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Aggregated and individual pharmacy record data. Association between antibiotic and antihypertensive drug use

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In a previous attempt to relate drug use to morbidity we compared “sickness numbers” and dispensed drug volumes in Swedish municipalities and found positive correlations between sickness numbers and dispensed volumes of most drug types. Antibiotics were an exception; higher antibiotics volumes were associated with lower sickness numbers [1].

Aggregated pharmacy record data showed that municipalities with antibiotics volumes above the national average had lower volumes of cardiovascular (CV) drugs, primarily of antihypertensives [1], indicating a possible link between infection and hypertension. However, the employed aggregated pharmacy record data gave no information regarding the relation between the dispensed volumes of antibiotics and CV drugs for individuals. The present study aimed at obtaining such information.

The dispensed drug volumes in Sweden (2006) in DDD of antibiotics (ATC code J01) and the CV drugs diuretics (C03), beta-blocking agents (C07), calcium antagonists (C08) and ACE-inhibitors (C09) per 10-year age groups for patients aged ≥ 40 years were extracted from the Swedish Prescribed Drug Register [2]. The number of individuals and percentages of the population with anti-

biotics or CV drugs were determined. The expected percentage with both antibiotics and CV drugs was calculated as the product of the proportion of the population with antibiotics times the proportion with CV drugs. The ratios of observed percentage/expected percentage were calculated for each age group.

To determine if the use of antibiotics influenced the CV drug volume per individual, we compared for each age group the average volumes of CV drugs (DDDs of C03-C09) for patients with both antibiotics and CV drugs with the average volumes of CV drugs for patients with no antibiotics.

The extracted data comprised 2.35 million individuals or between 347,000 and 597,000 individuals per age group. The ratios of observed/expected percentages of patients with both antibiotics and CV drugs were higher than 1 in four of the five age groups, indicating that more patients than expected had acquired both types of drugs. The average volumes of CV drugs (average DDD/patient) were 5–6% higher per patient treated with antibiotics than for those not treated with antibiotics.

The present study showed that the proportion of the population with both antibiotics and CV drugs was higher than expected and that the groups of individuals treated with antibiotics on average had 5–6% higher volumes of CV drugs than those without antibiotics. Consequently, the use of antibiotics was not associated with lower volumes of CV drugs at the individual level as might be expected from the previous study using aggregated data [1]. This is in accordance with reported observations where patients with CV disease were likely to be frequent attenders [3] of health care centres and to receive prescriptions of antibiotics as co-medication [4].

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Although the behaviour of individuals constitutes the characteristics of municipal populations, individual patient drug use data need not be congruent with the drug use data of the municipalities. Factors of importance for individual drug use are likely to be the patient's medical needs and the readiness to consult health care professionals. At the municipal level, factors such as the availability of health care and local therapy traditions may be important.

To summarize, the results of our study illustrate the difficulties in drawing conclusions regarding therapy from drug use data. Aggregated data indicated a possible link between hypertension and infection [1]. This was not supported by individual-based data. A functional association between antibiotics and CV drugs, implied by the aggregated data, is therefore less likely.

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