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Efficiency of decontamination measures in the prevention of surgical site infection in spinal surgery

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Background

- Surgical Site Infections (SSI) are responsible for increased mortality, morbidity and costs

Excess length of stay, charges, and mortality attributable to medical injuries during hospitalization, Zhan, JAMA, 2003

- Major concern in spine surgery : 2-10 %

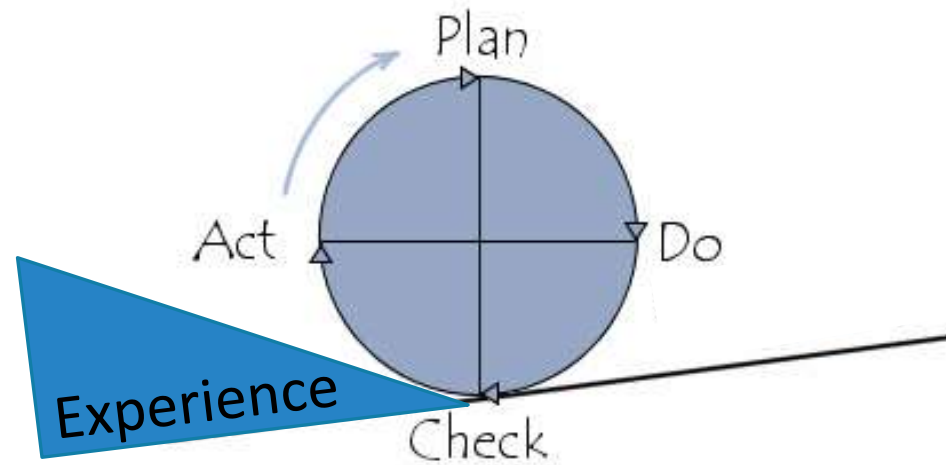
Surgical-site infection in spinal injury: incidence and risk factors in a prospective cohort of 518 patients , Dubory A, Eur. Spine Journal, 2014

- Well-known risk factors : age, diabetes, cancer, paralysis, extent of surgical procedure...

Risk factors for surgical site infections following spinal fusion procedures: a case-control study, Rao, Clin Infect. Dis., 2011

History of intervention

- 2011 (Beaujon hospital) : Increase of SSI incidence
- Analysis and implementation of preventive measures
- 2014 : Move to an other hospital (HEGP): Recurrence of SSI raise





Rational

- Proved efficiency in cardiac surgery

Significant reduction of endemic MRSA acquisition and infection in cardiothoracic patients by means of an enhanced targeted infection control programme , Schelez S, J. Hosp. Infect., 2005

- Growing evidences for utility in orthopedic surgery

Staphylococcus aureus Screening and Decolonization in Orthopaedic Surgery and Reduction of Surgical Site Infections, Chen, AF, CORR, 2013

- No french nor european guidelines for spine surgery

Objectives

- Evaluation of the impact of decolonization measures on SSI's incidence
- Evaluation of the specific impact of decolonization measures on *Staphylococcus aureus*

