which may provide equivalent protection to 3 doses administered at monthly intervals [10]. The ability of these schedules to provide long lasting protection also needs careful evaluation.

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Trends in Antimicrobial Consumption May Be Affected by Units of Measure

To the Editor—A recent article by Polk et al. [1] assessed the discrepancies between measures of antimicrobial consumption—specifically, defined daily doses (DDD) and days of therapy—in a sample of 130 US hospitals over a 1-year period. Those who are familiar with drug consumption studies and their methods are well aware that calculation of DDD and methods are not always the gold standard. Although there was not a statistically significant difference observed in overall systemic antibacterial use between the 2 measures, with 6 out of 10 of the commonly used individual antibacterial agents, the difference was significant and considered to be of major or moderate importance.

Interest in antimicrobial consumption arises from antimicrobial resistance studies that generally examine the relationship of an antibiotic-resistant organism and antibiotic consumption over a period of time or in geographically separated areas. The sample of 130 hospitals in the study by Polk et al. [1] provides an opportunity to assess the consistency of or trends in the measures of days of therapy and DDD in a large sample of institutions and, possibly, the strength of associations with trends in antimicrobial-resistant organisms. We believe this would be a very interesting avenue for analysis of the data and would encourage the authors to pursue this in the future. We previously assessed trends in antibiotic consumption over a 6.5-year period in adult acute care centers in Calgary, Canada [5], and found an 18.9% reduction in DDD per 100 patient bed-days, but observed only a 10.3% reduction when the trends were measured by prescribed daily doses per 100 patient bed-days, after deriving prescribed daily doses for 35 of the most commonly used systemic antibiotics from a sample of those prescribed over this period. The difference was statistically significant and can be at least partially explained by changes in penicillin prescribing, which represent 17%–18% of total systemic antibacterials by DDD measures and 12%–13.5% by measures of prescribed daily doses. Over the study period, a decrease in the use of older penicillins, such as ampicillin, penicillin G, and cloxacillin, was observed; these drugs have DDD values that greatly underestimate prescribed daily doses or actual daily doses. This decrease coincided with an increase in the use of piperacillin-tazobactam, for which the DDD value moderately overestimates prescribed daily doses. Although this was not a dramatic discrepancy in trend magnitude or direction, we believe this observation highlights the potential for misinterpretation of DDD in antimicrobial consumption studies. If trends in antimicrobial consumption are as distorted as they were in our study, interventions that alter antimicrobial prescribing may be misguided or, alternatively, correlations with antimicrobial-resistant organism trends may be inaccurate. We concur with Monnet [6] that adjustment to DDD values according to the World Health Organization’s Collaborating Centre for Drug Statistics Methodology is warranted and may resolve this potential for error.

References


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Reply to Dalton et al.

To the Editor—We thank Dalton and colleagues [1] for providing examples of potential pitfalls in applying defined daily doses (DDD) methods to the assessment of changes in antibiotic consumption. A figure that was not included in our original paper further illustrates this concern [2]. As was stated in our abstract [2], “The mean (± standard deviation) of total antibacterial drug use measured by the number of DDDs per 1000 patient-days and the number of DOTs [days of therapy] per 1000 patient-days were not significantly different (792 ± 147 and 776 ± 120, respectively; P = .137), although the correlation was poor (r = 0.603)” (p. 664).

The figure below is the source of these data; it compares the relationship of total antibiotic use by these 2 methods. Hospitals to the right of the diagonal line use antibacterial drugs where, on balance, the prescribed daily dose is greater than the World Health Organization–approved DDD (such as ciprofloxacin and ampicillin-sulbactam) and where the measure of antibiotic use by DDD methods, from ~1000 DDD per 1000 patient-days to ~500 DDD per 1000 patient-days, but without a change in the actual days of therapy (~700 DOT per 1000 patient days).

For example, it might be possible to reduce the DDD per 1000 patient-day measure of use by 50% (figure 1, dotted line) with no change in DOT per 1000 patient-days. We restate our conclusion that, “additional work must be done before definitive recommendations can be made as to the best method of measuring use. In the mean time, individual hospitals should decide their main purpose for measuring antibacterial use and select ≥1 method that will allow them to achieve their goals” [2, p. 669].

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