



## What is MARR?

- Michigan Antibiotic Resistance Reduction Coalition
- Group of like-minded community and professional organizations
- Objective:
  - Educate physicians and consumers about appropriate use of antibiotics

## Antibiotics

- Compounds that can kill or inhibit the growth of bacteria
- Antibiotics attack the bacteria directly or prevent them from reproducing
- Specialized medicines
  - Work on specific bacteria
- Antibiotics DO NOT work on viruses



## Bacteria

- Tiny microscopic organisms
- Numerous types
- Live almost everywhere, except for sterile sites such as blood and spinal fluid
- Most are harmless, aiding in digestion and preventing other harmful germs from taking up residence
- Bacteria can make you sick
  - When they get where they are not supposed to be
  - When conditions allow them to grow more rapidly



## Antibiotic Resistance

- Since their discovery during the 20th century, antibiotics have reduced the threat posed by infectious diseases.
  - combined with improvements in sanitation, nutrition, immunizations, etc. there has been a dramatic drop in deaths from diseases that were previously widespread, untreatable, and frequently fatal.



## Antibiotic Resistance



- These gains are now seriously jeopardized by the emergence and spread of microbes that are "resistant" to cheap and effective first-choice antibiotics
- Resistance occurs when an antibiotic can not effectively control or kill bacterial growth

## How does "resistance" happen?

- Natural phenomenon
  - Bacteria adapt to survive in the presence of the antibiotic
    - "survival of the fittest"
- Bacteria then enhance the effects of resistance
  - Multiply quickly
    - Resistance is passed on during replication
  - Can also pass on resistance genes to other similar bacteria
- This process is accelerated by various factors
  - most importantly being patient-related

## Factors promoting resistance

- Overuse and abuse of antibiotics
- Use of newer agents first
  - Falsely believed to be better
  - Increasing resistance to these agents as well
- Physician pressure
  - demands for unnecessary antibiotics
  - Less time to spend with patients
- Patient compliance



"A Prescription for Disaster"

## Consequences of resistance

- Resistant infections are very hard to treat
- Treatment failure=prolonged illness
  - Increased chance of spreading the resistant bacteria to others
- Must use second-line agents to treat
  - ↑ Cost
  - ↑ Side effects
  - Multi-resistant forms of bacteria



## How serious is the problem?

- Since the early 1990's, resistance to penicillin and other antibiotics has increased in the U.S.
- In the past, *S. pneumoniae* (a type of bacteria) was almost always susceptible to penicillin
- Now, there is a trend of increasing *S. pneumoniae* resistance



VPD Surveillance Manual, 3rd Edition, 2002  
Chapter 9: Pneumococcal Disease, 9-1

## How serious is the problem?

- Some bacteria are resistant to all oral antibiotic agents
- Increasing antibiotic use is likely the cause

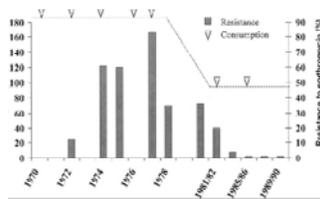
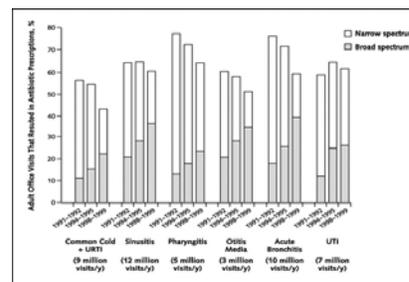


Figure 1. Association between annual human consumption of macrolides (in tons) and frequency of macrolide resistance among group A streptococci

Antimicrobial Drug Use & Resistance among Respiratory Pathogens in the Community. Low DE, Clinical Infectious Diseases

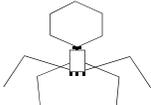
- But despite all this, physicians continue to prescribe antibiotics at times they are not needed

These conditions are usually caused by viruses and do not respond to antibiotics, but for some reason they are prescribed >50% of the time



Antibiotic prescribing among adults between 1991-1992 and 1998-1999

Changing Use of Antibiotics in Community-Based Outpatient Practice, 1991-1999. Steiner MA, Annals of Internal Medicine



## Viruses

- Different from bacteria
- Invade living cells and use them to make more viruses
  - Cannot replicate on their own
  - Not alive
- Antibiotics **DO NOT** work against viruses
- Your immune system has natural defenses against viruses
- Prevention has been a more effective method of controlling virus infections
  - vaccination

