

# Resisting Resistance: Practical Decision Tools for Choosing Antimicrobials Safely



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# *Purpose*



**Provide information about evidence-based decision-making strategies and support tools available for appropriate antimicrobial prescribing by nurse practitioners and other prescribers (physicians, physician assistants)**



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# *Nurse Practitioners*



- Registered Nurses with graduate degrees—masters or doctorates—
- Diagnose
- Prescribe pharmaceuticals and other treatment modalities
- Manage patients in primary and acute care (referrals, follow-up)



# *Prescriber's responsibility*



- Cure one illness without creating another
- Determine if the disease should be treated with an antimicrobial or if watching and waiting are viable alternatives
- Prevent resistance for as long as possible



# *Infections commonly treated by NPs*



- **Helicobacter pylori**
- **Urinary Tract Infection**
- **Methacillin Resistant Staphylococcus Aureus (MRSA)**
- **Community Acquired Pneumonia, Upper and Lower Respiratory Tract Infections**
- **Cellulitis**
- **Sexually Transmitted Infections**
- **Otitis Media**
- **HIV**



# *What's the problem?*



Resistance to antimicrobials occurs globally and is increasing rapidly—

- Helicobacter Pylori resistance is up 10%
- Escherichia coli resistance to trimethoprim-sulfamethoxazole led to increased use of ciprofloxacin and levofloxacin; now more resistance to those drugs.

(Castro-Fernandez & Vargas-Romero, 2009; Rice, 2009)



# *What's the problem?*



- **Neisseria gonorrhoeae** is so resistant to fluoroquinolones that they are not recommended as treatment anywhere in the US
- **H1N1**—CDC recommended the use of oseltamivir together with rimantidine rather than alone because resistance already being seen

(Division of STD Prevention, 2009; CDC, 2009)



## *What's the problem?*



- 2007—94,000 serious MRSA cases in the US, mostly hospital related; 14% were community acquired—

*Of the total, 19,000 resulted in death*

(Klevens, et al., 2007)





# *What's the problem?*



- Despite the evidence and availability of guidelines, prescribers continue to prescribe inappropriately
- Nurse practitioners tend to prescribe similarly to physicians

(Running, Kipp & Mercer, 2006; Ladd, 2005; Fontana, Devine & Kelber, 2000)



# *Factors in sub-optimal prescribing*



- Parental expectations higher among Asian and Latino populations in US (Mangione-Smith, 2004)
- Physicians “soften” the longer they are in practice
- High volume workload, patient education diminished (Cadieux, Tamblyn, Dauphinee, & Libman, 2007)
- Limited antimicrobial resistance education incorporated into professional NP coursework –88.4% of respondents in survey of 149 NP programs indicated that they had dedicated antimicrobial resistance lectures (Sym, Brennan, Hart, & Larson, 2006)



# *Factors in sub-optimal prescribing*



- Physicians obtain answers to only one in three questions that arise in clinical practice, many are regarding drug treatment
- When answers are sought, the sources used are the readily available ones which provide an answer in one to two minutes

(Ely, Osheroff, Ebell, et al., 1999)



# *Factors in sub-optimal prescribing*



- **Time constraints, lack of knowledge of available resources, limited access to resources at point of care**

(Sellman, Decarolis, Schullo-Feulner, Nelson, & Filice, 2004)



# *Factors in sub-optimal prescribing*



- Perception of importance of preventing antimicrobial resistance—
  - In one study, NPs ranked avoidance of long-term resistance as the eighth most important of 18 factors influencing antibiotic prescribing

(Wright and Neill, 2001)



# *Factors in sub-optimal prescribing*



- **Influence of pharmaceutical representatives -- mixed**

(Kessenich and Westbrook, 1999; Wright and Neill, 2001)



# *Factors in OPTIMAL prescribing*



- 80% of participants in study agreed that having immediately accessible information would be helpful to their clinical decision making
- only 55% of the time were external sources used, usually regarding antimicrobials)

(Sellman, Decarolis, Schullo-Feulner, Nelson, & Filice, 2004)





- **Survey of NPs regarding resource use in adults:**
  - **14.5% always relied on guidelines**
  - **62.5% very often relied on guidelines**
  - **2.6% never relied on guidelines**

(Goolsby, 2007)





# *Optimal prescribing (continued)*



- **Decision support at the point of electronic order entry might improve antimicrobial prescribing**

