

## DANMAP 2001

No. 1/2, 2003

The Danish Integrated Antimicrobial Resistance Monitoring and Research Programme (DANMAP) publishes an annual report describing the consumption of antibiotics and the development of resistance in bacteria collected from production animals, foodstuffs and humans in Denmark.

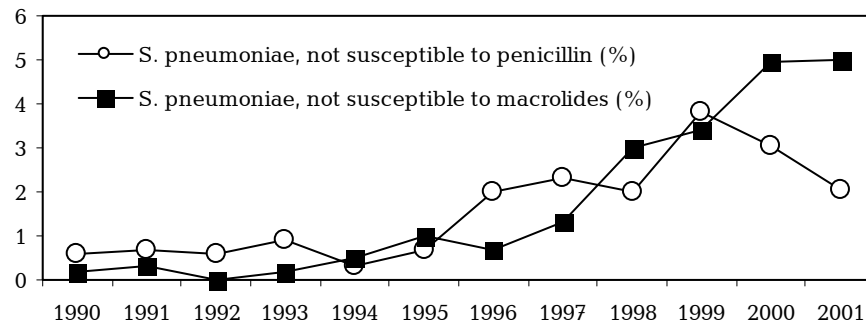
### Consumption of antibiotics

The use of antibiotics in food animal production leads to the development and spread of resistance among commonly occurring non-pathogenic bacteria as well as food-borne pathogens, such as *Salmonella* and *Campylobacter*.

The use of antibiotics as growth promoters ceased in Denmark in 1999. This led to a decrease in the total consumption of antibiotics in food animal production from 205 tons of active substance in 1994 to 96 tons in 2001, of which 74% was used in pork production. The highest relative consumption was seen in fish farming, where 79 mg were consumed per kg of fish produced, whereas only 41 mg were consumed per kg of pig slaughtered. In comparison, in 2001 approximately 42 tons of antibiotics were used for the medical treatment of patients, which represents just under a third of the total consumption.

Antibiotic consumption in primary health care, measured in defined daily doses (DDD) per 1,000 inhabitants per day, has been fairly stable for the last five years: from 12.24 in 1997 to 12.85 in 2001. There was an increase of 5% from 2000 (12.25) to 2001 (12.85). This increase is mainly due to an increased consumption of penicillins and macrolides in March-April 2001. This coincided with high influenza activity and intense press coverage of several cases of meningococcal disease in February-March, which may have contributed to an increased consumption of antibiotics. Ninety percent of the total consumption takes place outside hospital settings. As a result, even a modest percentage increase in consumption in primary health care may significantly influence resistance among isolates from general practice, since the volumes involved will be significant. Antibiotic consumption in hospitals, measured in DDD per 1,000 bed-days, has been increasing since 1997: from 392 in 1997 to 484 in 2001. The increase in consumption of quinolones (23%), cephalosporins (9%) and carbapenems (8%) from 2000 to 2001 is a particular cause of

**Fig 1. Resistance among invasive *Streptococcus pneumoniae* isolates, 1990-2001. (Source: Dept. of Respiratory Infections, Meningitis and STIs)**



concern. It has not been possible to investigate whether the increase is well-founded. With all other factors remaining the same, an increase among the broad-spectrum antibiotics is worrying, since these antibiotics exert a greater selection pressure and increase the risk of infections due to, for example, multi-resistant Gram-negative bacteria and methicillin-resistant staphylococci.

### Antibiotic resistance

In Denmark, the most common food-borne zoonosis is campylobacteriosis, with an annual incidence of 86 per 10<sup>5</sup>. For *Campylobacter jejuni* acquired in Denmark, the level in tetracycline and quinolone resistance remained stable in 2001, though still at a relatively high level, approximately 25%. Quinolone resistance was significantly higher for bacteria acquired abroad.

The incidence of salmonellosis in 2001 was 55 per 10<sup>5</sup>. In general, resistance was low among *S. enteritidis*, which is responsible for 49% of cases of illness. Quinolone resistance was the most frequent, representing 5% for bacteria acquired in Denmark and 8% for bacteria acquired abroad. For *S. typhimurium*, which causes 20% of cases of illness, resistance has generally been increasing in recent years. Again, resistance was highest among bacteria acquired abroad. Resistance among domestically acquired bacteria was higher than expected, compared with isolates from Danish foodstuffs. This is probably due to imported foodstuffs and some under-reporting of travel activity.

