Antimicrobial Stewardship: Fighting Resistance Needs Your Assistance

Shelita Dattani, BScPhm, PharmD
Director, Practice Development and Knowledge Translation

Sarah Tessier, Candidate for PharmD
Student Professional Affairs

Program Accreditation

The following program has been peer reviewed and has received CCCEP Accreditation.

- 1.0 CEU
- CCCEP File : 8002-2019-2719-L-P

Presenter Disclosures

- **Presenter:** Shelita Dattani
- I have no current or past personal relationships with commercial entities relevant to this presentation
- I have not received a speaker's fee for this learning activity

This program has received no financial or in-kind support from any commercial or other organization.

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Learning Objectives

By the end of this presentation the learner will be able to:

1. Describe antimicrobial resistance as a global threat
2. Highlight the successes that pharmacists have achieved in antimicrobial stewardship (AMS) in the acute care setting
3. Understand AMS efforts in primary care, where most antibiotics are prescribed
4. Apply AMS principles using a structured framework to evaluate a patient presenting with an infectious disease
5. Identify opportunities for AMS in community pharmacy

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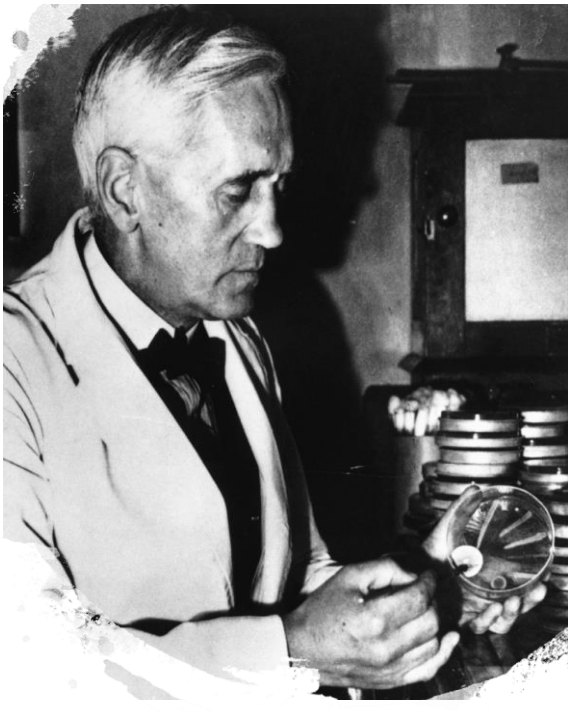
Antimicrobial Resistance

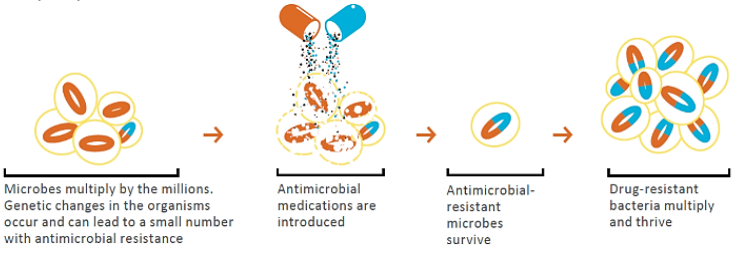
"But I would like to sound a note of warning ... It is not difficult to make microbes resistant to penicillin in the laboratory by exposing them to concentrations not sufficient to kill them and the same thing has occasionally happened in the body."

- Sir Alexander Fleming, Nobel Prize Lecture, 1945



Antimicrobial Resistance – How it Occurs

- Mechanism by which microbes prevent a drug from working
- Direct link to antibiotic use
- Selective pressure from antimicrobial use can increase resistance at an individual and population level



Public Health Ontario. Antimicrobial resistance. Ontario Agency for Health Protection and Promotion. Rehttps://www.publichealthontario.ca/en/DataAndAnalytics/OntarioHealthProfile/Pages/OHP-IWR-AR.aspx. Updated March 14, 2016. Accessed January 17, 2019

Antimicrobial Resistance – Global Concern

- Global threat to human health and public safety
  - Claiming lives of > 700,000 people each year
  - Dramatic cost increase to healthcare systems
- Projected to lead to more deaths than cancer by 2050
- Slow moving tsunami
- Need to take “one health” approach, humans, animals and ecosystem

World Health Organization. Antimicrobial resistance. World Health Organization. https://www.who.int/news-room/fact-sheets/detail/antimicrobial-resistance. Published February 15, 2018. Accessed January 16, 2019.

History of Medicine

2000 B.C. – Here, eat this root.

1000 A.D. – that root is heathen. Here, say this prayer.

1850 A.D. – That prayer is superstition. Here, drink this potion.

1920 A.D. – That potion is snake oil. Here, swallow this pill.

1945 A.D. – That pill is ineffective. Here, take this penicillin.

1955 A.D. – Oops….bugs mutated. Here, take this tetracycline.

1960 – 1999 A.D. – 39 more "oops"… Here, take this more powerful antibiotic

2000 A.D. – The bugs have won! Here, eat this root.

Source: Adapted from World Health Organization http://www.who.int/infectious-disease-report/2015/

