Antibiotics for Upper Respiratory Tract Infections: Fact, Fiction or Foolish?"

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SEOICN

Objectives

- The attendee will be able to describe the indications for antibiotics in the management of common upper respiratory tract infections.
- The attendee will also be able to list the main findings of the AIM project and its implications for their prescribing.

Introduction

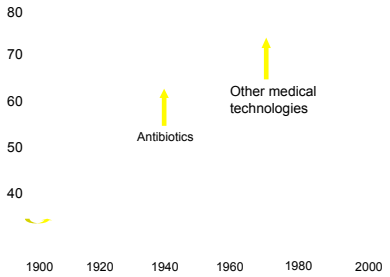
- Effective antimicrobial stewardship programs, also known as antimicrobial management programs, can be financially self supporting and can improve patient care
- Antimicrobial stewardship includes not only limiting inappropriate use but also optimizing antimicrobial selection, dosing, route, and duration of therapy
- The ultimate goal of antimicrobial
- stewardship is to improve patient care and health care outcomes

- "The war against infectious diseases has been won."
  - Dr. William Stuart, U.S. Surgeon General, 1969

Sobering Thoughts

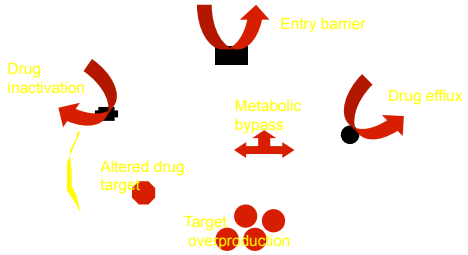
- The earth is 5 billion years old and bacteria have been around for 4 of those 5 billion years!
- Antibiotics are the only class of therapeutic agents that effect the environment.
- Infectious diseases are still the most common cause of death worldwide.

Estimated Life Expectancy at Birth



National Vital Statistics Report (1999)

Biochemical Mechanisms of Antimicrobial Resistance



Antibiotics and Mechanisms of Resistance

ß-lactams	B-lactamases, altered PBP, efflux
Macrolides	MLS, efflux
Aminoglycosides	AME, permeability
Flouoroquinolones	altered topoisomerases, efflux
Tetracyclines	efflux, altered target
Chloramphenicol	CAT, efflux
Sulfonamides	altered dihydropteroate synthase
Trimethoprim	altered dihydrofolate reductase
Vancomycin	bypass pathway
Rifampicin	altered target

Genetics of Antimicrobial Resistance

- Genetic diversity
  - nucleotide substitution, DNA rearrangements and gene acquistion
- Gene acquisition
  - transformation, transduction and conjugation
- Mobile genetic elements
  - gene cassettes
  - integrons
  - insertion sequence elements and transposons
  - plasmids

Why Are Resistant Infections Happening?

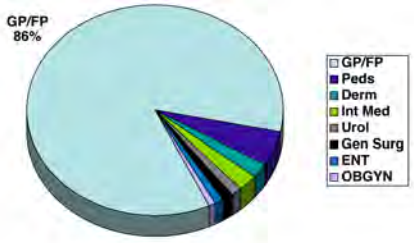
- Enormous biomass of microorganisms
- Genetic plasticity
- Antibiotics are microbial products, organisms have seen them before!
- *Excessive antibiotic use
- World wide travel
- *Lax infection control practices

*Fixable

What Can We Do?

- Keep aware
- National/Provincial Surveillance Programs
- Get to know your microbiology lab
  - Expect rapid turn around times
  - Appropriate susceptibility test reporting
- Infection Control in the office & hospital
- Decrease antibiotic prescriptions for viral URI's by half!
- Improve communication with patients

Who's Prescribing Antibiotics?



Based upon IMS Canada Data
A total of 26,277,325 antibiotic prescriptions

Decreasing Incidence of Resistant Strains is Possible

- Finnish study 1991-1994: Seppala et al. NEJM August 1997
- National program to reduce erythromycin utilization decreased use from 2.4 to 1.4 doses/1000 population
- Commensurate drop in erythromycin resistant group A Streptococci throughout the nation

Causal Association Between Antibiotic Use & Resistance

Changes in antimicrobial use are paralleled by changes in the prevalence of resistance.

Antimicrobial resistance is more prevalent in health care–associated bacterial infections, compared with those from community-acquired infections.