Methods

- 01/2008 – 12/2013

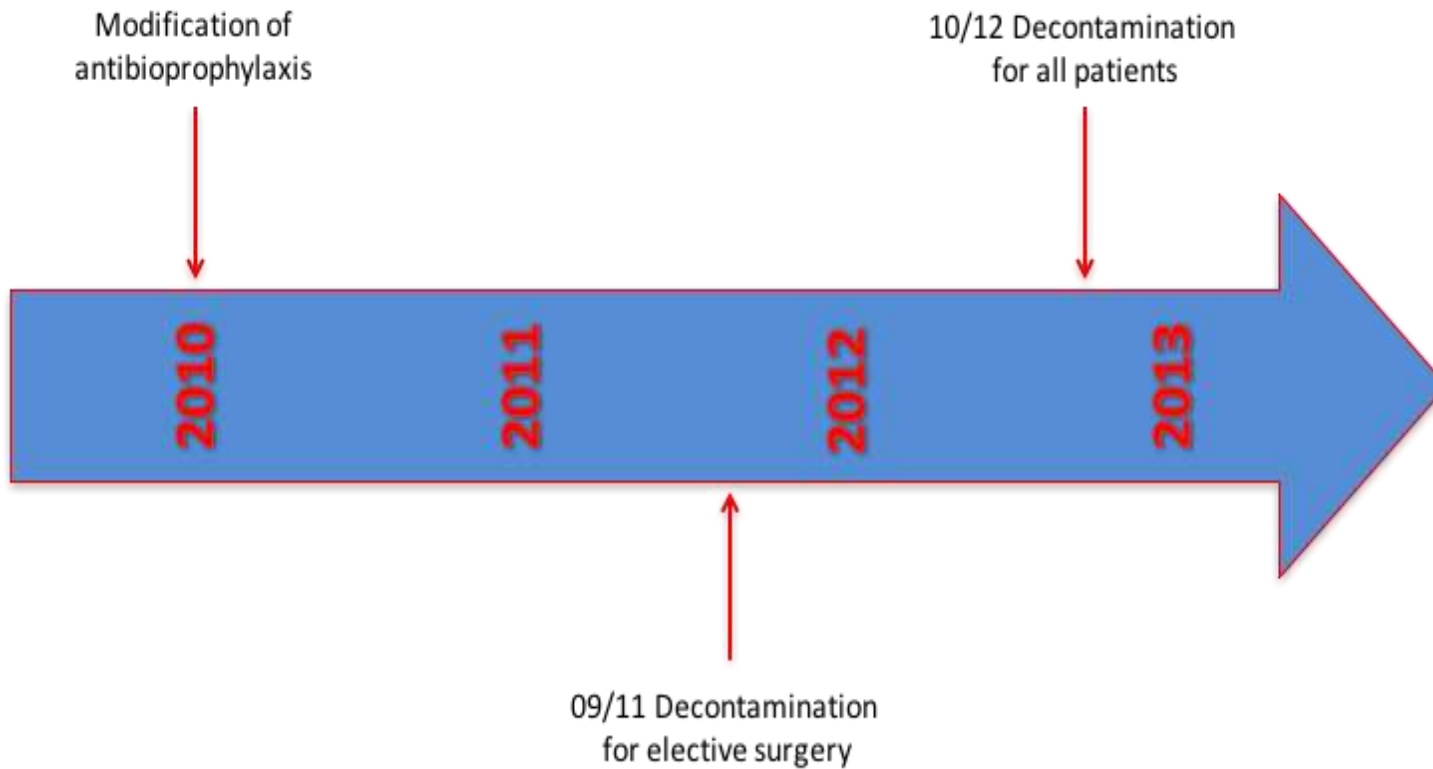
- All spinal procedures

- Exclusion when past SSI

- Analysis with **interrupted time series model**



