



Scientific Institute of Public Health



Validation study : Secondary research questions

National surveillance of ICU-acquired
nosocomial infections

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1



Validation study: objectives

- **Determination of Sensitivity & Specificity** of reported ICU-surveillance data (PN & BAC) against a reference gold standard.
- Evaluate the **accuracy** of all data reported to the surveillance.
- **Exhaustiveness** (completeness) of the denominator.



Secondary research questions

- Assessment of workload associated with data collection and entry.
- Identification of factors influencing the Sens. & Spec. of the infection data
- Profile of hospitals refusing to participate to the validation study:
 - Bias in the validation results?



Methods - 1

- Descriptive analyses of hospital questionnaire data
- Study of risk factors of sens en spec :
 - Hospital data (Questionnaire)
 - Surveillance data (patient level)
- Analysis at patient level (correction factor for hospital size) using logistic regression
- Reasons of refusal: same profile ?



Global results

- 35 hospitals included in the analysis
- 906 validated records \in 4097 patient files (LOS \geq 2 days)

- 5 hospitals refused to participate to the validation study
- 5 hospitals : participation not possible

Results (ongoing, n=35 hosp.)

	Se % (95%CI)	Sp % (95%CI)
Pneumonia	53,3 (45,2-61,3)	98,6 (97,8-99,1)
Bacteraemia	61,9 (45,6-76,0)	99,4 (98,9-99,7)

Completeness of denominators : 81,2% for all patients staying >48h in ICU



Global results

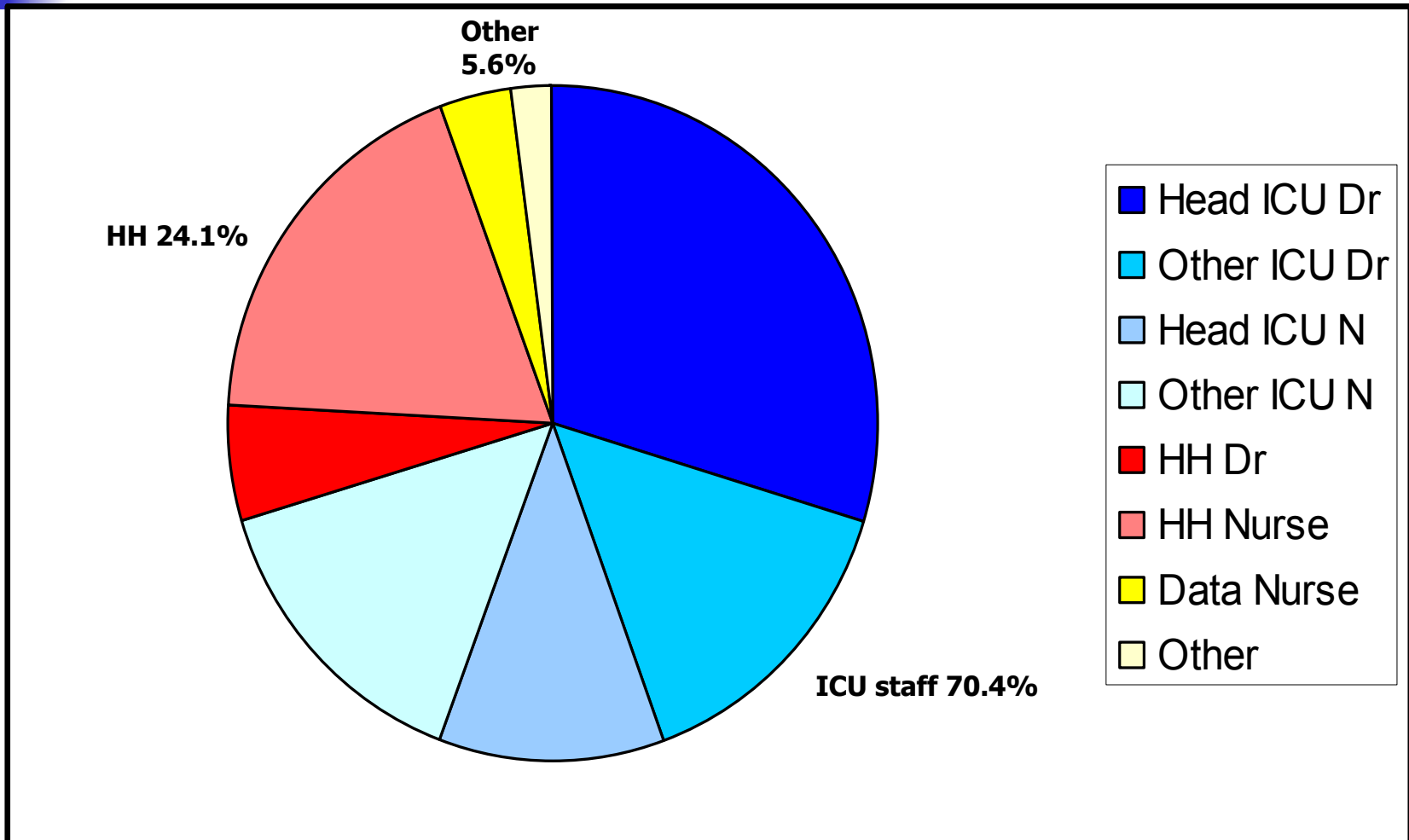
- ICU type :
 - 88,6% polyvalent
 - 5,7% surgical unit
 - 2,9% medical unit
 - 2,9% coronary unit
- Mean ICU size = 11 beds (range 4-32)
- Mean length of stay = 7 days (range 3-222)