Patients with health care–associated infections caused by resistant strains are more likely than control patients to have received prior antimicrobials.

Areas within hospitals that have the highest rates of antimicrobial resistance also have the highest rates of antimicrobial use.

Increasing duration of patient exposure to antimicrobials increases the likelihood of colonization with resistant organisms.

Adapted from Shales et al CID 1997

TREATMENT SCENARIOS

Pharyngitis Assessment*

Criteria	Points
Temp >38°C	1
Absence of Cough	1
Swollen &/or tender anterior cervical nodes	1
Swelling of or purulent exudate on tonsils	1
Age 3-14 years	1
15-44 years	0
≥45 years	-1

McIsaac et al JAMA 2004, 291:1587-1595.

*Not for use in epidemics, in regions or pts with history of rheumatic fever, pts with valvular heart disease, or immunocompromised

Pharyngitis Management

Score	% Risk of GAS	Management
≤0	1-2.5	No swab*, No Rx
1	5-10	No swab*, No Rx
2	11-17	Swab, Rx if +
3	28-35	Swab, Rx if +
≥4	51-53	Swab & Rx right away If Swab – then D/C Rx

*Personally I am quite liberal with swabs, but maybe I am biased?
BUT 20% are asymptomatic carriers too!

Madden S. Et al. Update on Acute Rheumatic Fever. Can Fam Phys 2009, 55:475-478

Viral Pharyngitis 90%

- Suggestive features
  - Conjunctivitis
  - Cough
  - Hoarseness (watch out for the “hot potatoe”!)
  - Runny nose
  - Oral or pharyngeal ulcers
  - Diarrhea
- No Antibiotics!

GAS Pharyngitis Treatment

- Primary goal is to prevent acute rheumatic fever and rare suppurative complications
- Rx for 10 days
- First Line:
  - Penicillin V for adults/older kids
  - Penicillin V or amoxicillin for smaller kids
- Pen Allergic Type 1
  - Erythromycin/clarithromycin/azithromycin
- Pen Allergic not Type 1
  - cephalexin

Laryngitis (& Croup)

- Is a viral infection
- No antibiotics!
  - Rest, fluids, symptomatic Rx
- Croup Rx = dexamethasone once & racemic epi

Reveiz I. Cochrane Review 2007 Issue 2

Acute Rhinopharyngeosinusitis

- AKA "A Cold"
- Antibiotics useless
- "But doctor I am coughing up this terrible crap!"
  - Cough it into a tissue and do not look at it! ☺
  - Antibiotics offer no benefit and do harm
  - Analgesics and topical decongestants
  - Systemic decongestants not for children
  - Vit C, echinacea or zinc….limited evidence

Acute Otitis Media

- Canadian Pediatric Society supports watchful waiting for 48-72 hours
  - Can Ped Soc. Ped Child Health 2009, 14:457-460.
- Spontaneous recovery rate is 80-90% in otherwise healthy children with normal ears
- In RCT of placebo vs amoxicillin outcomes the same
  - Le Saux et al. CMAJ 2005, 172:335-341.

Watchful Waiting Caveats

- Under 6 months
  - Dx is difficult, if AOM reasonably certain then treat right away and follow closely
- 6-24 months
  - Requires cooperative parents that can observe the child for 48-72 hours
  - Reassess at 24 hours in clinic/ED/Office
    - If AOM confirmed treat appropriately
- >24 months
  - Reassess in 2-3 days if not improved
    - If AOM confirmed treat as appropriate

AOM Treatment

- Children with intact TM
- 1st Line
  - Amoxicillin
    - 5 days if >2 years and normal ear
    - 10 days all others
- Adults
  - 1st Line
    - Amoxicillin
- Macrolides or TMP-SMX if pen allergic

Sinusitis

- Most “sinusitis” is viral
- Bacterial sinusitis in adults:
  - URTI not improved after 7-10 days or worsening after 5 days with “some” of:
  - Purulent nasal discharge
  - Nasal congestion
  - Facial pain
  - Postnasal drip
  - Fever
  - Dental/ear pain

Sinusitis Treatment

- Adult and children 1st Line:
  - Amoxicillin 10-14 days (duration poorly defined)
- Saline rinses
- Topical decongestants (3-4 day only)
- Antihistamines of no benefit
- Intranasal steroids of marginal benefit
- If pen allergic: macrolides or TMP-SMX

Ahovuo-Saloranta et al. Antibiotics for acute maxillary sinusitis. Cochrane Review 2008

Acute Bronchitis

- **Viral viral viral viral viral viral viral!!!**
- **<10% bacterial in adults**

Factors Affecting Antibiotic Decisions

Doctors as Pushers?
Patients as Junkies?
Or Just Lousy Communications?