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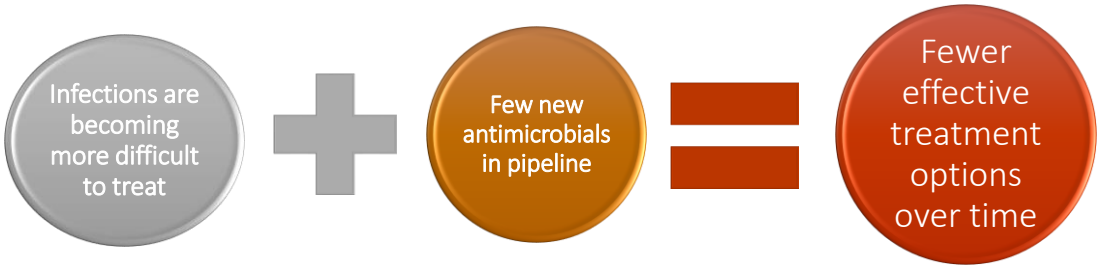
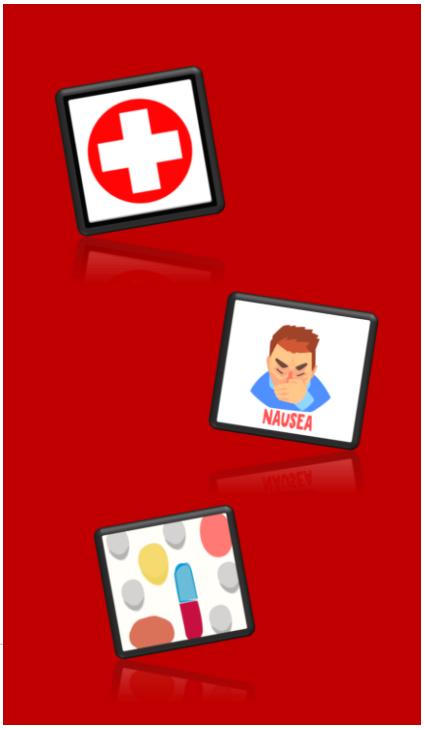
Antimicrobial Resistance – The Problem



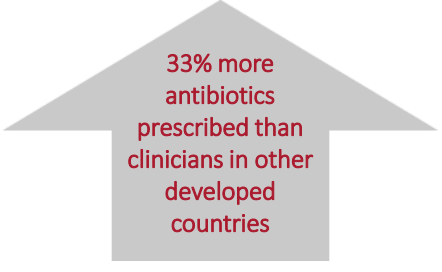
Antibiotic Harm

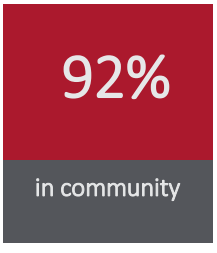
- Antibiotic-related adverse drug events
  - Up to 1/5 visits to ED
  - Common cause of adverse drug events in children
- Risk of:
  - Drug interactions
  - Secondary infections (e.g. C. *difficile*)



Antimicrobial Prescribing in Canada

- >23 million antimicrobial prescriptions prescribed annually
- Cost of antimicrobial prescribing >$780 million





HealthCareCAN, National Collaborating Center for Infectious Disease. Putting the Pieces Together, A National Action Plan on Antimicrobial Stewardship. https://nccid.ca/wp-content/uploads/sites/2/2017/01/Putting-the-Pieces-Together.pdf. Published November 2016. Accessed January 2019.

Antimicrobial Stewardship

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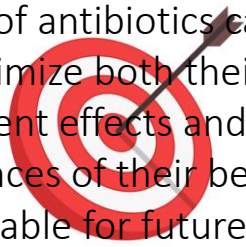
How the appropriate use of antibiotics can maximize both their current effects and the chances of their being available for future generations



Public Health Ontario. . Ontario Agency for Health Protection and Promotion. https://www.publichealthontario.ca/en/BrowseByTopic/Pages/Topic.aspx?k=Antimicrobial%20stewardship%20%28ASP%29%20InformationByTopic%3A%22Antimicrobial%20stewardship%20%28ASP%29%22&start1=21. Updated March 14, 2016. Accessed February 6, 2019

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Antimicrobial Stewardship In Hospitals –Driven By Accreditation - Pharmacists As Quarterbacks

Pharmacists have a key role in

- Education – provider and patient
- Prescribing –independent or collaborative practice model
- Daily audit and feedback
- Utilization and tracking

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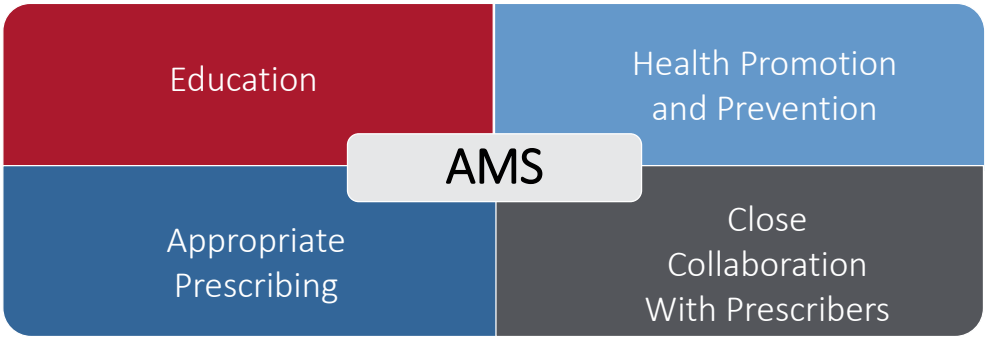
Antimicrobial Stewardship In Primary Care Settings

- Initial focus in acute care or hospital environments
- Reality: 90% of antibiotics prescribed in **outpatient** settings
  - Frequently unnecessary or inappropriate
  - Huge opportunity for community pharmacists

