

**INTRODUCTION**

The European Centre for Disease Prevention and Control (ECDC) provides information about the proportion of Methicillin Resistance *S.aureus* (MRSA) by collecting antimicrobial resistance surveillance data from across the European Union, but there is a lack of comparable data on the situation in Switzerland. Switzerland offers a unique situation for epidemiological analysis, because of its central position in Europe and its 3 main linguistic regions (German, French and Italian), which have strong cultural and economic ties to neighbouring countries.

**OBJECTIVES**

To evaluate the epidemiology and trends of MRSA and methicillin sensitive *S. aureus* (MSSA) infections and colonization in Switzerland and its linguistic regions from 2004 to 2014.

**METHODS**

We conducted a descriptive and time series analysis of the ANRESIS data on *S. aureus* including MRSA and non-multidrug-MRSA (Nm-MRSA, as a marker for community-acquired MRSA(CA-MRSA), which is defined as being susceptible to  $\geq 3$  of the following: ciprofloxacin, clindamycin, tetracycline and co-trimoxazole (TMP-SMT)) from 2004 to 2014 with stratification by linguistic regions, age-group ,in- versus outpatient status and sample location.

**ACKNOWLEDGMENTS**

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**Table 1. Time Series Analysis :trend of proportion MRSA among *S. aureus* and NmMRSA among MRSA**

	Trend MRSA	R <sup>2</sup>	Trend NmMRSA	R <sup>2</sup>
Switzerland	0.92%	0.88	0.92%	0.88
German	0.03%	0.39	0.92%	0.68
French	-0.28%	0.66	0.86	0.8%
Italian	-0.15%	0.46	0.42%	0.37
Outpatient	0.01%	0.28	0.61%	0.70
Inpatient	-0.18%	0.59	1.07%	0.62
<16	0.05%	0.59	1.14%	0.61
16-65	-0.02%	0.21	1.17%	0.84
>65	-0.3%	0.77	0.53%	0.76
Not-invasive	-0.09%	0.45	0.83%	0.85
Invasive	-0.10%	0.50	1.04%	0.70

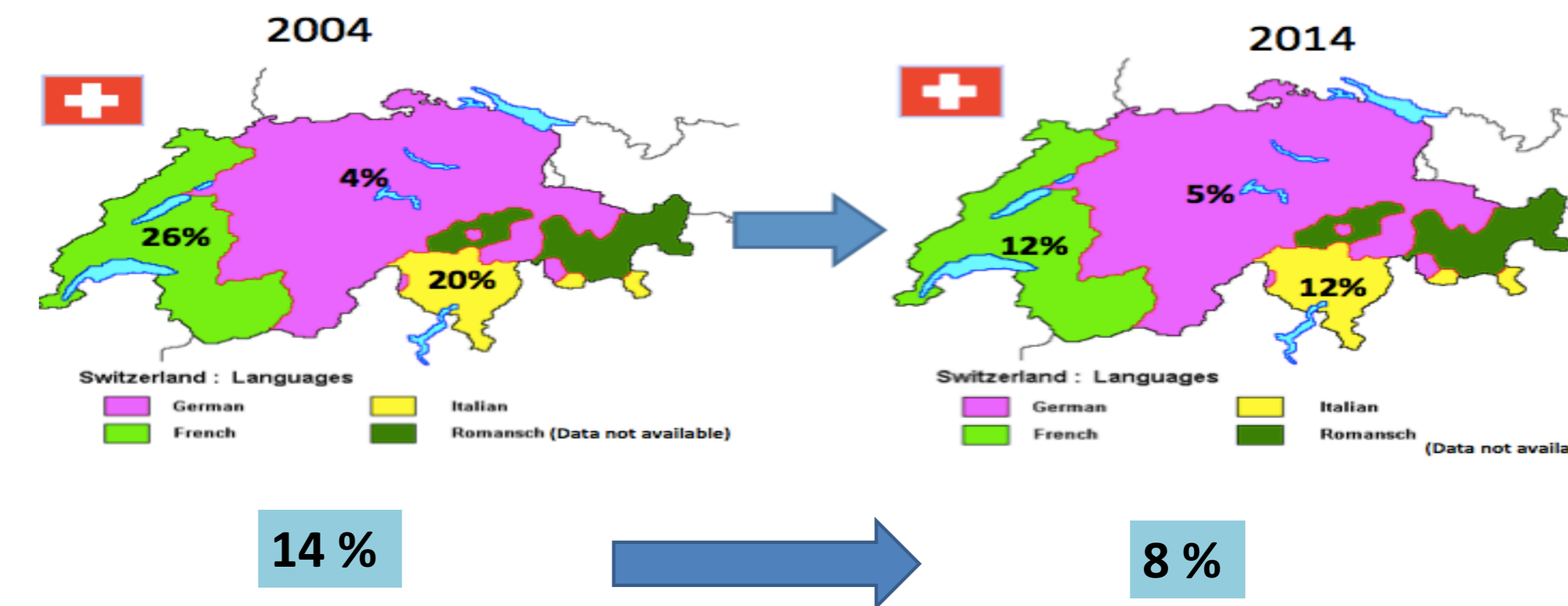
**Table 2. Multivariate logistic regression comparing the risk factors for NmMRSA versus MRSA**