Objective

- To identify and quantify the determinants of antibiotic prescribing for upper respiratory tract infections (URTIs) for both physicians and patients in family practice.

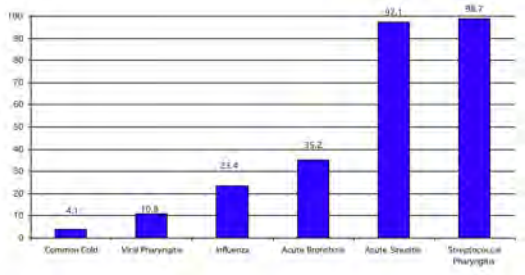
Long Term Goal

- To develop and implement target interventions to improve antibiotic use for URTIs in family practice.

Physician Survey

- 316 southeast Ontario family physicians surveyed
- Comprehensive survey concerning antibiotic prescribing practices for URTIs
- Relative importance of factors was tested with indication for antibiotic and antibiotic choice by multiple logistic regression analyses

Antibiotics Generally Prescribed for Healthy Adults with URTIs



Factors Predictive of the Prescribing of Antibiotics for Viral URTIs

➡ Physician knowledge deficits re: indication for antibiotic for viral URTIs (OR 30.3)
➡ Patient has outside obligations (OR 3.5)
➡ Fee-For-Service remuneration (OR 3.3)
➡ Physician desire to act (OR 2.5)
➡ Lower levels of satisfaction with knowledge of antibiotic usage for URTIs (OR 1.8)
➡ Participation in fewer university-sponsored CME courses (OR 1.4)
R-squared = 0.35

Factors Predictive of Not Choosing First Line Antibiotics

➡ Regular meetings with pharmaceutical sales representatives (OR 2.1)
➡ Ascribing less importance to guidelines from medical authorities (OR 1.9)
➡ Concerns about patient co-morbidity (OR 1.9)
➡ Not being Certified by the College of Family Physicians of Canada (OR 1.8)
➡ Greater physician age (OR 1.4)
R-squared = 0.13

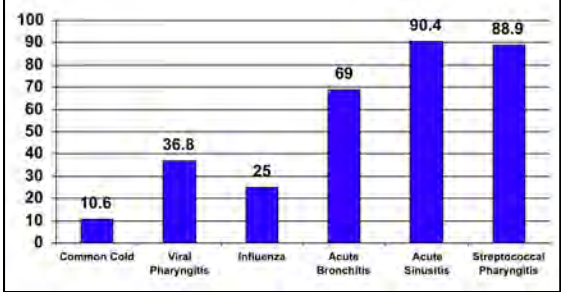
Conclusions Drawn From FAAD Physician Survey

- Medical knowledge and information sources were factor categories having the greatest quantitative influence on antibiotic prescribing practices for URTIs

Patient Survey

- 313 southeast Ontario patients surveyed
- Comprehensive survey concerning consult for URTI, motivation for consult, symptoms, interaction with physician, treatment received, and knowledge of antibiotics and URTIs
- Relative importance of factors was tested with indication for antibiotic and antibiotic choice by multiple logistic regression analyses

Antibiotics Prescribed for Adults with URTIs



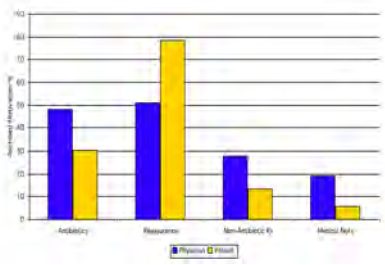
Factors Predictive of Patient Receiving Antibiotic for Viral URTI

➡ Patient expectations for antibiotic (OR 11.6)
➡ Patient did not receive over-the-counter recommendation and or non-antibiotic prescription (OR 8.1)
➡ Greater patient age (OR 1.6)