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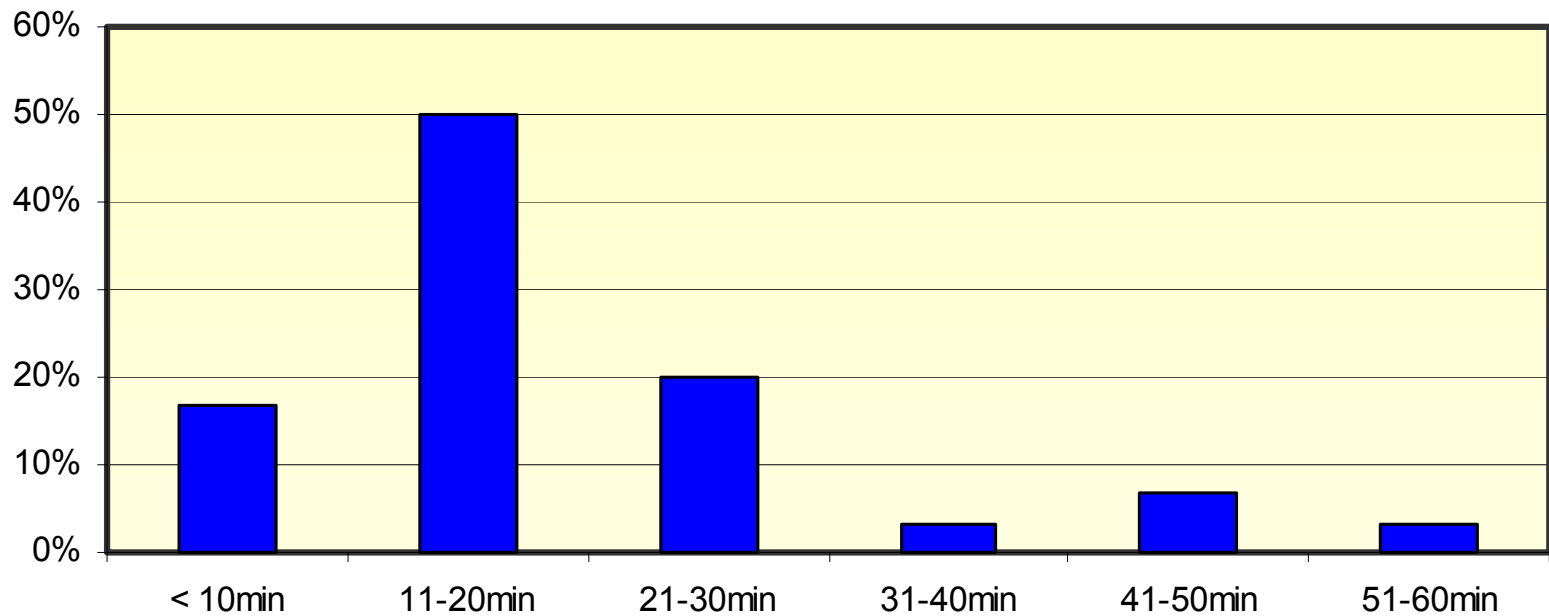
Who collects ICU data?