	OR	95% Conf.interval
German	1*	
French	0.28	0.26-0.32
Italian	1.3	1.14-1.46
Outpatient	1*	
Inpatient	0.63	0.58-0.69
<16	1*	
16-65	0.94	0.81-1.10
>65	1.8	0.36-0.5
Not-invasive	1	
Invasive	1.25	1.4-2.04

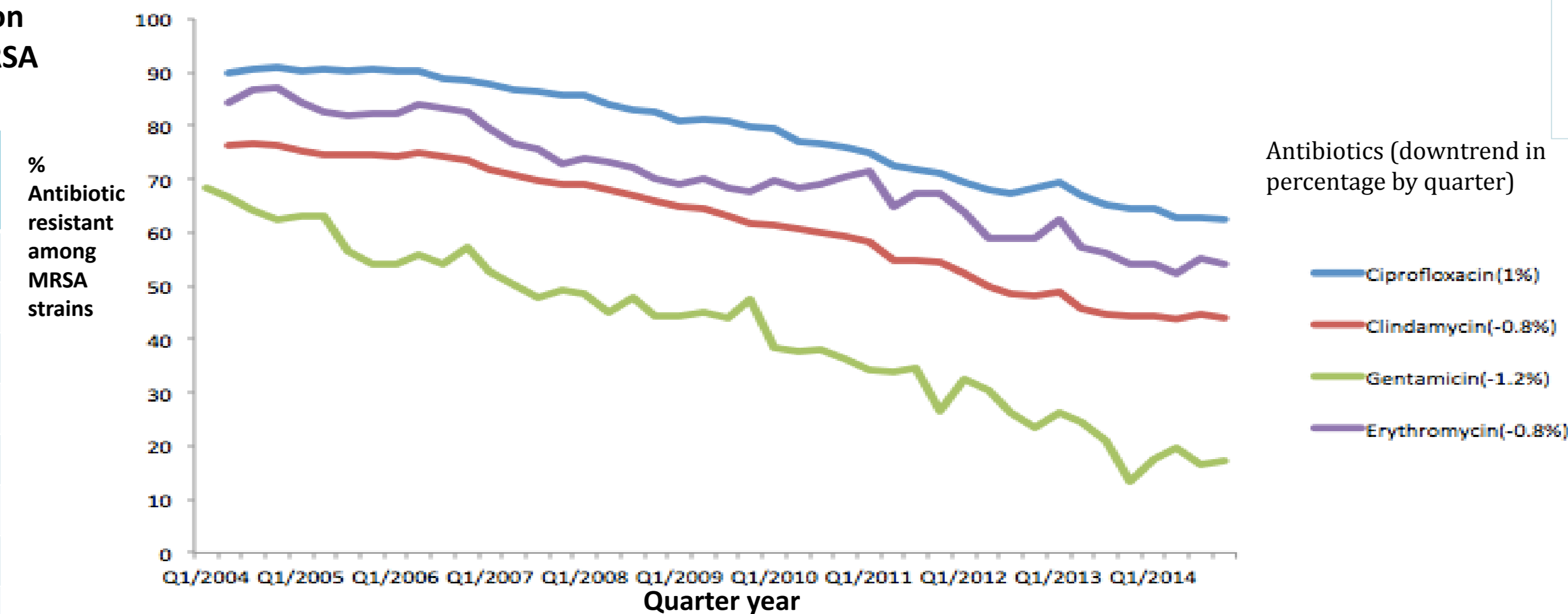
% Antibiotic resistant among MRSA strains

(\* )Reference category, adjusted for all other variables listed in the table.

**Fig.1 Proportion of MRSA among *S.aureus* by region**



**Fig.2 Proportion of antibiotic resistance among MRSA : trend per quarter**



**RESULTS**

14'648 MRSA and 115'917 MSSA isolates were included in the analysis. Although there was an overall decrease of the proportion of MRSA among *S. aureus*, an increasing trend of NmMRSA was observed (Table 1). Variations in geographical distributions were noted with a decrease in the proportion of MRSA in the French and Italian speaking regions and stable and low prevalence in the German speaking region (Fig.1. and Table 1). We noticed a significant increase in the proportion of MRSA in outpatients and younger population compared to a decreasing trend in inpatients in the elderly (Table 1). The multivariate regression showed that NmMRSA, comparing to MRSA, was associated with the invasive isolates, the outpatient status, Italian speaking region and elderly (Table 2). Resistance to ciprofloxacin, clindamycin, gentamicin and erythromycin in MRSA strains decreased (Fig.2). Conversely, resistance to tetracycline, TMP/SMT, fusidic acid and rifampicin remained low over the study period.

**CONCLUSIONS**

- The proportion of MRSA among *S. aureus* in Switzerland decreased overall from 2004 to 2014 similar to international trends.
- The French and Italian speaking regions moved from having hyper-endemic MRSA prevalence comparable with neighbouring countries, to lower levels of prevalence.
- Worrisome increases of methicillin resistance were found in younger persons and outpatients.
- The increased susceptibility to several antibiotic classes other than  $\beta$ -lactams suggests a dissemination of community-acquired MRSA strains.