Factors Predictive of Patient Not Receiving First Line Antibiotics

- If patients presented with wheezing, they were less likely to receive a first line antibiotic (OR 12.6)

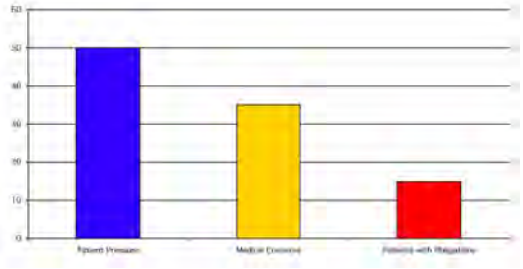
Are We Communicating? Ascribing Patient Motivation for Consults



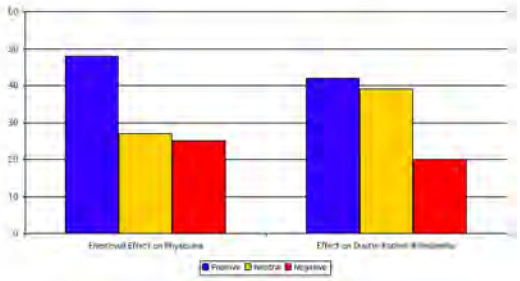
Physician Interviews

- Family physicians interviewed in their offices
- Semi-structured interview modeled on the critical incident technique
- 15-minute interviews recorded and transcribed

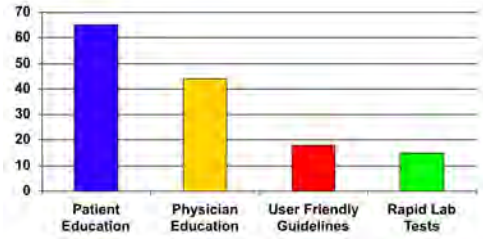
Factors in Prescribing Decisions When Antibiotics Were Probably Not Needed



Emotional Impacts of Physician Not Giving into Patient Pressure



Physician Suggested Methods to Improve Antibiotic Prescribing



Conclusions Drawn From Physician Interviews

- A very important issue for physicians
- Patient pressure perceived as a major factor in inappropriate antibiotic use
- Appropriate prescribing has positive or neutral emotional effects for physicians and doctor-patient relations
- Patient and physician education seen as means to improve practices

AIM SEO Project Results

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Results

- The results are based on 5,552 eligible patient encounters for respiratory tract infections reported by family physicians in southeastern Ontario during the winters of 2008 and 2009

Eligible Patients

- Patients were eligible for inclusion if they presented with:
  - colds
  - acute laryngitis
  - croup
  - acute bronchitis
  - influenza
  - acute sinusitis
  - acute otitis media (AOM)
  - pharyngitis
  - pertussis
  - community-acquired pneumonia (CAP)
  - acute exacerbations of chronic bronchitis (AECB)

AIM RTI ENCOUNTER FORM

Date_____
Please list all prescriptions and over-the-counter (OTC) drug recommended for this RTI encounter.
Rxs:

OTCs:

Patient Age: _____ Sex: **M** **F**

_____ Repeat visit for same illness

_____ Antimicrobial sample provided

_____ Related Comorbidity (as per instructions)

Dx:

____ Streptococcal Pharyngitis

____ Viral Pharyngitis

_____ Acute Bronchitis _____ Cold

_____ Acute Sinusitis _____ Acute Laryngitis

_____ Croup _____ Acute Otitis Media

_____ Influenza _____ Pertussis

_____ Community-acquired Pneumonia, Mild to Moderate

_____ Acute Exacerbations of Chronic Bronchitis or Acute Exacerbations of Chronic Obstructive Pulmonary Disease

Patient Characteristics: Age & Sex

- Two-thirds of patients (66 %) were adults over 16 years of age
- 59 % of adult patients were female
- Half (51 %) of patients 16 and under were male

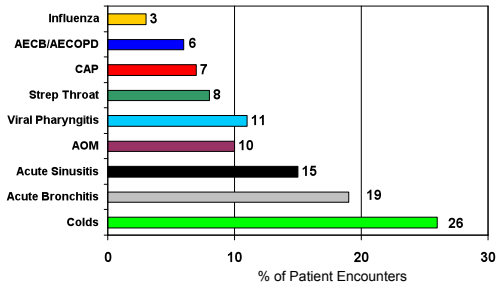
Patient Characteristics: Repeat Visits

- 11 % of patient encounters were repeat visits for the same illness

Patient Characteristics: Comorbidity

- Patients with related comorbidity accounted for 8 % of visits
- 12 % of adults had related comorbidity and only 2 % of children had related comorbidity
- Related comorbidity was defined as clinically evident immune suppression, active lung disease, or congestive heart failure.