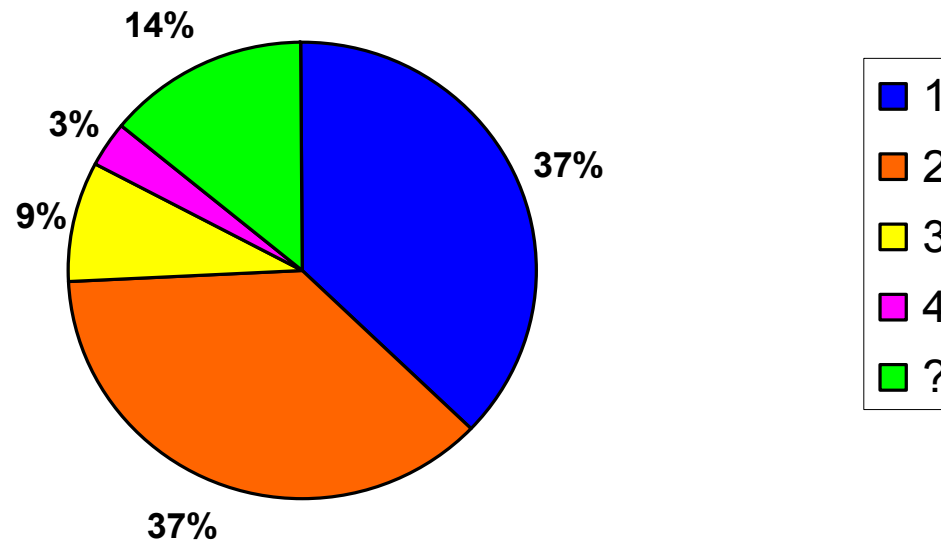
Workload

Necessary time per patient

(mean 20')



Number of persons involved in surveillance





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Independent risk factors for FN & FP Pneumonia: *decision to participate*

	OR	95% CI	P-value
In ICU, intensivist involved	1		
In ICU, intensivist not involved	0.6	(0.4-0.9)	0.008
Outside ICU, intensivist involved	0.7	(0.5-0.9)	0.019
Outside ICU, intensivist not involved	6.4	(3.7-11.1)	<0.001
Other (non-med) personnel involved	0.7	(0.5-1.0)	0.057