4 ways pharmacists can help fight antimicrobial resistance



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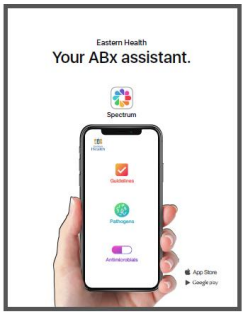
Antibiograms Across Canada

- Eastern Health NL created mobile app "Spectrum"
- Facilitates antimicrobial selection in hospital
- Data from hospitals in NL, NS, ON, AB and BC
- Contains:
  - Local resistance rates by pathogen
  - Local guidelines and epidemiology
  - Antimicrobial information

*Continually updated



Other Antibiograms

Antibiograms online		
Province	**Source**	**Description**
British Columbia	LifeLabs	- Community - Data grouped by region
Alberta	DynaLife* Calgary Laboratory Services	- Community, acute and long-term care
Ontario	LifeLabs Mount Sinai Hospital/University Health Network	- Community and acute care - Data grouped by region
Nova Scotia	Nova Scotia Health Authority	- Data grouped by region
PEI	Health PEI	- Community and acute care data - Provides island wide antibiogram data

Scope of Practice Enablers

Province	Prescribing Authority	Infectious Condition *
Alberta	- Schedule I drugs - Additional Prescribing Authority (APA) Required - Remuneration: yes	- Any as long as specified requirements are met
Saskatchewan	Two levels: - Level 1: Pharmacists can prescribe Schedule I drugs for listed minor ailments - Level 2: Pharmacists can prescribe for a greater range of Schedule I drugs - Pharmacists must complete prescriptive authority training - Remuneration: yes	- Level I: bacterial conjunctivitis, bacterial and fungal skin infections, UTI, cold sores, oral thrush - Level II: Any within pharmacist's scope of expertise as defined in specified requirements
Manitoba	- Specific Schedule I drugs for self-limiting conditions - *Extended practice pharmacists* may prescribe additional Schedule I drugs within their scope of expertise - Must complete training - Remuneration: yes	- Candidal stomatitis - Any within pharmacist's scope of expertise (if *extended practice pharmacist*)
Quebec	- Pharmacists can prescribe Schedule I drugs for minor ailments - No additional training required - Remuneration: yes	- UTI, cold sores, oral thrush

*List not comprehensive

Scope of Practice Enablers

Province	Prescribing authority	Infectious Condition*
New Brunswick	- Schedule I drugs for 32 listed minor ailments - Must participate in Minor Ailment Orientation - Remuneration: no public funding	- UTI, impetigo, fungal skin infections, cold sores, oral thrush
Nova Scotia	- Schedule I drugs for listed minor ailments - No additional training requirements - Remuneration: no public funding	- Impetigo, oral thrush, cold sores, fungal skin infections
Prince Edward Island	- Schedule I for listed conditions - Must obtain an Extended Practice Certificate (EPC) in Minor Ailment Prescribing - Remuneration: no public funding	- Sore throat, oral thrush, cold sores, fungal skin infections
Newfoundland and Labrador	- Schedule I drugs for 29 listed minor ailments - Remuneration: no public funding	- Impetigo, fungal skin infections, oral thrush

*List not comprehensive

Antimicrobial Stewardship Strategies

Appropriate antimicrobial prescribing

a. Right diagnosis
b. Right antibiotic
c. Right dose, route and duration
d. Least harm to patient and future patients

- Other Selected Strategies
  - Delayed prescribing
  - Optimizing duration of therapy

Framework Approach to Infectious Disease

Right Diagnosis
- Confirm indication and infection
- Identify key pathogen(s)

Right Antibiotic
- Empiric and targeted therapy

Right dose, route and duration

Least harm
- Monitor

Other Stewardship Strategies: Delayed Prescribing

- Delayed prescribing = a "watchful waiting" strategy to reduce unnecessary antibiotic use
- Rx issued by HCP for use by the patient at a later date, if their symptoms do not improve.

Role of the pharmacist

- Working with individual patients presented with a delayed prescription to provide support and education
  - Talk to patient about the risks/benefits of antimicrobial therapy
  - Offer symptom relief (e.g. analgesics, hydration, nasal saline, decongestants)
  - Inform patient about follow-up and take the time to follow-up with them within a few days

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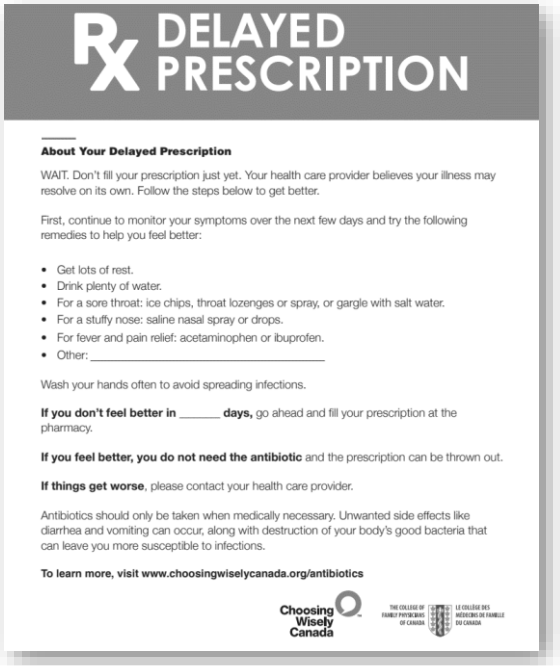
Advantages:

- ↑ patient satisfaction compared to providing no antibiotic
- ↓use of antibiotics compared to immediate prescribing
- Natural symptom improvement
- Opportunity for patient education



Rx DELAYED PRESCRIPTION

About Your Delayed Prescription

WAIT. Don't fill your prescription just yet. Your health care provider believes your illness may resolve on its own. Follow the steps below to get better.

