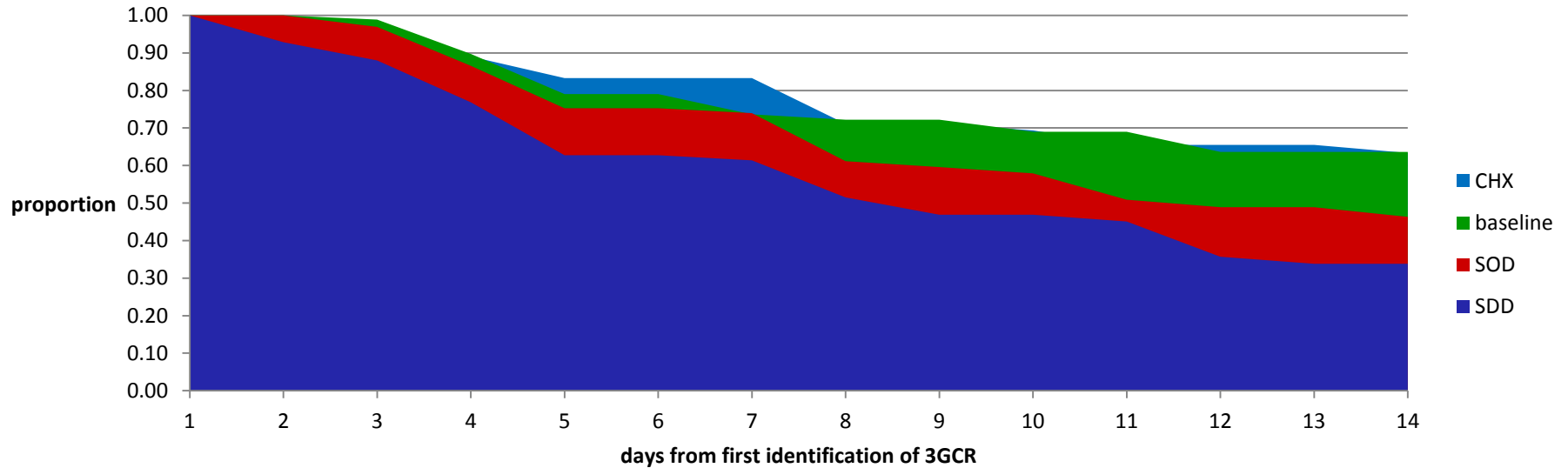
proportion colonized with CR-GNB in rectum



Colonization over time - rectum



proportion colonized with 3GCR in rectum



Results – rectum

Decolonisation rate ratios (95% CI)

More decontamination during SDD for ESBL and carbapenem-R



	Baseline	CHX	SOD	SDD
	rate ratio*	rate ratio* 95% CI	rate ratio* 95% CI	rate ratio* 95% CI
3rd gen. cephalosporin R. EB	1,00	0,89 (0.55, 1.45)	1,36 (0,87-2,14)	2,18 (1,41-3,39)
Carbapenem resistant GNB	1,00	0,95 (0,33-2,68)	1,02 (0,27-3,26)	4,96 (2,17-12,02)

* compared to baseline, rate per 1000 days at risk



Discussion

- Low level of colistin resistance in participating hospitals
 - $\leq 1\%$
- Strengths
 - Control period
 - Follow-up until discharge
 - Large cohort
 - Antiseptics compared to antibiotics
 - Uniform surveillance scheme
 - No change in infection control policy
- Limitations
 - No long-term effect and no information after discharge
 - Could be suppression rather than decolonisation



Ecological benefits

Temporary suppression



Lower prevalence of ESBL and carbapenem resistant gram negative bacteria



Less cross-transmission?



Less infections?



Conclusion



- During ICU stay:
 - Decontamination of carbapenem-R GNB from rectum by SDD
 - Decontamination of cephalosporin-R enterobacteriaceae from:
 - rectum by SDD
 - respiratory tract by SOD and SDD
 - No decontamination by chlorhexidine 1% oral gel



Overall low level of colistin resistance

E-Poster: Tuesday 12:54 - 12:59

The prevalence of resistance to Colistin during Selective Decontamination in European Intensive Care Units

N.L Plantinga et al.

- Watch Presentation **#EP0930**
- View Abstract **#3791**



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