Among invasive *Streptococcus pneumoniae*, the proportion of penicillin non-susceptible isolates continued to decrease and reached 2% in 2001, while macrolide resistance remained unchanged at 5%, [fig. 1](#). It is impossible to determine whether this

represents a real stabilisation or is due to the spread of specific, more susceptible clones or, for example, is the result of variations in the collection of specimens. The primary indications for the use of macrolides are infections with *Chlamydia* or *Mycoplasma* (urogenital or in the respiratory tract) that require treatment, and as an alternative to penicillin preparations in case of penicillin allergy. Macrolide resistance among group A streptococci (GAS) was 2.7% in 2001, varying from 0.4-5.5% between counties. Approximately 50% of the macrolide-resistant GAS were simultaneously resistant to tetracycline. Penicillin is still the first drug of choice for the treatment of GAS. Compared with other countries, the frequency of methicillin resistance in *Staphylococcus aureus* isolates (MRSA) in Denmark is low (less than 1%). However, the number of registered infections is increasing, with 83 cases in 2001. There was no essential increase in the number of imported or hospital-acquired cases. The increase occurred mainly in primary health care and was predominantly due to the spread of a new multi-drug-resistant virulent clone (EDK97-1). A working group is now being established to devise a strategy to prevent further spread.

### Comments

The surveillance of antibiotic consumption and resistance has proven to be an indispensable tool in identifying new resistance problems, following the spread of resistance and monitoring the effect of interventions. The DANMAP report can be obtained from: [www.vetinst.dk/file/Danmap%2001.pdf](http://www.vetinst.dk/file/Danmap%2001.pdf). (D. L. Monnet, T. L. Sørensen, Department of Antibiotic Resistance and Hospital Hygiene)

## Patients with selected individually notifiable diseases

Notifications received during the 4th quarter of 2002, compared with the corresponding period in 2001

County	Tuberculosis		Meningococcal disease		Pertussis < 2 yrs		Chronic Hepatitis B		Hepatitis A		AIDS	
	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001	2002	2001
Cph. Municipality	27	45	4	1	9	7	2	5	2	5	1	9
Frb. Municipality	2	3	-	-	2	2	1	1	-	-	-	2
Cph. County	19	12	2	3	8	8	3	-	4	8	2	4
Frederiksborg	2	7	-	1	9	2	2	2	1	-	1	4
Roskilde	1	-	2	3	2	4	-	2	-	-	-	2
West Zealand	1	3	1	2	3	3	-	-	-	-	-	1
Storstrøm	5	7	1	-	7	2	-	-	-	1	1	-
Bornholm	-	-	-	-	-	-	-	-	-	-	1	-
Funen	1	9	3	4	4	4	1	4	6	2	-	1
South Jutland	3	-	-	4	3	1	1	2	-	-	-	-
Ribe	2	1	-	1	5	1	-	1	-	-	-	-
Vejle	-	3	3	4	6	3	-	4	-	1	-	-
Ringkøbing	3	8	1	3	10	3	5	-	10	-	1	-
Aarhus	13	14	-	2	15	9	9	3	3	2	-	1
Viborg	3	4	4	2	6	2	-	-	-	-	-	-
North Jutland	9	5	3	1	1	2	1	2	-	-	1	1
Other	6	-	-	1	-	-	-	-	-	-	1	-
Total	97	121	24	32	90	53	25	26	26	19	9	25

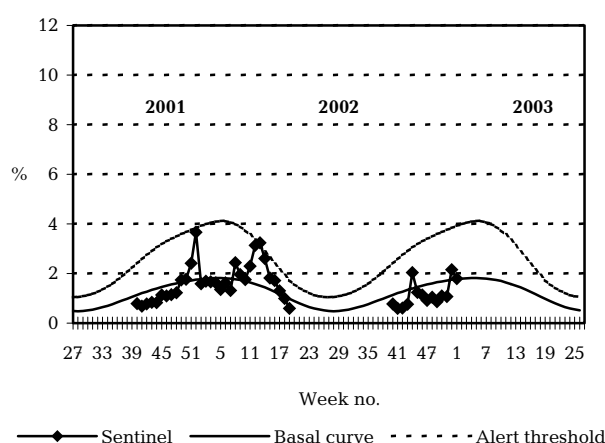
## Patients with other individually notifiable diseases

Notifications received during the 4th quarter of 2002 compared with the corresponding period in 2001, DK

	4th quarter	
	2002	2001
Creutzfeldt-Jakob disease	-	3
Foodborne diseases	167	201
Hepatitis B - acute	7	11
Hepatitis C - acute	-	1
Hepatitis C - chronic	53	55
Legionella pneumonia	36	26
Neuroborreliosis	25	22
Paratyphoid fever	1	5
Pneumococcal meningitis	14	13
Psittacosis (ornithosis)	7	3
Shigellosis	51	38
Typhoid fever	4	4
VTEC	33	14

## Sentinel surveillance of influenza activity

Weekly percentage of consultations, 2001/2002/2003



**Sentinel:** Influenza consultations as percentage of total consultations

**Basal curve:** Expected frequency of influenza consultations under non-epidemic conditions

**Alert threshold:** Possible incipient epidemic