Methods



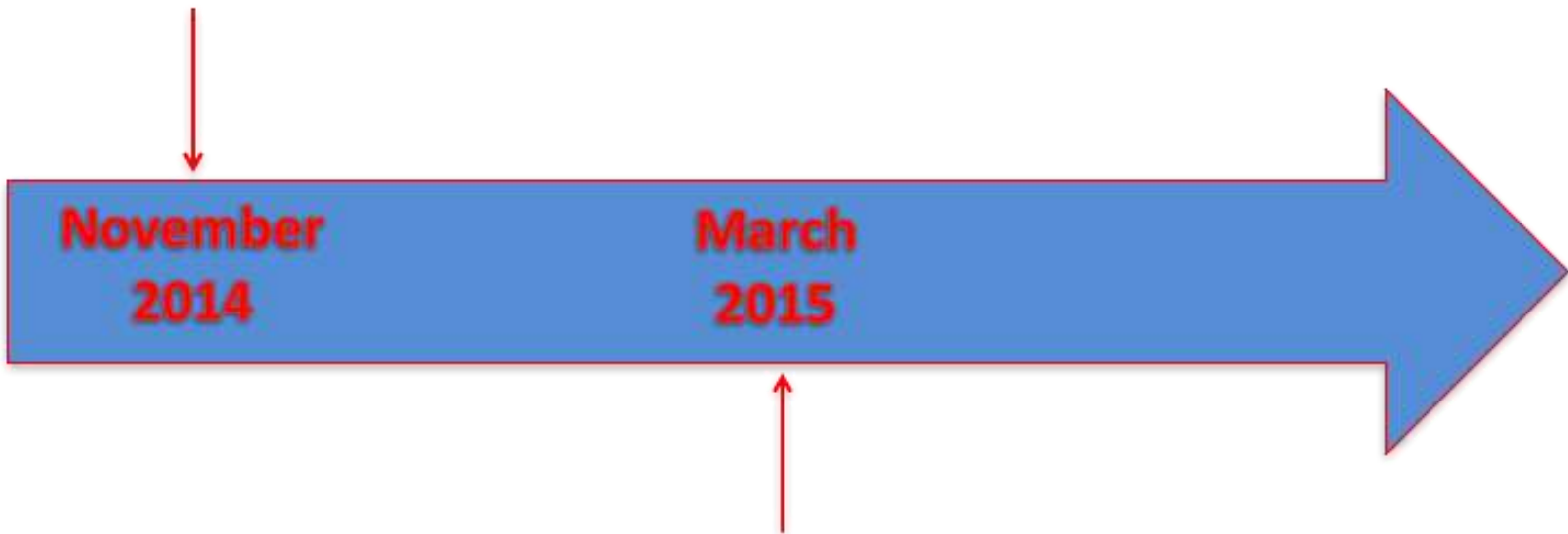
Methods

- 09/2014 – 09/2015
- All spinal procedures
- Exclusion when past SSI
- Analysis with **logistic regression model**