Independent risk factors for FN & FP

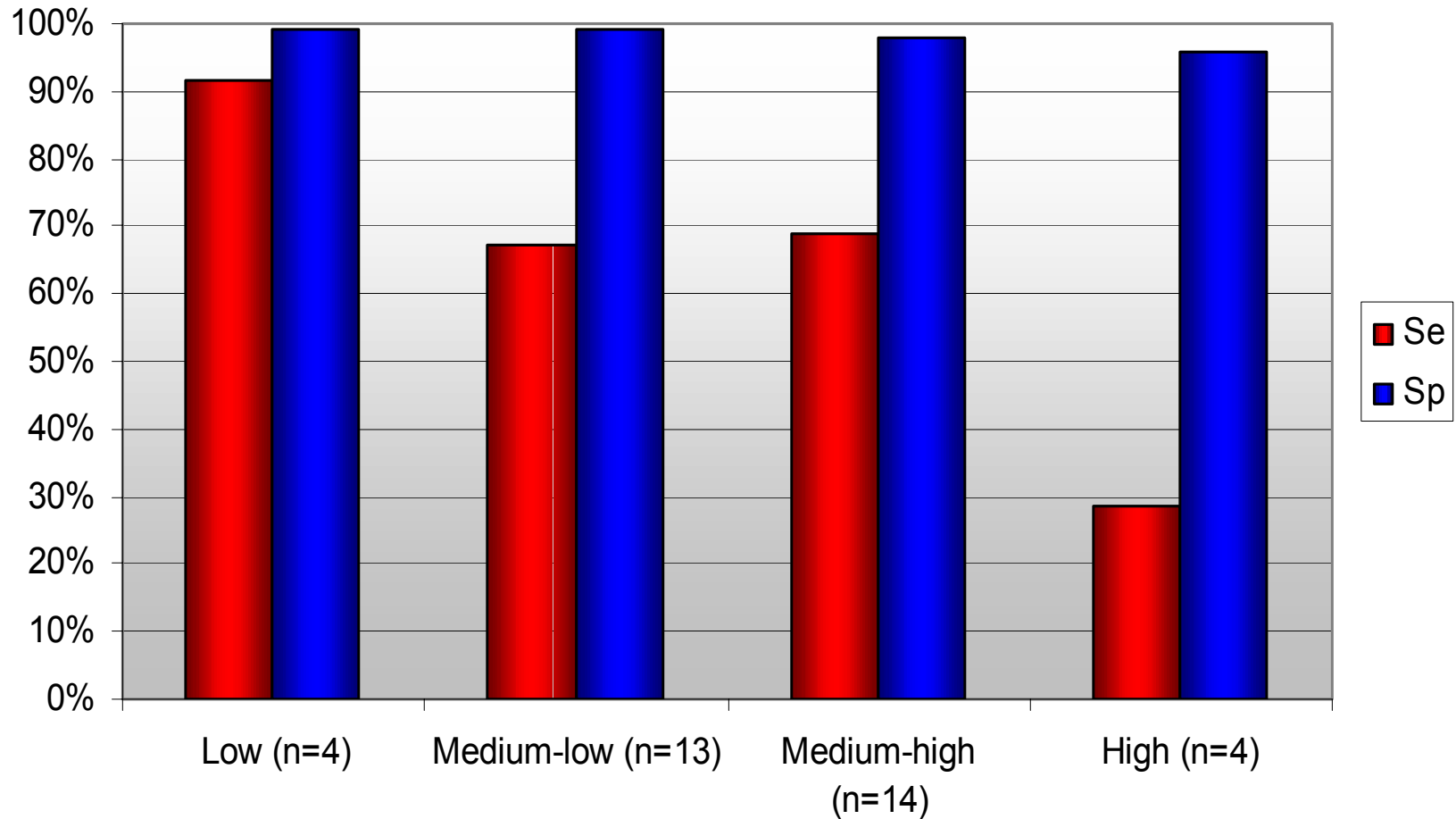
Pneumonia: *adherence to protocol definitions*

	OR	95% CI	P-value
Selection of patients (wrong)	0.4	(0.2-0.8)	0.015
≥3 major criteria to report PN	2.3	(1.6-3.1)	<0.001
Infection file filled in if no micro-org.	0.3	(0.2-0.4)	<0.001
Infections reported on both files	0.4	(0.3-0.5)	<0.001
Early PN included	0.7	(0.5-0.9)	0.021

Independent risk factors for FN & FP Pneumonia: *Other characteristics*

	OR	95% CI	P-value
PN risk score ≥ 30	4.0	(2.3-6.9)	<0.001
≥ 1 of discordant values	4.0	(2.1-7.6)	<0.001
Zero infection rate	1.6	(1.3-2.2)	<0.001