### Do I Need an Antibiotic?

ILLNESS	USUAL CAUSE	ANTIBIOTIC?
Cold	Viral	NO
Flu	Viral	NO
Chest Cold	Viral	NO
Sore Throat	Viral	NO
Acute Bronchitis	Viral	NO
Acute Rinosinusitis	Viral	NO

## Common Cold Treatment

- 1<sup>st</sup> generation antihistamines and decongestants
  - Cough suppressants offer limited help
- Analgesics & antipyretics (Tylenol, Motrin, Aleve)
  - Fever, sore throat
- No expectorant needed (Guaifenesin)
  - Not proven to be effective

## Sore Throat



- Mostly viral unless strep throat
- Only 10% adults & 30% children with a sore throat have strep
- Positive strep test=antibiotics
- Otherwise pain relief
  - Analgesics & throat lozenges

## Cough/Chest Cold

- More than 90% cases are non-bacterial
- Antibiotics are only needed if pneumonia
- See a doctor for a cough lasting > 3 week

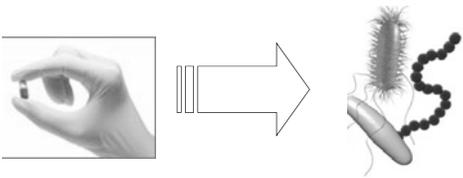


## FLU

- Viral
- High fever, headache, tired, sore throat, body aches, runny nose, cough
- Prevention is key
  - Vaccination annually
- Treatment for the flu
  - Anti-virals (NOT antibiotics)
  - need to begin taking the within 2 days of feeling sick
  - may shorten the time you are sick by 1 or 2 days
  - may make you less contagious



**Remember:**  
Antibiotics **ONLY** work against bacterial infections



AntiBiotic = AntiBacterial

**How can you help fight against antibiotic resistance?**

- **Never take antibiotics for a viral infection**
  - Follow the previous guidelines
  - Talk to your doctor &/or pharmacist
- **Do not demand antibiotics from your physician**
- **When given an antibiotic:**
  - Finish the entire therapy course (even if you feel better)
  - Do not keep antibiotics for later use or share antibiotics
- **Reduce your chances of getting sick**
  - Eat healthy
  - Exercise
  - Regular sleep
  - And especially....

**WASH YOUR HANDS OFTEN!!**

- Recent survey found that **94% of Americans say they always wash their hands**
- Public restroom observation shows only 68% of adults did



- **Why should you wash?**
  - Germs are so small you can not see them
  - Some can cause illnesses
  - Washing **CORRECTLY** greatly reduces the spread of germs

Do you have correct technique?

**FIGHT GERMS BY WASHING YOUR HANDS!**

 <b>1</b> Wet your hands	 <b>2</b> Soap	 <b>3</b> Lather and scrub - 20 sec	 <b>4</b> Rince - 10 sec
 <b>5</b> Turn off tap	 <b>6</b> Dry your hands	<b>DONT FORGET TO WASH:</b> - between your fingers - under your nails - the tops of your hands	

**What about hand sanitizer & anti-bacterial soaps?**



- These products also interfere with the growth & reproduction of bacteria
- **2 Kinds:**
  - **Fast-acting/disappear quick:**
    - Alcohols, chlorine, peroxide
  - **Long-acting/leave residue**
    - Triclosan, triclocarban

**Why is this important?**

- **Bacterial resistance**
- **Studies have shown bacteria becoming resistant to triclosan**
  - Which were then resistant to several antibiotics
- **Only use hand sanitizer when correct technique is impossible**
  - Use alcohol based products
- **Do not use anti-bacterial soaps**

## Conclusion

- Antibiotic resistance is a serious problem
- We need your help to stop it!



## References

- [www.cdc.gov/drugresistance/community](http://www.cdc.gov/drugresistance/community)
  - CDC website dedicated to antibiotic resistance
- [www.apus.org](http://www.apus.org)
  - Alliance for the Prudent Use of Antibiotics
- [www.mi-marr.org](http://www.mi-marr.org)
  - Michigan Antibiotic Resistance Reduction Coalition website
- [www.who.int](http://www.who.int)
  - WHO/World Health Organization