First, continue to monitor your symptoms over the next few days and try the following remedies to help you feel better:

- Get lots of rest.
- Drink plenty of water.
- For a sore throat: ice chips, throat lozenges or spray, or gargle with salt water.
- For a stuffy nose: saline nasal spray or drops.
- For fever and pain relief: acetaminophen or ibuprofen.
- Other: _____

Wash your hands often to avoid spreading infections.

If you don't feel better in _____ days, go ahead and fill your prescription at the pharmacy.

If you feel better, you do not need the antibiotic and the prescription can be thrown out.

If things get worse, please contact your health care provider.

Antibiotics should only be taken when medically necessary. Unwanted side effects like diarrhea and vomiting can occur, along with destruction of your body's good bacteria that can leave you more susceptible to infections.

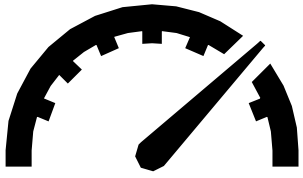
To learn more, visit www.choosingwiselycanada.org/antibiotics

Choosing Wisely Canada

Choosing Wisely Canada. Rx Delayed Prescription. Choosing Wisely Canada. https://choosingwiselycanada.org/wp-content/uploads/2018/10/Delayed-Prescription-EN-.pdf. Accessed January 2019.

Other Stewardship Strategies: Optimizing Duration of Therapy - Is Shorter Smarter?

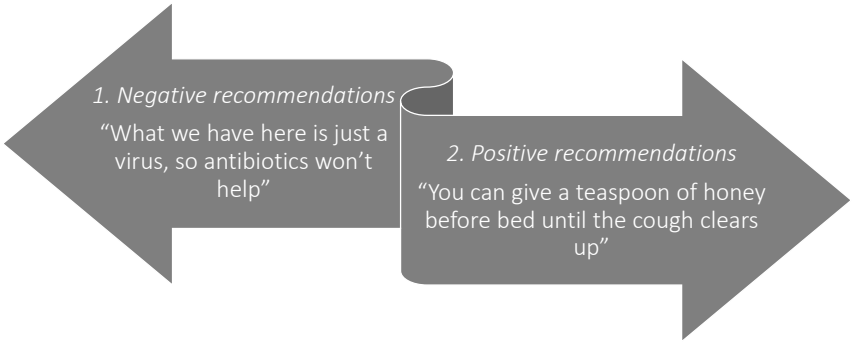
- Optimizing duration of therapy → better patient care, reduced harm and ↓AMR
- ≠ worse clinical outcomes
- Evidence supported:
  - CAP as few as 5 days
  - Uncomplicated cystitis, 1-3 days
  - Sinusitis (5-7 days if uncomplicated/younger adult)



**Always consider patient specific factors

Other Stewardship Strategies: Effective Communication

- 2 styles of effective communication
- Use a combination of both to enhance patient acceptance



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Case Studies: Demystifying Antimicrobial Stewardship in Community Pharmacy

Meet Diane

- 26 year old female
- Presents with burning upon urination, frequency and pressure in lower abdomen
- No fever, vaginal discharge or nausea/vomiting
- Feeling similar to previous UTI

Meet Diane

- Previously allergy to amoxicillin
- Only listed medication = oral contraceptive pill
- ≠ pregnant

Knowledge Assessment

Given the information in the case, what is the most likely diagnosis for Diane's condition?

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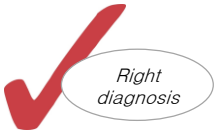
Knowledge Assessment

What further testing would be required for Diane?

Diane



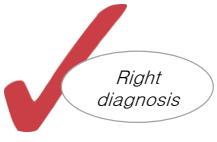
- Symptoms consistent with uncomplicated cystitis:
  - Dysuria
  - Frequency
  - Suprapubic pain
- Previous diagnosis with dipstick =

subsequent diagnosis due to similar symptomatology

Knowledge Assessment

What is/are possible pathogens for Diane's condition?

Diane - Bugs



- Primary pathogen in community-acquired, uncomplicated cystitis = E. coli (75 – 95%)
- S. saprophyticus (5 – 20%) in young, sexually active women
- Additional possibilities:
  - Other Enterobacteriaceae
  - E. faecalis

Additional considerations:
- Results from a previous culture
- Local resistance patterns

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Diane - Drugs

- E. coli → most cases of uncomplicated cystitis = main target of empiric therapy
- Physician prescribed:

Nitrofurantoin 100 mg PO QID for 7 days

Applying our AMS principles do we agree with this therapy?

Knowledge Assessment

What is an appropriate duration of therapy for Diane's Nitrofurantoin?

