SENTINEL SURVEILLANCE OF ANTIBIOTIC RESISTANCE IN SWITZERLAND (SEARCH)

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Objectives

Comprehensive, representative and valid surveillance of antibiotic resistance on local, national and international levels is key to resistance control. We established a national surveillance program in Switzerland within the frame of the National Research Program for Antibiotic Resistance (NRP49).

Methods

Routine resistance data are collected electronically on a weekly base from 22 representative clinical microbiology laboratories into a central data base.

Data are validated, mapped to a common nomenclature and subjected to algorithms identifying double samples, defining microorganisms as contaminants versus pathogens and nosocomial versus community acquired. Proportions and temporal trends were calculated using Chi-Square test.

For data access a public internet site (www.search.ifik.unibe.ch) was developed including an interactive resistance database for the most prevalent microoganisms. Laboratories can access and analyze their own data online.

SEARCH System*

Steering committee members of SEARCH

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SEARCH laboratories

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Conclusions and outlook

SEARCH is an ongoing, representative, valid Swiss antibiotic resistance surveillance system including
-samples from hospitalized and ambulatory patients,
-samples from children and adults
-infecting and colonizing microorganisms
-all microorganism species tested in routine laboratory practice

Actual resistance data from SEARCH are available by internet (www.search@ifik.unibe.ch) and will help practicioners to decide upon optimal antibiotic regimens.

In further steps antibiotic consumption data and bacteremia data will be integrated into the database.

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Results: representativeness

Numbers differ from the abstract because data for 2007 are presented here instead of the 2006 data.

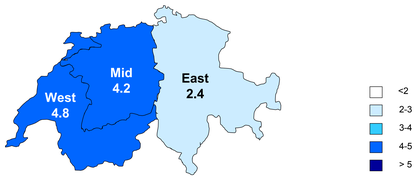
Data providers

For 2007 resistance data on 131'097 clinical isolates representing 419 bacterial species are available

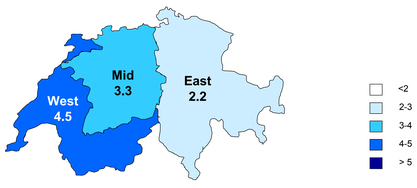
75% of isolates are from hospitalized patients, 22% from ambulatory care and 3% from long term care. The system represents approximately 80% of acute care hospital days and > 30% of Swiss practicioners in the outpatient setting.

At present East-Switzerland is underrepresented. Linkage of 2 laboratories in East-Switzerland to SEARCH is ongoing.

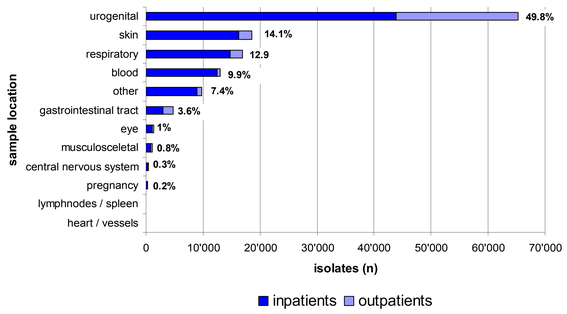
Isolates from inpatients per hospital bed



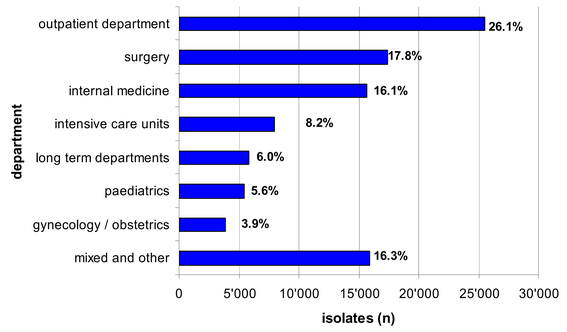
Isolates from outpatients per 1000 population



