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OREGON PUBLIC HEALTH DIVISION • OREGON HEALTH AUTHORITY

RESIST THIS: UNNECESSARY PRESCRIBING OF ANTIBIOTICS

Since its inception in 2001, the Oregon Alliance Working for Antibiotic Resistance Education (AWARE) has promoted judicious use of antibiotics for respiratory infections. As you'll see below, Oregon has made some progress over the last decade, but antimicrobial resistance still poses significant health threats: each year in the United States, resistant bacteria cause at least 2 million serious infections and kill at least 23,000 people.[1] Although the multidrug-resistant Gram-negative bugs spreading through intensive care units may capture more headlines, excessive use of antibiotics in outpatient settings also lead to unnecessary costs, avoidable adverse events and antibiotic-resistant infections.[2,3]

A recently published map shows per capita consumption of oral antibiotics, by state[4]; Oregon ranks second-lowest in the nation (Lauri Hicks, CDC, personal communication). To help make Oregon number one, read on.*

TRENDS IN ANTIBIOTIC OVERUSE

The National Ambulatory Medical Care Survey and the National Hospital Ambulatory Medical Care Survey abstract diagnoses and prescriptions from a nationally representative sample of ambulatory visits (office, hospital outpatient and emergency department). The survey found that during 2007–2009 in the U.S., antibiotics were prescribed for adult patients during 10% of all visits.[5] When antibiotics are prescribed, they are often broad-spectrum agents: 61% of the time overall and 80% of the time for infections including nasopharyngitis, bronchitis, viral pneumonia, and influenza (conditions for which antibiotics are rarely indicated). The most commonly prescribed antibiotics were quinolones (25% of antibiotics), macrolides (20%) and penicillins (12%).

The younger set is treated to antibiotics even more regularly. Data from 2006–2008 revealed that antibiotics were prescribed during 21% of pediatric ambulatory visits; 50% were broad-spectrum, most commonly macrolides.[6] Sixty-three percent of children with respiratory conditions for which antibiotics are not clearly indicated received a prescription anyway. In general, these two studies support findings from earlier published work suggesting that, although overall rates of antibiotic use for respiratory tract infections have been dropping since the 1990s, the use of broad-spectrum agents has been increasing.[7]

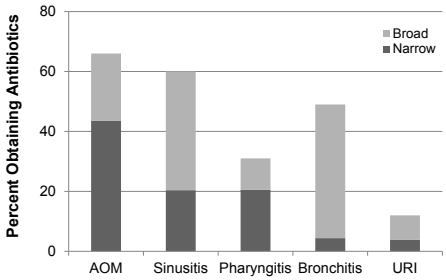
OREGON'S PRESCRIBING HABITS

In 2009 the Oregon Legislative Assembly passed a bill creating the all-payer, all-claims (APAC) database to measure the quality, quantity, and cost of health care in Oregon. The database houses medical and pharmacy claims and enrollment data on approximately 2.6 million Oregonians covered by commercial health insurance, Medicaid and Medicare. We queried medical claims for outpatient visits for acute respiratory tract infections (ARTIs) in 2011–2012. Excluded were visits with chronic pulmonary diseases (asthma, chronic bronchitis, emphysema, and COPD), other infectious diseases that typically call for treatment with antibiotics (urinary tract infections, skin and soft tissue infections, and sexually transmitted infections), or any patient seen in the previous 30 days for an upper respiratory tract infection (URI, defined as common cold or nasopharyngitis by ICD9 codes 460, 465, 465.8 and 465.9). The outpatient medical claims were then linked with pharmacy claims for antibiotic prescriptions within three days of the visit.

We found that patients obtained antibiotics for 66% of 197,173 cases of acute otitis media (AOM), 60% of 202,218 cases of sinusitis, 31% of 297,532 cases of pharyngitis, 49% of 175,813 cases of bronchitis, and 12% of 346,629 cases of URI. In general, the proportion being treated went down with age — except for URI, where the probability of obtaining† an antibiotic rose with age.