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Case Study: Demystifying Antimicrobial Stewardship in Community Pharmacy

- Appropriate duration of therapy for uncomplicated UTI

	Agent	Duration of Therapy
First line	Nitrofurantoin	5 days
	SMP-TMX	3 days
	Fosfomycin	Single dose
Second line	Fluoroquinolones	3 days
Third line	Beta-lactams	5 – 7 days

Colgan R, Williams, M. Diagnosis and Treatment of Uncomplicated Cystitis. Am Fam Physician. 2011;84(7):771-776.
https://www.aafp.org/afp/2011/1001/p771.html. Published October 2011. Accessed January 2019.
Milo G et al. Cochrane Database of Systematic Reviews. 2005, Issue 2. Art. No.: DD004682.
Gupta K et al. *Clin Infect Dis.* 2011;52(5):e103-e120.

Monurol. In: RxTx. Ottawa, ON: Canadian Pharmacists Association [Updated August 10, 2017; Accessed January, 2019]
Fosfomycin. In: Lexi-Drugs. Hudson, OH: Lexi-Comp, Inc. [Updated January 9, 2019; Accessed January 21, 2019].
Nitrofurantoin. In: RxTx. Ottawa, ON: Canadian Pharmacists Association [Updated November, 2018; Accessed January, 2019].
Septra (combination). In: Lexi-Drugs. Hudson, OH: Lexi-Comp, Inc. [Updated January 21, 2019; Accessed January 21, 2019].

Knowledge Assessment

When should we follow-up with Diane?

Case Study: Demystifying Antimicrobial Stewardship in Community Pharmacy

- When should symptom improvement occur?
- Symptoms resolution in 48 – 72 hours
  - If no resolution = treatment failure
  - Perform urine culture
  - Confirm patient compliance
- When should you follow up?

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The Evidence - RxOUTMAP

Rationale

Despite ability to prescribe in certain jurisdictions – little evidence on outcomes of pharmacist care

Study Objective

Evaluate effectiveness, safety, and patient satisfaction of pharmacist assessment and management of patients with uncomplicated UTI

- Prospective registry of 39 community pharmacies in New Brunswick
- Total of 750 patients

Primary Outcome	Secondary Outcome
Clinical cure at 2 weeks	Adverse events, adherence, patient satisfaction and time from decision to seek care until seen by pharmacist or physician

The Evidence - RxOUTMAP

Study Intervention

- Pharmacists assessed patient for UTI symptoms and either:
  1. Prescribed antibacterial therapy
  2. Modified antibacterial therapy
  3. Provided education*only
  4. Referred to physician
- Follow-up occurred at 2 weeks

The Evidence - RxOUTMAP

Results

- Clinical cure: 88.9%
- ↓time from decision to seek care until assessment (1.7 vs 2.8 days)
- ↑ patient satisfaction

Conclusion

- The care by pharmacists is both effective and safe and patient satisfaction is high

Meet Roger

- 5-year old
- Presenting with a cough, runny nose with green colored mucus and fatigue
- Afebrile
- No medical conditions, medications or allergies
- Mother is concerned; “Which antibiotic can I give him”?

Knowledge Assessment

What is the most likely diagnosis for Roger’s condition?

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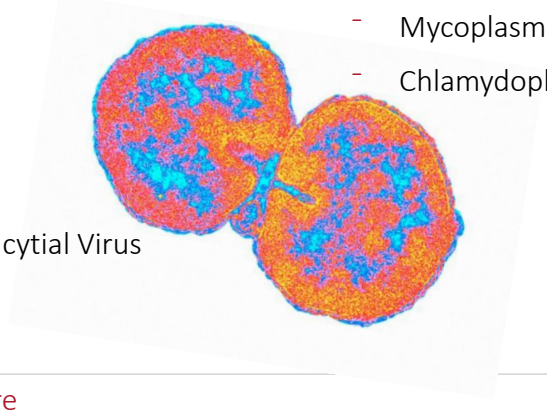
Roger

- The following symptoms are consistent with bronchitis:
  - Cough
  - Sputum

***In patient with acute bronchitis symptoms (i.e. colour of sputum) cannot be used to differentiate between viral and bacterial causes.*

Roger - Bugs

- Viral Causes (> 90%)
  - Influenza
  - Parainfluenza
  - Rhinovirus
  - Coronavirus
  - Respiratory Syncytial Virus

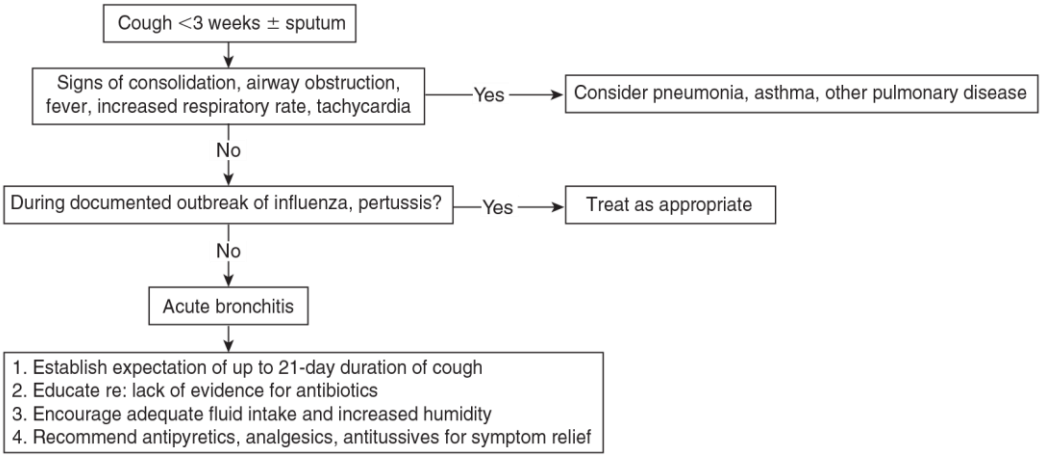


Bacterial etiology (< 10%)

- Mycoplasma pneumoniae
- Chlamydophila pneumoniae

**Primarily viral in nature

Management of Acute Bronchitis



Acute Bronchitis. In: RxTx. Ottawa, ON: Canadian Pharmacists Association [Updated May, 2018; Accessed January, 2019]

Knowledge Assessment

What is the best treatment for Roger's bronchitis?