Methods

Beginning of the study



Beginning of decontamination measures

Data

- Age
- Gender
- Nature of the surgical approach
- Presence of spinal implants

Outcomes

- Monthly incidence of SSI
- Proportion of *Staphylococcus aureus* among all SSI

Beaujon : 4613 patients

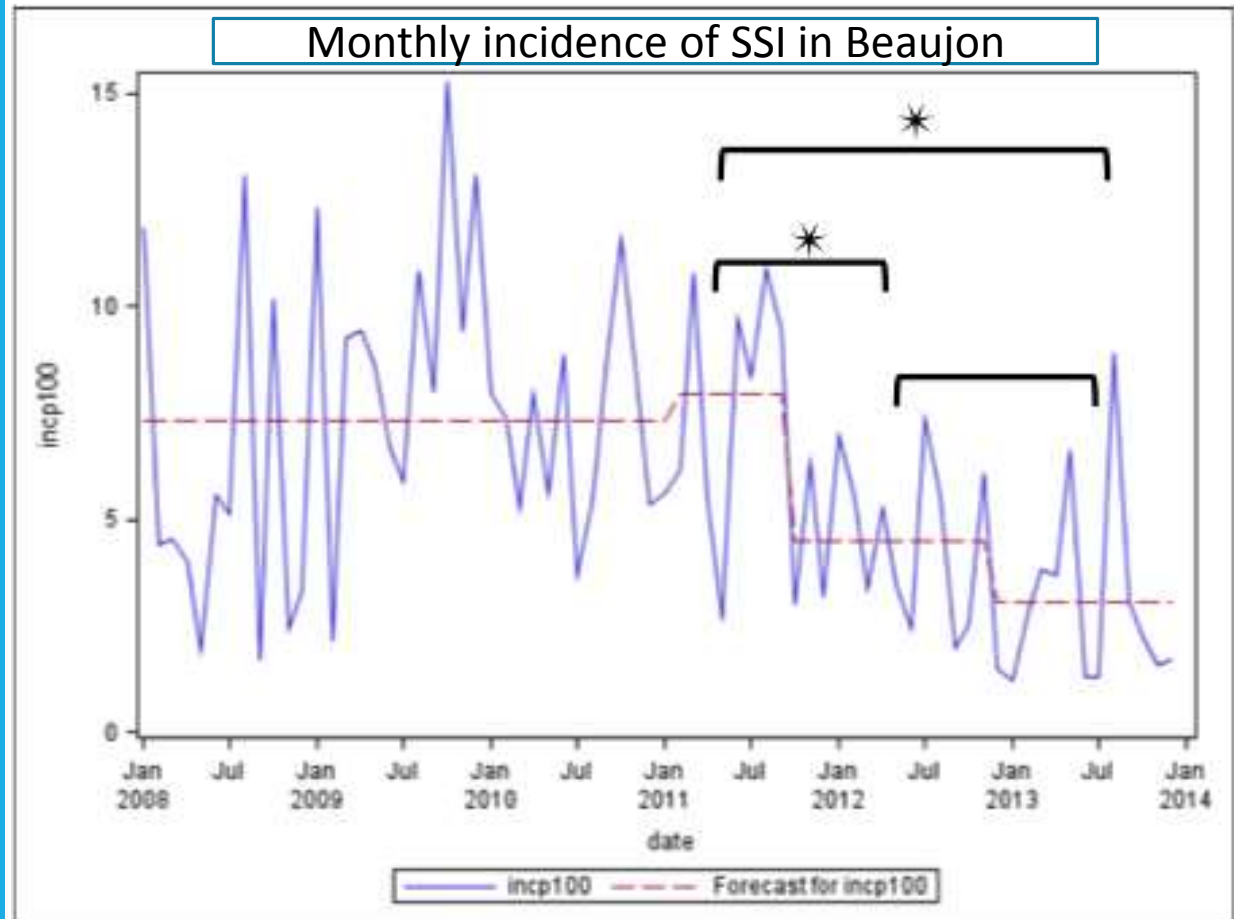
	Period 1	Period 2	Period 3	Period 4	p
N	2067	564	914	1068	
Age	52.8	52.6	53.7	55	0,003
Gender (men)	48.04	53.2	50.1	48	0,13
Emergency procedures	32.4	29.61	31.7	28.1	0.08
Surgical implants	64.5	64.7	67.2	64.4	0.56
Surgical approach					
Posterior approach	76	76.42	74.51	75.44	0.65
Anterior approach of thoracic or lumbar spine	7.21	5.14	8.86	7.58	0.06
Anterior approach of cervical spine	12.48	15.25	13.02	13.86	0.33
Combined approach	2.23	2.3	2.19	1.97	0.28

HEGP : 701 patients

	Period 1	Period 2	p
N	266	435	
Age	53	51,7	0,0015
Gender	48,1	54,2	0,09
Emergency procedures	32	31,7	0,26
Surgical implants	65,3	65,3	0,6
Surgical approach			
Posterior approach	76.7	82.3	0.07
Thoracic or lumbar anterior approach	12.03	7.82	0.06
Anterior cervical approach	9.4	8.51	0,69
Combined approach	2.63	1.38	0,23