The Figure shows the proportion of respiratory infections treated with broad- and narrow-spectrum antibiotics. For bronchitis, 91% of those obtaining antibiotics received a broad-spectrum antibiotic, followed by URI (68%) and sinusitis (66%). The Table (*verso*) details the classes of drugs used: we were reassured that 66% of patients treated with antibiotics for either AOM or pharyngitis received narrow-spectrum agents. Surprisingly though, Oregon clinicians treated sinusitis much differently, favoring amoxicillin-clavulanate and azithromycin over penicillins. This, despite the fact that the bacteria infecting the sinuses are the same ones that trudge up a Eustachian tube to the middle ear. More concerning was the high use of azithromycin, particularly for bronchitis (71%) and URIs (47%) — clinical syndromes for which antibiotics are rarely warranted.

Figure. Proportion of outpatient ARTIs for which antibiotics were obtained, broad- vs narrow-spectrum, Oregon, 2011–12



BOTTOM LINE

From published data and our own surveillance, Oregon seems to be more stalwart than the nation as a whole in

* Wouldn't it be great to be number one in something other than vaccine exemptions for philosophical reasons?

† We only counted prescriptions that the patient filled, generating a pharmacy claim. (Maybe they saw the AWARE educational materials as they left the office?) There are likely to be cases where the clinician wrote an antibiotic prescription that the patient did not fill; these would not get counted since there would be no pharmacy claim

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Table. Antibiotics used to treat outpatient ARTIs, Oregon, 2011–2012.

	AOM	Sinusitis	Pharyngitis	Bronchitis	URI
Antibiotic Class	**n*=130,108**	**n=120,599**	**n=130,108**	**n=85,228**	**n=41,286**
Narrow-spectrum beta lactams+	66.3%	34.3%	65.6%	9.4%	31.8%
Amoxicillin-clavulanate	10.6%	19.7%	6.0%	4.5%	7.2%
Azithromycin	12.8%	28.7%	21.7%	71.2%	47.3%
Fluoroquinolones	0.5%	2.9%	0.7%	3.6%	2.4%
Second-generation and above cephalosporins	7.2%	5.8%	2.3%	1.3%	3.2%
All other broad spectrum	2.5%	8.6%	3.8%	9.9%	8.1%

*n indicates number of antibiotic prescriptions filled for that condition
+ includes penicillin, ampicillin, amoxicillin and first-generation cephalosporins

resisting the urge to prescribe antibiotics every time a patient sneezes. However, we seem inordinately fond of treating infections that are typically viral — viz.,‡ bronchitis and URIs. And, although we are fairly restrained in our use of fluoroquinolones and third-generation cephalosporins, we have a weakness for the Z-pak.

In general, macrolides are not recommended for the empiric treatment of sinusitis or AOM due to high rates of resistance in *Streptococcus pneumoniae*, the leading bacterial etiology of both of these syndromes; 10% of strains causing invasive pneumococcal infections in the Portland metropolitan area in 2013 were resistant to macrolides, while only 1% were resistant to penicillins. And remember that azithromycin has been associated with a small risk of sudden cardiac death due to QT-interval prolongation and associated *torsades de pointes* — a horror that prompted the FDA to insist that the label warn against using azithromycin in patients with known risk factors like QT-interval prolongation, hypokalemia, hypomagnesemia, bradycardia, or use of certain antiarrhythmic agents.[8]

What's the answer? Take advantage of AWARE resources, such as our guidelines for management of respiratory tract infections: physicians, nurses, physician assistants and pharmacists can earn free continuing education units. Use our free, downloadable patient and provider education materials during patient visits, or add them to discharge instructions. AWARE is teaming up with Immunize Oregon to offer a training entitled "Having Difficult Conversations: Working through Conflict and Uncertainty with Motivational Interviewing." The seminar focuses on the basic techniques of motivational interviewing and their application in patient education settings, specifically around the topics of immunizations and antibiotic use. Immunize Oregon and Oregon AWARE aim to provide this seminar to as many groups as possible and are offering a series of free presentations at the Portland State Office Building. Click on the date you want to attend (RSVP required).

- Tuesday May 19, from 2:00-4:00 pm
- Friday June 26, from 8:00-10:00 am

‡ antiquated (1530's, Latin) abbreviation of videlicet "that is to say, to wit, namely"

FOR MORE INFORMATION

- FREE CME: Judicious use of antibiotics: A guide for Oregon clinicians. Available at: *http://public.health.oregon.gov/PreventionWellness/SafeLiving/AntibioticResistance/Documents/judicioususefinal.pdf*
- Oregon Alliance Working for Antibiotic Resistance Education (AWARE) website: *www.healthoregon.org*
- CDC's Get Smart home page: Available at: *www.cdc.gov/getsmart/community/index.html*

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