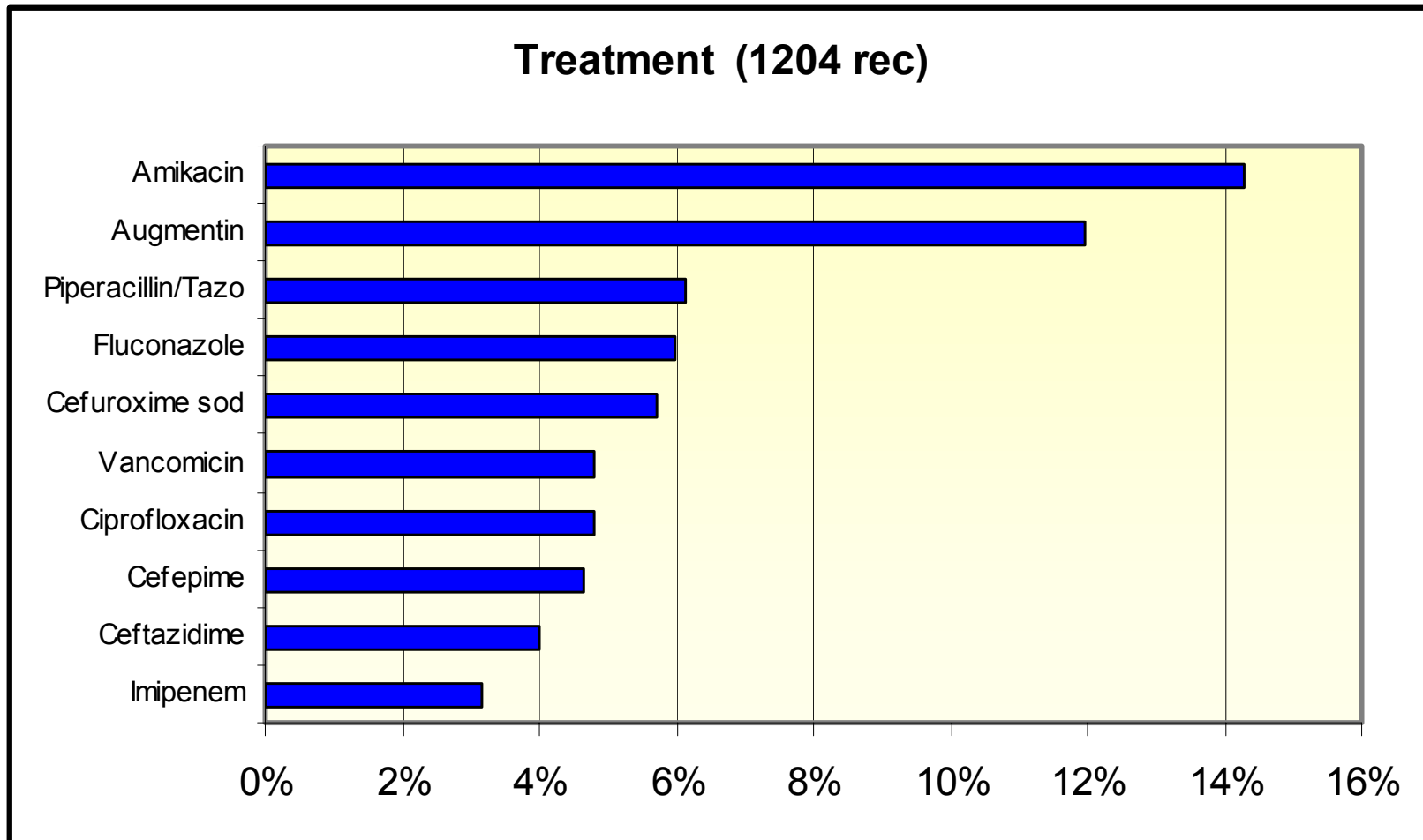
Se & Sp according to FN/FP score



Mean FN/FP risk