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Case Study: Demystifying Antimicrobial Stewardship in Community Pharmacy

- Routine use of antibiotics not recommended – does not improve clinical course
- Advise on treatments that will provide symptom relief
  - Stay hydrated
  - Use a humidifier
  - Use of honey in children

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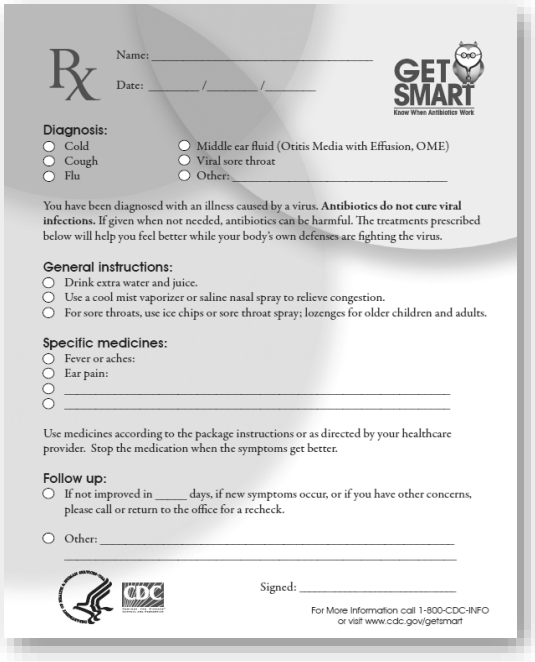


Rx

Name: _____

Date: _____/_____/_____

GET SMART
Know When Antibiotics Work

Diagnosis:

- ○ Cold
- ○ Cough
- ○ Flu
- ○ Middle ear fluid (Otitis Media with Effusion, OME)
- ○ Viral sore throat
- ○ Other: _____

You have been diagnosed with an illness caused by a virus. **Antibiotics do not cure viral infections.** If given when not needed, antibiotics can be harmful. The treatments prescribed below will help you feel better while your body's own defenses are fighting the virus.

General instructions:

- ○ Drink extra water and juice.
- ○ Use a cool mist vaporizer or saline nasal spray to relieve congestion.
- ○ For sore throats, use ice chips or sore throat spray; lozenges for older children and adults.

Specific medicines:

- ○ Fever or aches:
- ○ Ear pain:
- ○ _____
- ○ _____

Use medicines according to the package instructions or as directed by your healthcare provider. Stop the medication when the symptoms get better.

Follow up:

- ○ If not improved in _____ days, if new symptoms occur, or if you have other concerns, please call or return to the office for a recheck.
- ○ Other: _____

Signed: _____

For More Information call 1-800-CDC-INFO or visit www.cdc.gov/getsmart

Rx Patient Name : _____ Date : _____

The symptoms you presented with today suggest a VIRAL infection.

- ☐ Upper Respiratory Tract Infection (Common Cold) : Lasts 7-14 days
- ☐ Flu : Lasts 7-14 days
- ☐ Acute Pharyngitis ("Sore Throat") : Lasts 3-7 days, up to ≤10 days
- ☐ Acute Bronchitis/"Chest Cold" (Cough) : Lasts 7-21 days
- ☐ Acute Sinusitis ("Sinus Infection") : Lasts 7-14 days

You have not been prescribed antibiotics because
antibiotics are not effective in treating viral infections.
Antibiotics can cause side effects (e.g. diarrhea, yeast infections) and may cause serious harms such as severe diarrhea, allergic reactions, kidney or liver injury.

When you have a viral infection, it is very important to get plenty of rest and give your body time to fight off the virus.

If you follow these instructions, you should feel better soon :

- ➳ Rest as much as possible
- ➳ Drink plenty of fluids
- ➳ Wash your hands frequently
- ➳ Take over-the-counter medication, as advised :

- ☐ Acetaminophen (e.g. Tylenol®) for fever and aches
- ☐ Ibuprofen (e.g. Advil®) for fever and aches
- ☐ Naproxen (e.g. Aleve®) for fever and aches
- ☐ Lozenge (cough candy) for sore throat
- ☐ Nasal Saline (e.g. Salinex®) for nasal congestion
- ☐ Other : _____
  (e.g. Nasal decongestant if Salinex® does not work, for short-term use only!)

Please return to your provider if :

- ➳ Symptoms do not improve in _____ day(s), or worsen at any time
- ➳ You develop persistent fever (above 38°C, or _____ as directed)
- ➳ Other : _____

Prescriber _____

Rx FILES — Choosing Wisely Canada

This "Viral Prescription Pad" has been adapted from the RQHR Antimicrobial Stewardship Program www.rqhealth.ca/antimicrobialstewardship, and is **available in other languages.** http://www.rxfiles.ca/rxfiles/uploads/documents/ABX-Viral-Prescription-Pad-Languages.pdf

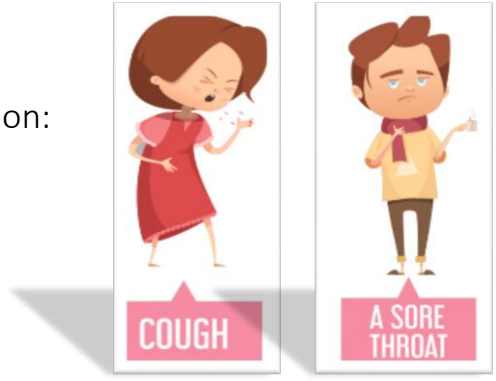
Visit www.RxFiles.ca/ABX for more information.

