

What's New in the Patient Safety World

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Medications Most Likely to Harm the Elderly Are...

...antibiotics!!! At least for patients in primary care. Not the drug category we'd have suspected. We would have predicted opiates, anticoagulants, or diabetes drugs as the most likely offenders. But a new study from New Zealand found medications to be the number one cause of harm to ambulatory patients age 65 and older and antibiotics the most common offenders ([Wallis 2015](#)).

New Zealand is unique in that it has a "no-fault" accident insurance for medical issues. Wallis looked at treatment injury claims in that database from 2005 to 2009. Medication-related injuries accounted for 34% of all claims and 72% of serious and sentinel injuries. Second on the list were injuries related to minor surgical procedures (15%) but these caused no serious injuries. Interestingly, failure or delay to diagnose or treat accounted for only 3% of all injuries but, as we'd expect, accounted for a larger percentage of serious or sentinel injuries (12%).

But the surprising finding was that the antibiotic category accounted for 51% of all medication injuries and 39% of serious or sentinel injuries. Only 9% of the medication injuries likely involved error. 91% involved allergic or idiosyncratic reactions without likely occurrence of error.

The study was not able to determine the likelihood that injuries were preventable. However, given the nature of most of the medication injuries, the strategy most likely to prevent them would be to avoid prescribing them in the first place. And for antibiotics, in particular, there may well be opportunity to prescribe fewer of them. Particularly in the elderly, who are likely on multiple medications, antibiotics may often interact with one or more of these other drugs. We know some of them can interact with warfarin. We also know that some of them can prolong the QTc interval, thereby predisposing to torsade de pointes (see our June 29, 2010 Patient Safety Tip of the Week "[Torsade de Pointes: Are Your Patients at Risk?](#)"). And they can certainly predispose patients to infections with drug-resistant organisms or C. diff.

A US study ([Shebab 2008](#)) found an estimated 142,505 visits annually were made to US EDs for drug-related adverse events attributable to systemic antibiotics. Antibiotics were implicated in 19.3% of all ED visits for drug-related adverse events. Allergic reactions accounted for 78.7% of visits. The authors suggest that minimizing unnecessary

antibiotic use by even a small percentage could significantly reduce the immediate and direct risks of drug-related adverse events in individual patients.

Antibiotic stewardship programs have proven to be successful in hospitals at reducing antibiotic resistance (see or October 14, 2014 Patient Safety Tip of the Week “[Antibiotic Stewardship](#)”). But are there examples of antibiotic stewardship programs in ambulatory care?

There is a paucity of high-quality studies addressing this issue. A systematic review found low- to moderate-strength evidence suggesting that antimicrobial stewardship programs in outpatient settings improve antimicrobial prescribing without adversely effecting patient outcomes ([Drekonja 2015](#)). This review concludes that effectiveness depends on program type. Most studies were not designed to measure patient or resistance outcomes and data regarding sustainability and scalability of interventions are limited.

One study showed that an antimicrobial stewardship intervention on antibiotic prescribing for pediatric outpatients improved adherence to prescribing guidelines for common bacterial acute respiratory tract infections ([Gerber 2013](#)).

An excellent review of the state of ambulatory antibiotic stewardship programs ([Gangat 2015](#)) notes that the vast majority of antibiotics are prescribed in the ambulatory setting and that about 10% of ambulatory visits include a prescription for antibiotics. The authors also note that inappropriate outpatient antibiotic prescribing has been tied to bacterial resistance in inpatients as well. Inappropriate antibiotic prescribing includes not only their use in conditions which do not require antibiotics, but also use of broad-spectrum antibiotics where narrow-spectrum would be better, use of some combination antibiotic regimens, failure to de-escalate antibiotics once culture and sensitivity results are available, and unnecessarily prolonged courses of antibiotics. They further discuss potential components of ambulatory antibiotic stewardship programs, including education (clinicians and patients), evidence-based guidelines and algorithms and clinical pathways, and clinical decision support.

CDC certainly thinks there is a place for antibiotic stewardship in outpatient settings ([CDC 2015](#)). They note that over half of antibiotic prescribing in outpatient settings is unnecessary, and most of this inappropriate use is for acute respiratory infections, such as pharyngitis, sinusitis, or bronchitis. Antibiotics are also the most common cause of adverse drug events (ADEs) in children, accounting for 7 of the top 15 drugs leading to pediatric ADE-related emergency room (ER) visits. In adults, ADEs account for 1 out of 5 ADE-related visits to the ER.

CDC also notes that harm can be reduced by improving antibiotic prescribing. For example, a 10% decrease in inappropriate prescribing in the community can result in a 17% reduction in *Clostridium difficile* infection.

A recent report in CDC's Morbidity and Mortality Weekly Report (MMWR) called for a more community-wide coordinated effort to prevent the spread of drug-resistant pathogens ([Slayton 2015](#)). The authors noted that individual hospitals and nursing homes have their own programs for reducing such spread, including both interrupting transmission and improved antibiotic stewardship. But they noted that such individual facility efforts do not account for the importance of inter-facility spread and postulated that better community-wide coordination by such facilities would lead to even better outcomes. The study used two computer simulation models, one in a 10-facility network and another in a 102-facility network, using carbapenem-resistant Enterobacteriaceae (CRE) as a test case. They concluded that a coordinated effort, as opposed to just improving efforts at individual facilities, would lead to a 74% reduction in CRE acquisitions over a 5-year period in the 10-facility network and a 55% reduction over 15 years in the 102-facility network model. The coordinated effort would include sharing of data among facilities, likely through public health departments.

It's interesting that the above models did not include enhanced efforts at the ambulatory levels of care. We know that some antibiotic-resistant organisms, like MRSA, are becoming much more prevalent among ambulatory patients. It would seem logical that any community-wide effort to coordinate the fight to reduce antibiotic resistance would need to include the ambulatory care sector as well.

And the National Quality Forum has recently announced a new initiative on antibiotic stewardship ([NQF 2015](#)). An antibiotic stewardship action team will provide guidance and feedback on current antibiotic stewardship metrics, recommend best practices for incorporating antibiotic stewardship into accountability programs, and assess tools and resources to support stewardship.

And, of course, inappropriate antibiotics for the elderly are not limited to ambulatory and acute care settings. Up to 75% of nursing home patients are also inappropriately given antibiotics ([CDC 2015a](#)) and CDC has recently recommended that all nursing homes implement its "Core Elements of Antibiotic Stewardship for Nursing Homes" ([CDC 2015b](#)).

So maybe it's not so surprising after all that the medications most likely to harm the elderly are...antibiotics!!!

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