(Sellman, Decarolis, Schullo-Feulner, Nelson, & Filice, 2004)






- Study done in Strasbourg-Brumath, France reported Feb 2011—antibiotic prescribing guidelines embedded into the electronic medical record (EMR) for use at the time of prescribing showed a significant decrease in inappropriate prescribing

(Westphal, Jehl, Javeolot & Nonnenmacher, 2011)





*To prescribe,  
delay, or **NOT**  
**PRESCRIBE**: that  
is the question*



# *Decision-Making Strategies*



- More rigorous diagnosis—rapid antigen/PCR tests
- Vaccines for prevention
- Anti-viral treatments to prevent secondary bacterial infection

(Neiderman, 2005; Low, 2007)



# *And, of course....*



- Use available guidelines



# *Decision-Making Strategies*



- Consider if it is clinically appropriate to withhold antimicrobial and treat symptoms only—dependent on diagnosis, age, co-morbidities and clinical status

(Subcommittee on Management of Acute Otitis Media, 2004; National Center for Immunization and Respiratory Diseases, 2009; wong, Blumber & Lowe, 2006)



# *Decision-Making Strategies*



- Pressure from patient or patient's parent?

- ❖ *DELAYED PRESCRIBING OF ANTIBIOTIC WITH SYMPTOMATIC TREATMENT* vs. *NO PRESCRIBING WITH SYMPTOMATIC TREATMENT* resulted in similar patient satisfaction rates

- ❖ Clinical outcomes among immediate, delayed and no antibiotic groups are similar

(Cochrane systematic review: Spurling, Del Mar, Dooley & Foxlee, 2007)



# *Decision Making Tools*



- **McIsaac Sore Throat Scoring System**
- **The age-appropriate sore throat score is a simple primary care management approach that improves identification of GAS infection, limits the need for throat swabs in all patients with sore throat and can reduce unnecessary antibiotic use.**

**(McIsaac, White, Tannenbaum & Low, 1998)**





**Step 1**  
**Determine the patient's total sore throat score by assigning points to the following criteria:**



CRITERIA	POINT
• TEMPERATURE > 38°C	1
• NO COUGH	1
• TENDER ANTERIOR CERVICAL ADENOPATHY	1
• TONSILLAR SWELLING OR EXUDATE	1
• AGE 3–14 YR	1
• AGE 15–44 YR	0
• AGE ≥ 45 YR	-1

**TOTAL SCORE** \_\_\_\_\_



## Step 2

Choose the appropriate management suggested below according to the total sore throat



Total Score	Chance of streptococcal infection in community with usual levels of infection, %	Suggested management
0	2–3	No culture or antibiotic is required
1	4–6	
2	10–12	Culture all; treat only if culture result is positive
3	27–28	
4 *If patient has high temperature or is clinically unwell, and presents early in disease course. Use erythromycin if patient is allergic to penicillin.	38–63	Culture all; treat with penicillin on clinical grounds*



# *Prescribing*



- Have current guidelines at the Point of Care (POC)
- Can be included in Electronic Medical Record (EMR) or found independently with internet search



# *Prescribing*



- Put icons for most frequently used websites on computer desktop for capturing most up to date information in minutes
- E-mail alerts for infectious disease news



# *Prescribing*



- **Obtain antibiogram information from local hospital**



## Selected Internet Antimicrobial Resources

### Free Online Data bases



	<b>Resource</b>	<b>Description</b>	<b>Website</b>
	National Guideline Clearinghouse	Compendium of thousands of peer-reviewed guidelines, with a robust search engine: you may search very specifically, i.e., "antibiotic otitis infant," or "antibiotic urinary geriatric female," or "antibiotic resistance 2010 MRSA"	<a href="http://www.guideline.gov/">http://www.guideline.gov/</a>
	CDC - Get Smart: For Healthcare Professionals - Antibiotic Resistance	Overall website at CDC with links to many specific resources. Order free patient information sheets.	<a href="http://www.cdc.gov/getsmart/">http://www.cdc.gov/getsmart/</a>
	CDC – Campaign to Prevent Antimicrobial Resistance in Healthcare Settings	Specific guidelines for providers giving in-patient care and the latest news in drug resistance.	<a href="http://www.cdc.gov/ncidod/dhqp/ar.html">http://www.cdc.gov/ncidod/dhqp/ar.html</a>
	Johns Hopkins Poc-It Center Abx Guide	Search by diagnosis, drugs, pathogens, management, or vaccines.	<a href="http://hopkins-abxguide.org/">http://hopkins-abxguide.org/</a>
	Epocrates Online	General free drug reference which provides indications, dosing, contraindications, adverse effects, cost estimates. Subscription provides disease-specific guidelines.	<a href="https://online.epocrates.com/home">https://online.epocrates.com/home</a>