Beaujon

- 272 SSI
- Incidence ($p < 0,001$):
 - 7,3%
 - 4,5 %
 - 3 %



HEGP

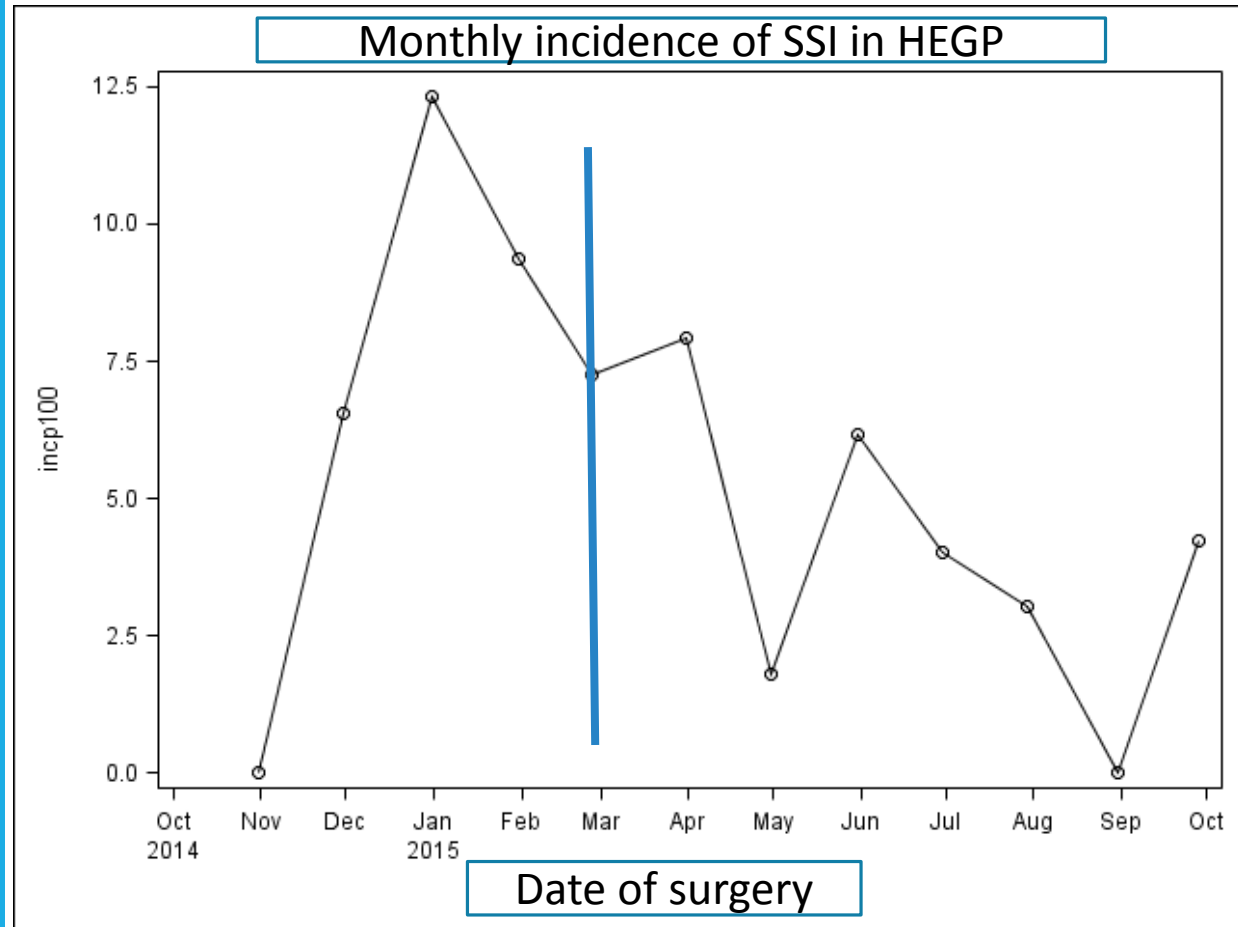
- 39 SSI

- Incidence

- 8,3 %

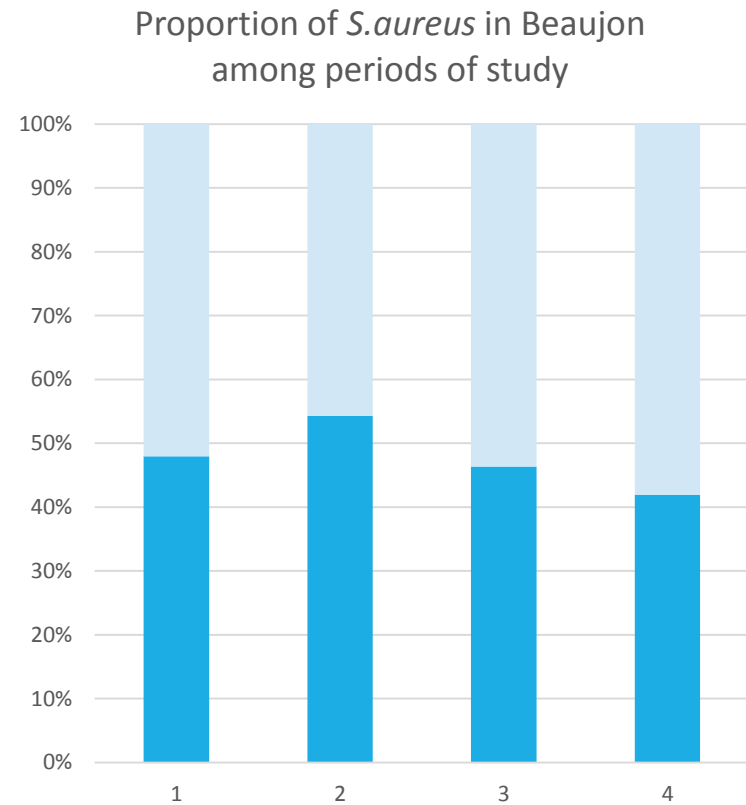
- 3,91 %

- (OR= 2.2, p<0.02)



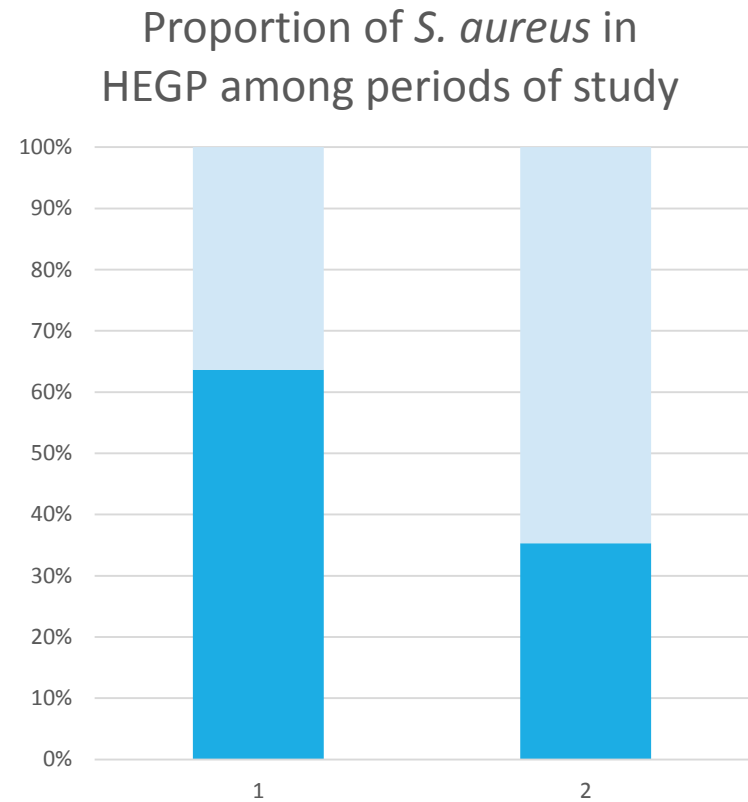
Proportion of *S. aureus*

- Beaujon : no difference



Proportion of *S. aureus*

- Beaujon : no difference
- HEGP: non significant decrease



Efficiency ?

- Bradford-Hill's causality criterias :
 - Strength
 - Consistency
 - Specificity
 - Temporality
 - Dose-response gradient
 - Plausibility
 - Coherence and experimental evidences

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Limitations

- Observational study
- Lack of data on *Staphylococcus aureus* carriage before and after decontamination

Conclusion

- Significant efficiency of decontamination measures
- Probable effect of comprehensive prevention of SSI
- Need to be associate with global improvement of care quality