Sample location

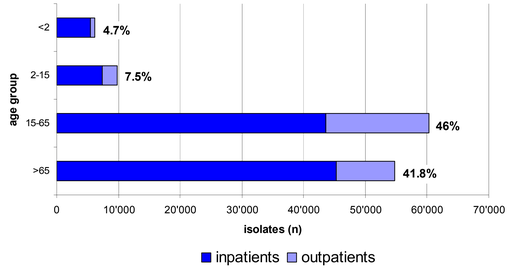


Hospital departments

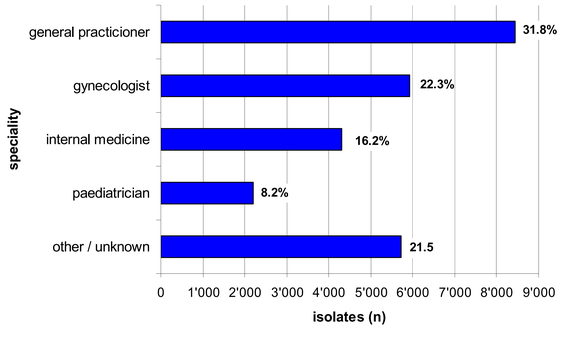


Age

12.2% of isolates derive from children < 15 years of age and 4.7% from < 2 years old.



Specialities in ambulatory samples



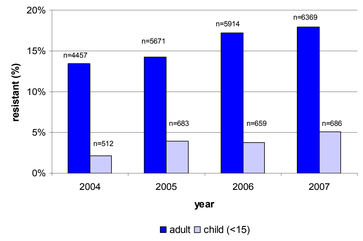
Results: resistance (examples)

Susceptibility of *S. pneumoniae* according to age and geographic region

S. pneumoniae 2007	East		South-West	
Susceptibility and n tested	<2 years	other	<2 years	other
Penicillin	90.16% (122)	95.02% (783)	75.81% (62)	81.72% (826)
Aminopenicillin	98.04% (51)	99.35% (309)	100% (21)	98.07% (362)
Ceftriaxone	100% (49)	99.23% (392)	75% (36)	91.58% (368)
Clindamycin	90.63% (32)	95.91% (220)	87.18% (39)	84.5% (613)
Erythromycin	83.53% (85)	88% (500)	91.67% (48)	78.61% (678)
Levofloxacin	100% (37)	99.59% (243)	98% (50)	99.61% (513)
Tetracycline	87.88% (33)	94.84% (213)	82.14% (56)	83.4% (729)
Trimethoprim-sulfamethoxazole	90.16% (61)	88.5% (400)	63.16% (57)	77.42% (753)

Quinolone resistance of *E. coli* according to age and year

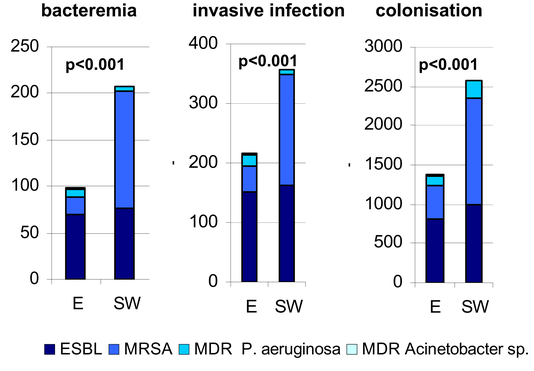
Quinolone-resistance in E. coli significantly increased from 2004 to 2007 in adults (p<0.001), while for children a non significant trend was observed (p=0.074).



Burden of multidrug resistance (MDR)

For 2007, data on 3957 inpatients experiencing colonisation or infection by at least one of four prominent multi-resistant germs[1] are represented in SEARCH. 14.3% of these had invasive infections.

Prevalence of MDR showed significant geographical differences with higher rates in South-West (SW) Switzerland, (8.5%) compared to the Northeast (E; 4.4%, p<0.001).



[1] MRSA = Methicillin-resistant *S. aureus*, ESBL=extended-spectrum beta-lactamase producers, MDR defined as resistant to at least 3 antibiotics out of 1) aminoglycosides, 2) 3. or 4th generation cephalosporins, 3) piperacillin-tazobactam, 4) carbapenems or 5) ciprofloxacin