RxFiles. Rx-Files-Viral-Prescription. Choosing Wisely Canada. https://choosingwiselycanada.org/wp-content/uploads/2018/10/Rx-Files-Viral-Prescription-EN.pdf. Accessed January 2019.

Case Study: Demystifying Antimicrobial Stewardship in Community Pharmacy

- Viral infections = education opportunity
- Inform patients on realistic symptom duration:

Symptom	Typical Duration
Cough	Up to 3 weeks
Flu	2 weeks
Cold	1 ½ weeks
Sore throat	1 week
Nasal congestion/sinusitis	2 ½ weeks



Case Study: Demystifying Antimicrobial Stewardship in Community Pharmacy

- Symptom improvement:
  - Cough 1 -3 weeks (up to 50% have a cough lasting > 3 weeks)
- **Red flags:**
  - Worsening symptoms
  - Development of new symptoms (i.e. dyspnea, fever)
  - Cough > 1 month
  - > 3 episodes/year

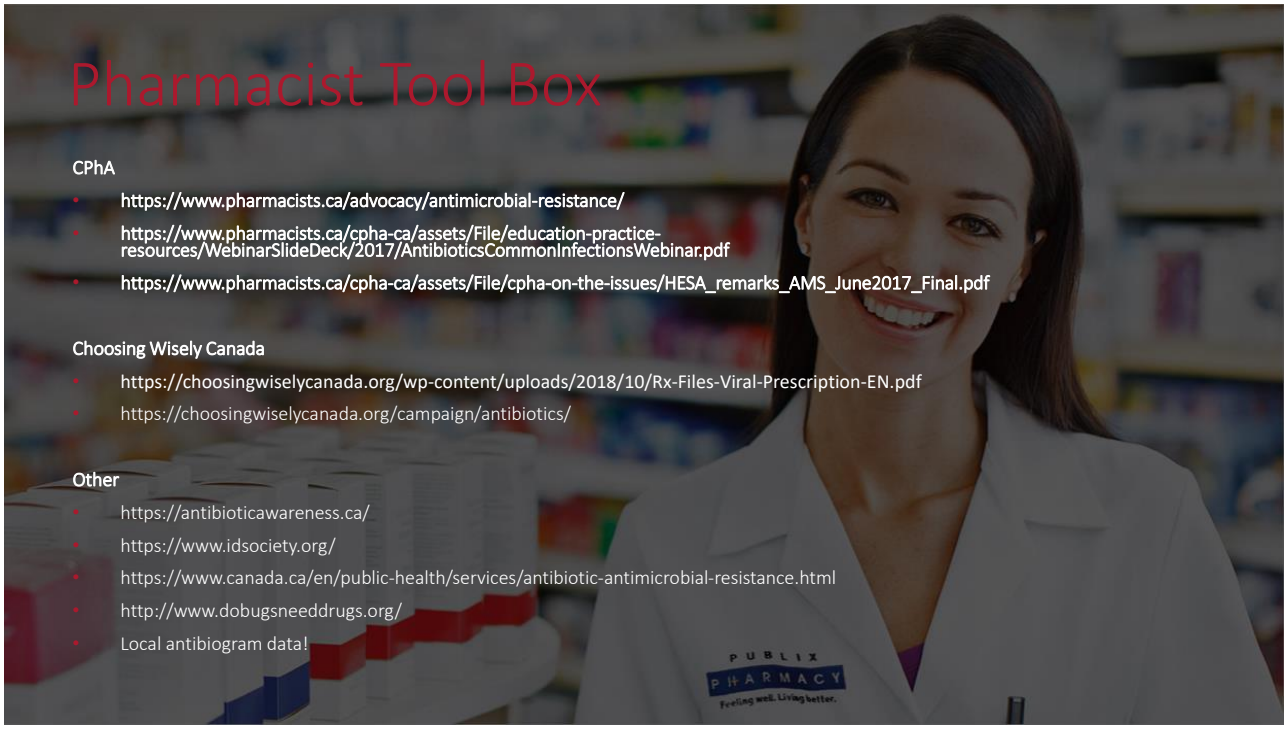
Community Infections Key Points

Infection	Key Points
Upper respiratory illness	Viral/flu illnesses never need antibiotics
Otitis media	Most children can be effectively treated with antipyretics
Sinusitis (82% get a prescription)	90% viral - Self-limiting unless persistent, worsening or severe – watchful waiting – use PODS criteria to assess for bacterial if no improvement
Pharyngitis	70 – 85% viral! Test those at high risk (modified Centor score) and only treat if positive
Bronchitis	> 90% caused by viruses
Pneumonia	Is NOT a clinical diagnosis – need a CXR
Uncomplicated Cystitis	Urine cultures are not needed in most cases Diagnosis can be made based on patient symptoms and history

CPhA Remarks – Standing Committee on Health (HESA) - 2017

- All jurisdictions to promote support of scope of practice harmonization and associated remuneration
- Implementation of full DIS and EHR
- National Prescribing Guidelines
- Indication for medication