# Free Online Databases

	Resource	Description	Website
	Medscape: Introduction to Antibiotic Uses and Challenges	Principles of antimicrobial prescribing and specific guidelines regarding common illnesses	<a href="http://www.medscape.com/viewarticle/723457_2">http://www.medscape.com/viewarticle/723457_2</a>
	Infectious Diseases Society of America (IDSA)	Many specific practice guidelines in free PDF form, as well as PDA versions.	<a href="http://www.idsociety.org/content.aspx?id=9088">http://www.idsociety.org/content.aspx?id=9088</a>
		<b>Purchased</b>	
	Redbook 2009	Pediatric infectious disease resource – updated every 3 years	<a href="http://aapredbook.org">http://aapredbook.org</a>
	Sanford Guide to Antimicrobial Therapy 2011	Annually-updated reference book –in several sizes and for PDAs	<a href="http://store.nexternal.com/shared/StoreFront/default.asp?CS=amt&amp;StoreType=BtoC&amp;Count1=831630885&amp;Count2=748771309">http://store.nexternal.com/shared/StoreFront/default.asp?CS=amt&amp;StoreType=BtoC&amp;Count1=831630885&amp;Count2=748771309</a>

## Free E-Mail Alerts



	PubMed Journal Citation Alerts	Main website: Tutorial instructions to sign up for journal updates, such as: <i>Journal of Infection and Public Health, Drug Resistance Updates, or Microbial Drug Resistance</i>	<a href="http://www.ncbi.nlm.nih.gov/pubmed/">http://www.ncbi.nlm.nih.gov/pubmed/</a> <a href="http://www.nlm.nih.gov/bsd/viewlet/myncbi/jourup.html">http://www.nlm.nih.gov/bsd/viewlet/myncbi/jourup.html</a>
	Red Book Email Alerts	This service is free, although the full book requires a subscription	<a href="http://aapredbook.aapublications.org/cgi/alerts/etoc">http://aapredbook.aapublications.org/cgi/alerts/etoc</a>
	Infectious Disease News	Registration is free, with several options for updates and CME.	<a href="http://www.infectiousdiseaseneeds.com/login.aspx">http://www.infectiousdiseaseneeds.com/login.aspx</a>

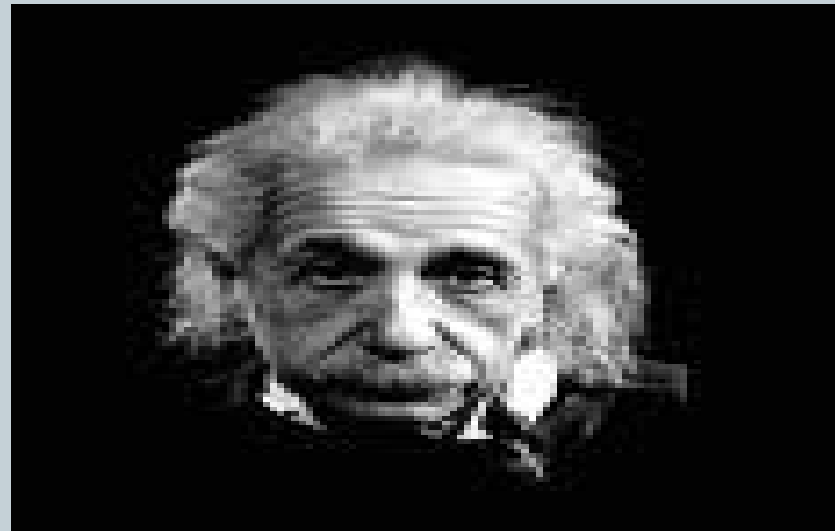






“Never commit to memory what can be easily looked up in books

--Albert Einstein



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.....or on the internet or embedded in the EMR”

--Norma Stephens

Hannigan



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