profile in hospital

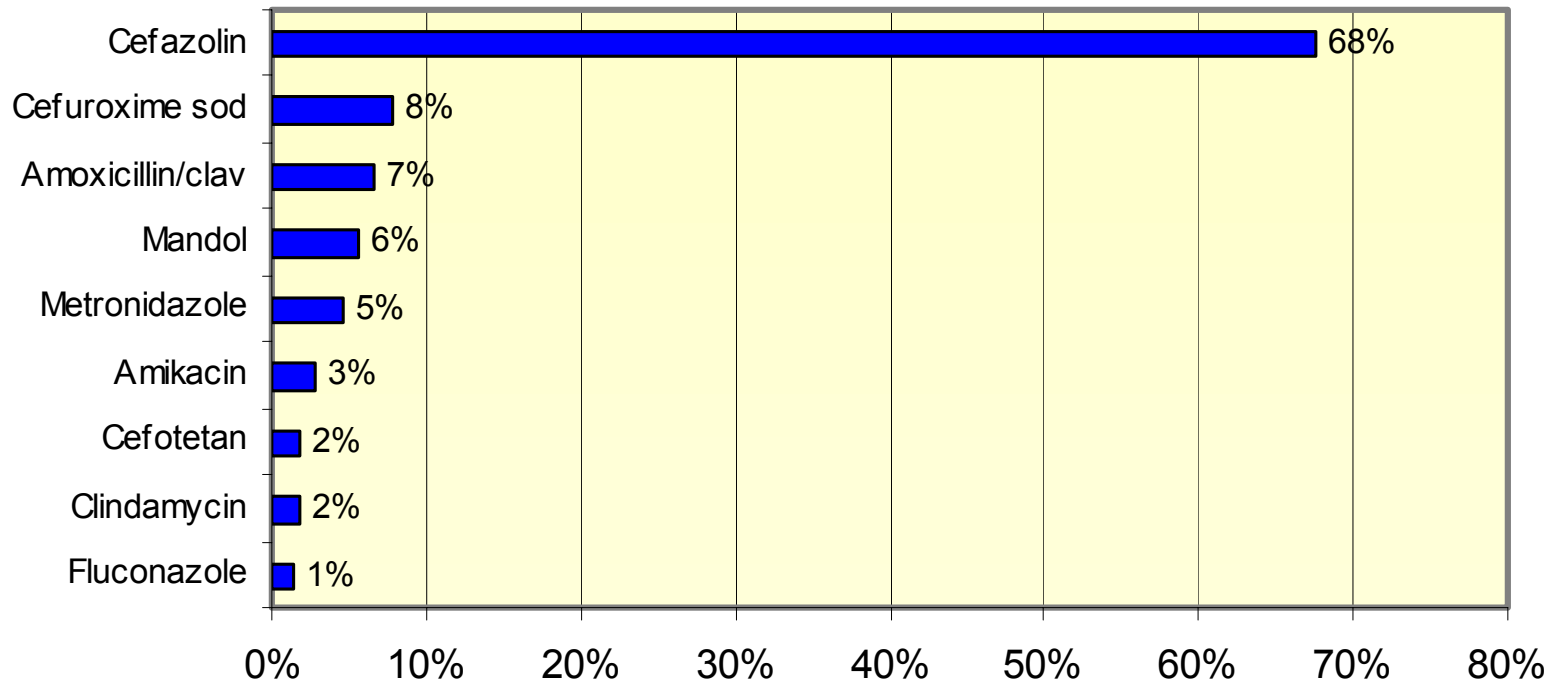


Most used antimicrobials (1)