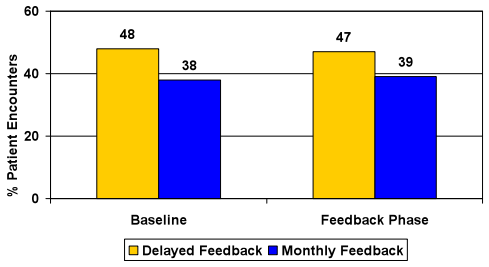
Frequency of Presenting Diagnoses



Overall Use of Antibiotics

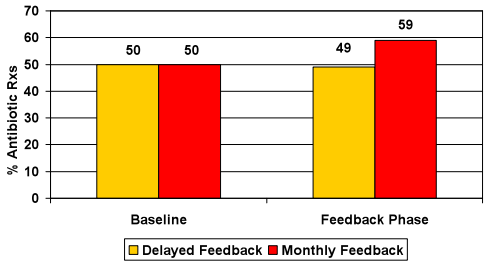
- Antibiotics were received by half (48%) of patients
- This overall rate of antibiotic prescribing is much higher than should be expected based on the diagnostic distribution

Antibiotic Prescriptions per Patient Encounter by Feedback Condition & Phase*



*Does not include CAP and AECB cases

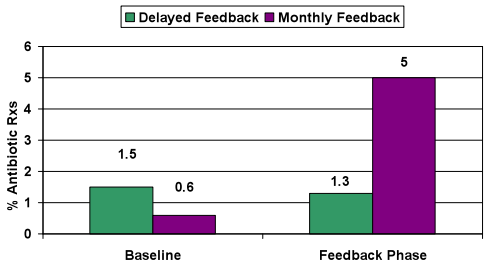
First Line Choice per Antibiotic Prescription



ANOVA Analysis for First Line Choice

- Interpretation: Feedback increased the use of first line antibiotic choices in the Monthly Feedback group when compared to their baseline prescribing and when compared to the Delayed Feedback group

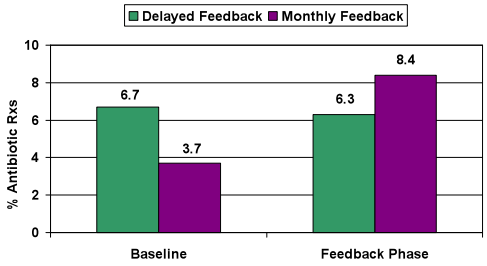
Erythromycin Prescriptions*



Feedback Phase and Condition Interaction F = 9.2, p = .003

*Does not include CAP and AECB cases

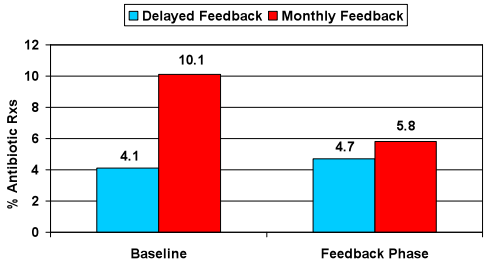
Penicillin Prescriptions*



Feedback Phase and Condition Interaction F = 4.5, p = .03

*Does not include CAP and AECB cases

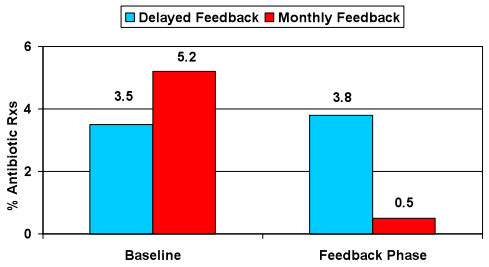
Amoxicillin Clavulanate Prescriptions*



Feedback Phase and Condition Interaction F = 4.8, p = .03

*Does not include CAP and AECB cases

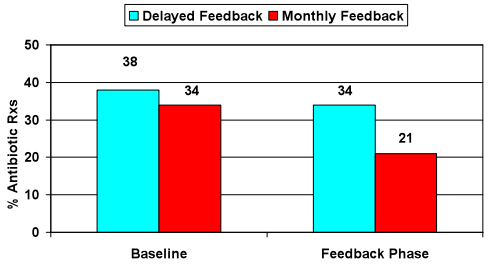
Second Generation Cephalosporin Prescriptions*



