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NATIONAL SURVEILLANCE OF COMMUNICABLE DISEASES

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DANMAP 2005 - ANTIBIOTIC CONSUMPTION AND RESISTANCE

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The annual DANMAP report (Danish Integrated Antimicrobial Resistance Monitoring and Research Programme) summarises the Danish consumption of antimicrobial agents used for animals and humans and follows the development of resistance in bacteria collected from animals, foodstuffs and humans. The 2005 DANMAP report is available at: www.danmap.org.

Antibiotic consumption in animals

The total consumption of antibiotics for animals in 2005 was identical to that of 2004. Consumption for treatment of pigs decreased by 0.2% to 92.2 tons of active substance, corresponding to 81% of the total veterinary consumption.
Concurrently, swine production rose by 1%. The reduction in antibiotic consumption in swine was caused mainly by a decrease in the prescription of tiamulin, aminoglycosides and macrolides for treatment of gastrointestinal infections.

Resistance in zoonotic bacteria

The occurrence of resistance in Salmonella Typhimurium isolated from imported pork generally exceeded that of corresponding Danish pork isolates. A similar tendency was observed for Campylobacter jejuni isolated from poultry meat, where imported poultry meat showed a higher tetracycline and ciprofloxacin resistance frequency than Danish-produced poultry meat.
S. Typhimurium isolates from human infections acquired abroad generally had a higher frequency of antibiotic resistance than corresponding isolates from infections contracted in Denmark. Increased ciprofloxacin resistance in isolates from infections acquired abroad was particularly significant. Similarly, C. jejuni isolates from human infections acquired abroad generally had a higher frequency of resistance to ciprofloxacin and tetracycline than corresponding isolates from infections contracted in Denmark.

Human antibiotic consumption

From 2004 to 2005, the consumption of antibiotics for human treatment increased by 5.1% to 32.4 million DDD (Defined Daily Doses) or 16.4 DDD per 1,000 inhabitant-days.
In primary healthcare, the total antibiotic consumption rose by 4.9%. The relative consumption share of the various classes of antibiotics remained stable, and more than 70% of the consumption was narrow-spectrum penicillins, penicillins with extended spectrum, and macrolides.
The continued increase in the consumption of fluoroquinolones (from 0.28 to 0.32 DDD per 1,000 inhabitant-days from 2004 to 2005) was reflected in an increase in the frequency of fluoroquinolone-resistant E. coli isolates.
Measured as DDD per 1,000 occupied bed-days, the mean antibiotic consumption in hospitals rose by 48% in the period 1997-2005.
The trend described previously in EPI-NEWS 43/05 concerning an increase in the consumption of cephalosporins, fluoroquinolones and carbapenems at the expense of extended-spectrum penicillins (except pivmecillinam), amino-glycosides and macrolides continued in 2005.

Table 1. Trends in resistance development for bacteria isolated in primary healthcare (PHC) and in hospitals

Bacteria, type of sample	% (2004)	% (2005)	Trend ***)
Penicillin-R/I pneumococci, invasive *)	3	4	
Macrolide-R pneumococci, invasive	5	6	
Penicillin-R Group A streptococci, all	0	0	
Macrolide-R Group A streptococci, all	2	2	
Methicillin-R S. aureus (MRSA), blood	1	2	↗
Ampicillin-R E. coli, blood	41	40	
Cefuroxime-R E. coli, blood **)	2	3	↗
Gentamicin-R E. coli, blood	1	2	↗
Ampicillin-R E. coli, urine from PHC	39	41	↗
Sulfonamide-R E. coli, urine from PHC	37	38	↗
Ciprofloxacin-R E. coli, urine from PHC	3	4	↗
Ciprofloxacin-R E. coli, urine from hospitals	3	5	↗

*) R, resistant; I, intermediate **) Excl. Rigshospitalet (national referral hospital)
***) ↗, significant increase

Development of resistance in primary healthcare and hospitals

Trends in resistance development in pathogenic bacteria from human infections are shown in Table 1.
The number of methicillin-resistant Staphylococcus aureus (MRSA) cases rose from 549 in 2004 to 856 in 2005, including MRSA infections as well as carriers.
The primary healthcare and hospitals alike saw a minor, but significant increase in the frequency of ciprofloxacin-resistant E. coli urine isolates. The ciprofloxacin resistance increase occurs concurrently with an increase in the consumption of fluoroquinolones (primarily ciprofloxacin) in recent years, EPI-NEWS 41/04.