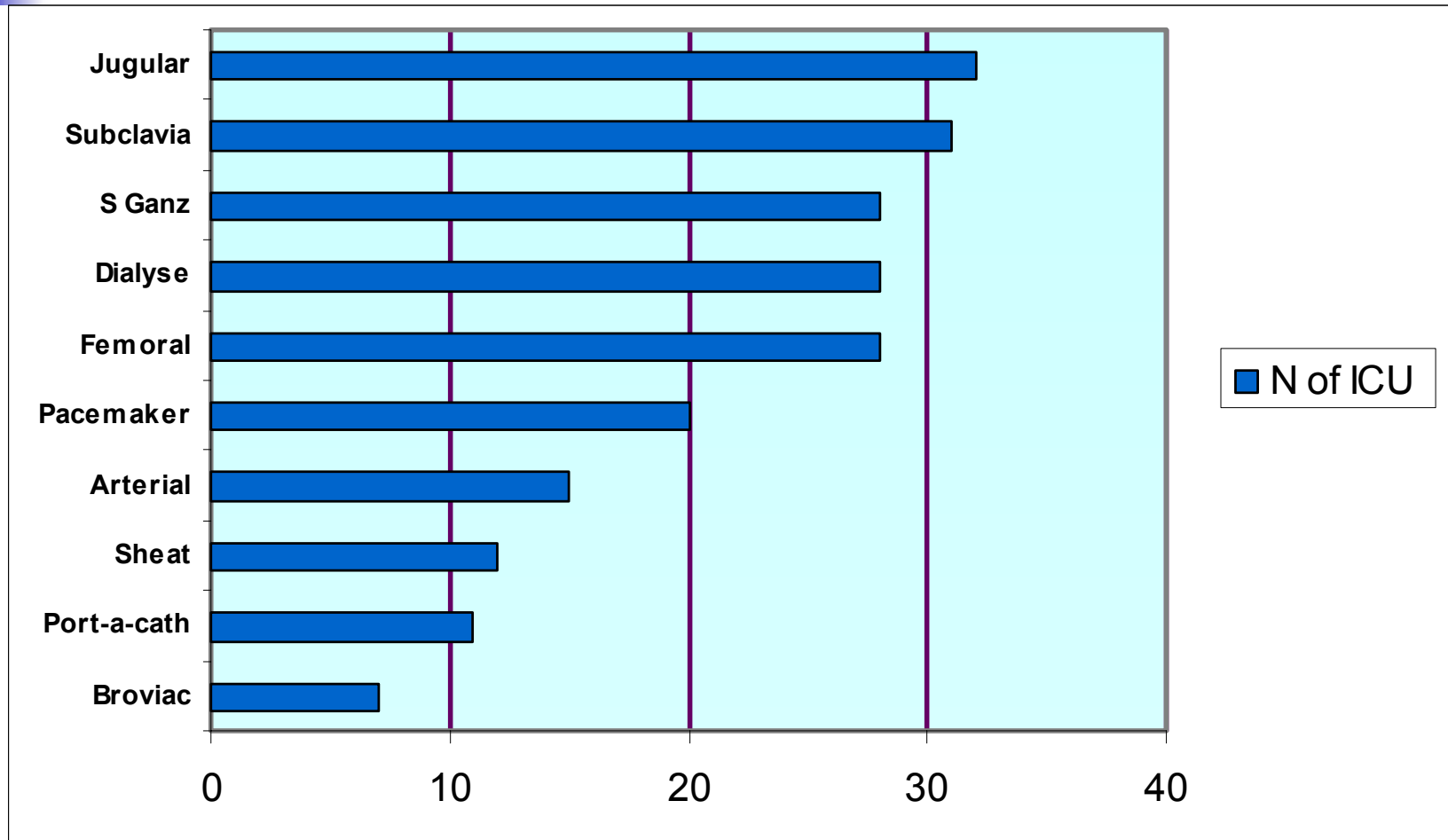


Most used antimicrobials (2)

Prophylaxis (309 records)