Pharmacist Tool Box



CPhA

- https://www.pharmacists.ca/advocacy/antimicrobial-resistance/
- https://www.pharmacists.ca/cpha-ca/assets/File/education-practice-resources/WebinarSlideDeck/2017/AntibioticsCommonInfectionsWebinar.pdf
- https://www.pharmacists.ca/cpha-ca/assets/File/cpha-on-the-issues/HESA_remarks_AMS_June2017_Final.pdf

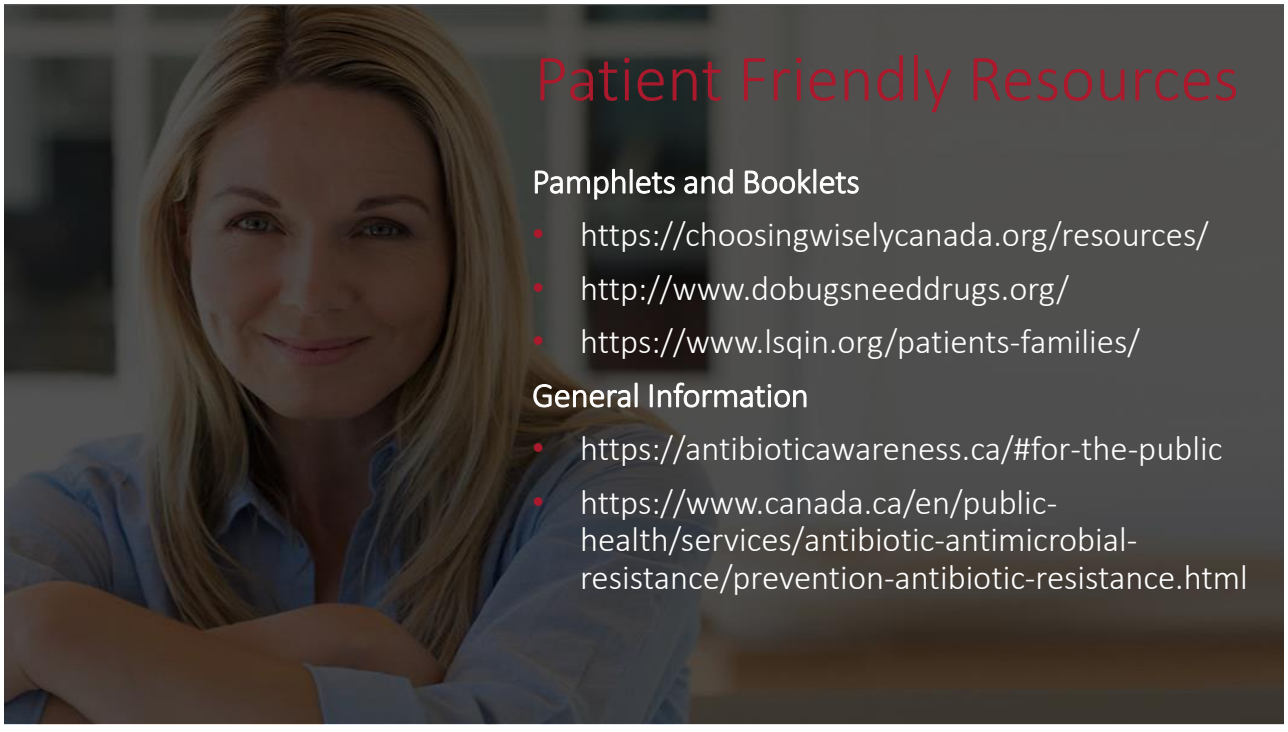
Choosing Wisely Canada

- https://choosingwiselycanada.org/wp-content/uploads/2018/10/Rx-Files-Viral-Prescription-EN.pdf
- https://choosingwiselycanada.org/campaign/antibiotics/

Other

- https://antibioticawareness.ca/
- https://www.idsociety.org/
- https://www.canada.ca/en/public-health/services/antibiotic-antimicrobial-resistance.html
- http://www.dobugsneeddrugs.org/
- Local antibiogram data!

Patient Friendly Resources



Pamphlets and Booklets

- https://choosingwiselycanada.org/resources/
- http://www.dobugsneeddrugs.org/
- https://www.lsqin.org/patients-families/

General Information

- https://antibioticawareness.ca/#for-the-public
- https://www.canada.ca/en/public-health/services/antibiotic-antimicrobial-resistance/prevention-antibiotic-resistance.html

Summary

- Overuse and misuse of antimicrobials has increased resistance rates
- Pharmacists should be stewards throughout the continuum of care
  - Acute care, LTC, primary care teams, public health, community
- You can help by:
  - Assessing patients
  - Providing patient education
  - Collaborating with other HCPs
  - Practicing appropriate prescribing
- *AMS is a team sport – pharmacists can be the quarterbacks!*

"You have to teach early and often… because education has the half-life of a beta-lactam"

"Antibiotics are uniquely societal drugs because individual use effects others in the community and environment."

"Antibiotics for surgery are like condoms for sex: only good just before and during the act."

Questions?

Shelita Dattani, BScPhm, PharmD
Director, Practice Development and Knowledge Translation
1785 Alta Vista Drive, Ottawa, ON
SDattani@pharmacists.ca

"Antibiotics are among the most potent of all anxiolytics – for prescribers."

Canadian Pharmacists Association / Association des Pharmaciens du Canada