Comments

The high frequency of antibiotic resistance in Salmonella bacteria from imported pork and in campylobacter bacteria from imported poultry meat probably reflects a difference in the use of veterinary antibiotics in the country of origin as compared to Denmark. The proportion of multi-resistant salmonella bacteria in imported pork exceeds that of Danish pork.
Infection with bacteria that are resistant to clinically essential antibiotics may entail an increased risk of treatment failure.
The 2004 increase in human antimicrobial consumption continued into 2005. Part of this overall tendency may be explained by the increase in activity in the hospital sector and by a shorter length of hospital stay. This should mean that more patients are treated and that part of the follow-up treatment takes place in general practice. Even though the activity increase partly explains the rise in antibiotic consumption, the overall rise in consumption creates an increased selection pressure on the bacterial flora, and therefore a rise in resistance, Table 1.
Continuous training and efforts to keep the primary healthcare as well as hospital staff updated on the rational use of antibiotics is essential. Rational antibiotic therapy is the tool to ensure optimum treatment of patients with bacterial infections and a low level of antibiotic resistance in Denmark.

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Individually notifiable diseases

Number of notifications received in the Department of Epidemiology, SSI (2006 figures are preliminary)

Table 1	Week 34 2006	Cum. 2006 [1]	Cum. 2005 [1]
AIDS	1	30	38
Anthrax	0	0	0
Botulism	0	0	0
Cholera	0	0	0
Creutzfeldt-Jakob	1	16	2
Diphtheria	0	0	0
Foodborne diseases	20	339	324
of these, infected abroad	0	75	74
Gonorrhoea	12	288	349
Haemorrhagic fever	0	0	0
Hepatitis A	1	16	43
of these, infected abroad	0	4	11
Hepatitis B (acute)	0	12	25
Hepatitis B (chronic)	3	230	96
Hepatitis C (acute)	0	6	1
Hepatitis C (chronic)	5	359	220
HIV	4	142	182
Legionella pneumonia	3	75	67
of these, infected abroad	0	20	22
Leprosy	0	0	0
Leptospirosis	0	5	10
Measles	0	27	2
Meningococcal disease	1	47	71
of these, group B	0	23	35
of these, group C	1	9	17
of these, unspec. + other	0	15	18
Mumps	1	11	6
Neuroborreliosis	1	28	45
Ornithosis	0	8	13
Pertussis (children < 2 years)	0	33	108
Plague	0	0	0
Polio	0	0	0
Purulent meningitis			
Haemophilus influenzae	0	1	1
Listeria monocytogenes	1	6	1
Streptococcus pneumoniae	0	50	86
Other aethiology	1	5	12
Unknown aethiology	0	7	12
Under registration	2	40	-
Rabies	0	0	0
Rubella (congenital)	0	0	0
Rubella (during pregnancy)	0	0	0
Shigellosis	2	37	72
of these, infected abroad	1	31	59
Syphilis	0	47	82
Tetanus	0	2	2
Tuberculosis	4	269	283
Typhoid/paratyphoid fever	1	18	24
of these, infected abroad	1	17	22
Typhus exanthematicus	0	0	0
VTEC/HUS	7	93	104
of these, infected abroad	4	32	37

[1] *Cumulative number 2006 and in corresponding period 2005*

Selected laboratory diagnosed infections

Number of specimens, isolates, and/or notifications received in SSI laboratories

Table 2	Week 34 2006	Cum. 2006 [2]	Cum. 2005 [2]
Bordetella pertussis			
(all ages)	2	136	354
Gonococci	3	286	294
of these, females	0	52	30
of these, males	3	234	264
Listeria monocytogenes	4	32	18
Mycoplasma pneumoniae			
Resp. specimens [3]	2	275	655
Serum specimens [4]	8	247	548
Streptococci [5]			
Group A streptococci	2	109	83
Group B streptococci	3	65	52
Group C streptococci	0	15	17
Group G streptococci	4	99	81
S. pneumoniae	5	696	786

Table 3	Week 32 2006	Cum. 2006 [2]	Cum. 2005 [2]
Pathogenic int. bacteria [6]			
Campylobacter	121	1635	2138
S. Enteritidis	44	316	366
S. Typhimurium	10	221	312
Other zoon. salmonella	12	358	327
Yersinia enterocolitica	2	110	147
Verocytotoxin-producing E. coli	9	87	93
Enteropathogenic E. coli	16	149	155
Enterotoxigenic E. coli	8	150	216

[2] *Cumulative number 2006 and in corresponding period 2005*

[3] *Resp. specimens with positive PCR*

[4] *Serum specimens with pos. complement fixation test*

[5] *Isolated in blood or spinal fluid*

[6] *See also www.germ.dk*

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