Registered catheters by Belgian ICUs

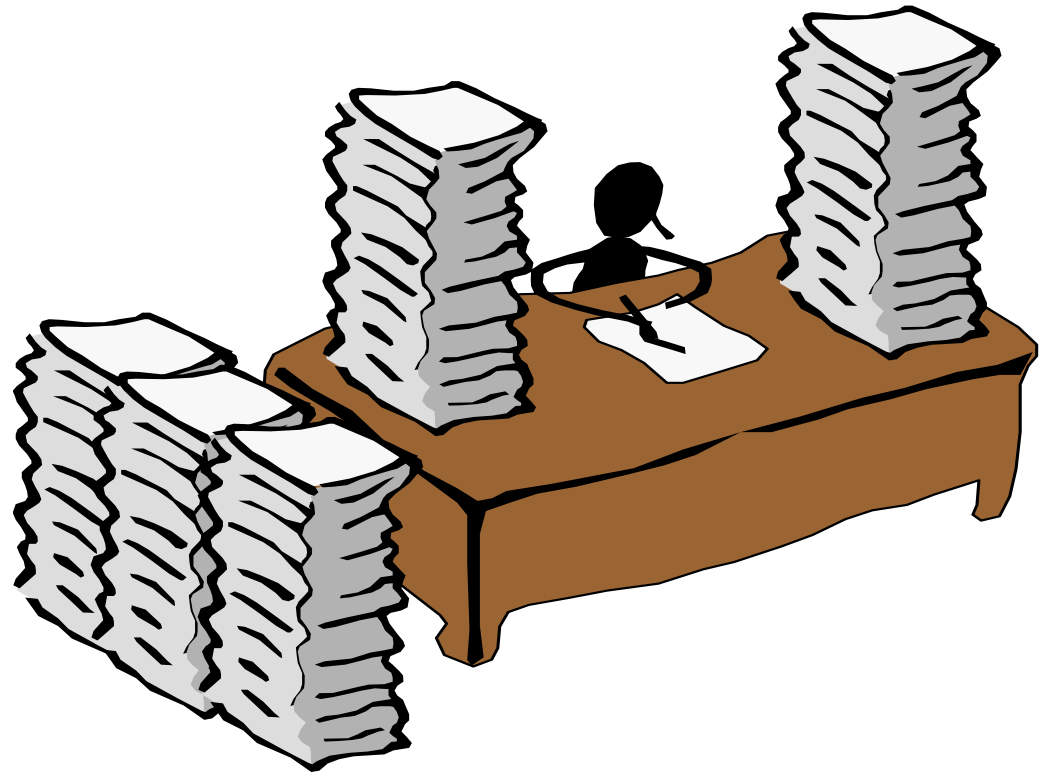
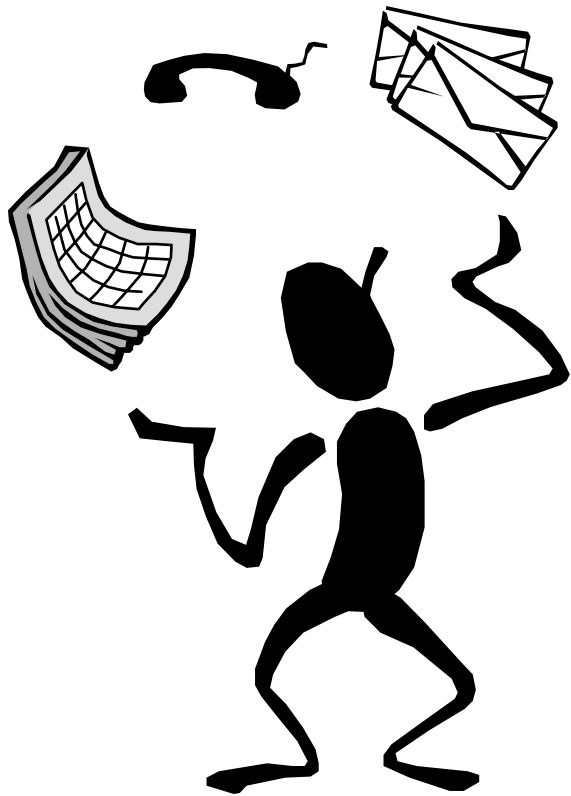




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Reasons of refusal



Profile of participation versus refusal: patient characteristics (pts >48h)

	N hosp	Mean LOS in days (NS)	Tot. catheter use % (NS)	VUR % (NS)
Participation	35	6.9	88.0	39.1
Refusal	5	7.5	83.2	34.4
Participation not possible	5	5.9	71.3	29.0

Profile of participation versus refusal: quality of data

	N hosp	Tot. missing & discordant (%) <i>(NS)</i>	Tot. major errors (%) <i>(NS)</i>
Participation	35	52.0	1.5
Refusal	5	53.5	1.8
Participation not possible	5	88.4	1.9

Profile of participation versus refusal: infection rates

	N hosp	BAC / per 1000 ptdays (NS)	PN / per 1000 ptdays (p=0.04)
Participation	35	3.1	9.0
Refusal	5	3.6	12.3
Participation not possible	5	3.7	13.8



Discussion – 1

- Collection of data mainly done at the ICU
- Number of persons involved is rather low (mean 2)
- Time invested : rather high



Discussion – 2

Important risk factors for the FN en FP pneumonia

- Zero infection rate
- Intensivist not involved nor in decision to participate nor in data collection
- Infection file not filled in if no micro-org identified
- Diagnostic criteria too specific for PN:
 - Wait for 3 major criteria
 - Early PN not included
- PN risk score of ≥ 30





Discussion – 3

- Profile of hospitals participating to validation study versus refusing & 'participation not possible' :

No significant difference in patient characteristics, quality of data & infection rates (with exception of PN rate)

→ Probably no bias



Conclusions

- Identifies methodology problems and factors influencing Sens. & Spec. of the surveillance.
- Gives a better idea of field work
- Better targets the ICPs' training.