Tidsskriftet Tidsskrift for Den norske legeforening

Can measuring antibiotic use reduce antibiotic resistance?

EDITORIAL

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The author has completed the ICMJE form and declares no conflicts of interest.

If we are to reduce the unnecessary use of antibiotics in hospitals, we must be able to measure and monitor their use in a way that has clinical relevance.

The World Health Organization has encouraged all countries to work actively to prevent antibiotic resistance (1). Although Norway fares well in international comparisons, there has been a significant increase in the incidence of gram-negative bacteria that produce extended-spectrum beta-lactamases (ESBLs) in Norwegian hospitals in recent years. The two main interventions for preventing a further escalation are good infection control measures and restrictive use of broad-spectrum antibiotics (2).

Global antibiotic consumption is stated as defined daily doses (DDD) per 1000 population per day. This makes little sense in hospitals, and consumption there is therefore typically measured as DDD per 100 bed days. This allows for fluctuations in activity, but does not reflect variations in the patients' medical needs.

Ideally, a quality indicator for antibiotic use in hospitals should provide useful information for health authorities, hospital management and clinicians. It should also reflect the extent to which the use of antibiotics is in accordance with good practice. However, measuring the consumption of antibiotics in

hospitals in a way that enables the establishment of good quality indicators presents several challenges. Despite the fact that many hospitals use electronic medication charts, retrieving reports showing antibiotic use for different indications has proven to be technically difficult. Furthermore, periodic NOIS-PIAH prevalence surveys conducted under the auspices of the Norwegian Institute of Public Health (3) have failed to provide sufficient information for use in individual departments, because the survey population is small and manual collection from patient charts is laborious. In practice, hospital departments' purchasing figures are retrieved from pharmacies' sales databases and used as the numerator in the quality indicators.

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In this edition of the Journal of the Norwegian Medical Association, Skaare et al. present robust research (4) in which they used available figures from Norwegian hospitals to examine how five established and five novel indicators for the use of broad-spectrum antibiotics correspond to consumption rates and resistance figures from the Norwegian Surveillance System for Antimicrobial Drug Resistance (NORM) (5). When comparing the various indicators, they find that all show results that correlate with the incidence of ESBL-producing gram-negative bacteria.

Skaare et al. concluded that several indicators appear to be valid for measuring antibiotic use in hospitals. The indicator that encompasses the economic surrogate marker Case Mix Index (CMI) is well-adapted for a variable case mix and thus better reflects justified variations in clinical practice. In this indicator, outpatients are also included in both the numerator and denominator, which is not the case with the current quality indicator (DDD per 100 bed days). The indicator can also be easily calculated from the same source data that the hospitals report to the Norwegian Patient Registry.

Correct antibiotic use entails restrictive use of broad-spectrum, resistance-driving agents, but this must not prevent use in patients where it can help save lives and give health benefits. A quality indicator should not, therefore, solely reflect consumption figures, but a consumption that takes into account patients' medical needs.

The national quality indicator that is currently used to monitor antibiotic use in hospitals has limited value due to the described limitations. The proposed indicator is more useful because it takes greater account of the case mix. Only then can an indicator help to correct poor practices. When applied to figures from 2012–20, the new indicator showed the greatest reduction in antibiotic use (29.3 %) of all the indicators tested, and the largest number of hospitals that achieved at least a 30 % reduction in antibiotic use (13 out of 22). Although these are encouraging figures, the findings reflect the need to continue the efforts to improve antibiotic use in Norwegian hospitals. I therefore encourage the health authorities to consider the proposed new indicator.

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Publisert: 25 April 2023. Tidsskr Nor Legeforen. DOI: 10.4045/tidsskr.23.0231