Feedback Phase and Condition Interaction F = 10.6, p = .001

*Does not include CAP and AECB cases

Extended Spectrum Macrolide Prescriptions*



Feedback Phase and Condition Interaction F = 5.1, p = .02

*Does not include CAP and AECB cases

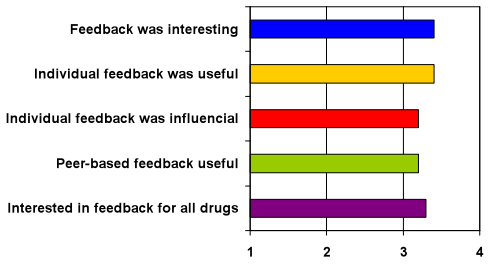
Antibiotic Samples

- Patients received antibiotic samples in 1.4 % of encounters
- 45 % of antibiotic samples were provided for conditions where antibiotics are not indicated
- 55 % of antibiotic samples were provided for conditions where antibiotics might be indicated and only 55 % of these samples were for first line antibiotic choices
- Less than a third (30 %) of samples were distributed appropriately

AIM Participants Program Evaluation Results

- After completion of the study and receiving feedback, physician participants were surveyed about the intervention
- Three-quarters (39 of 53) of participants completed the AIM Participant Evaluation survey

Feedback on Feedback



Preferred Frequency and Sources of Prescribing Feedback

- The two most preferred frequencies for feedback on the use of antibiotics for RTIs were quarterly (53 %) and biannually (30 %)
- Medical associations such as College of Family Physicians of Canada, OMA, and CMA were overwhelmingly (87 %) the choice of physicians to provide feedback
- Feedback from medical schools was endorsed by a third of physicians (respondents could indicate more than one preferred source)
- Not a single physician thought that feedback supplied by drug companies was a good idea

Physician Perceived Influences on Antibiotic Prescribing Practices

Prescribing Influences	Degree of Perceived Influence
Published practice guidelines	3.6
University & medical org sponsored CME	3.2
Medical journals & text books	2.9
Fellow physicians	2.7
Pharma sponsored CME	2.4
Patient requests & expectations	2.2
Pharmaceutical representatives	1.8

Physician Comments on the Suboptimal Use of Antibiotics

- Patient expectations and pressure was reported by 61 % as reason for overuse
- A fifth of physicians (22 %) mentioned time pressures as reason for the overuse of antibiotics
- Dosing issues was reported by 40 % as the reason for the suboptimal use of first line antibiotics
- A fifth mentioned allergies and a fifth physician knowledge deficits for lack of first line antibiotic use
- The most frequent suggestions for improving antibiotic prescribing for RTIs were physician education (59 %) and patient / public education (35 %)

Discussion

- Feedback of antibiotic prescribing practices increased the use of first line antibiotic choices
- Physicians found the feedback intervention to be interesting, useful, and influential
- Large-scale implementation of feedback on antibiotic use would have costs savings due to the increased use of less expensive first line choices
- Bacterial resistance would be impacted because first line antibiotics are often narrow spectrum

Large-scale Provision of Feedback

- Physician linked antibiotic prescribing data is available, for a price, and is used by drug companies to target market physicians
- Diagnosis and treatment linked data could be readily included in the billing process
- Individual and peer-based feedback on antibiotic and Rx drug prescribing, along with unbiased medical information, could be periodically provided to family physicians by medical orgs and assns

Objectives

- The attendee will be able to describe the indications for antibiotics in the management of common upper respiratory tract infections.
- The attendee will also be able to list the main findings of the AIM project and its implications for their prescribing.

Session 4: Thursday, March 2nd, 2010
5:30 pm – 6:30 pm

- **Topic:**
- Cellulitis and Other Soft Tissue Infections
- **Overview**:
  - This videoconference will review the clinical manifestations, diagnosis and treatment of common skin and soft tissue infections including cellulitis, diabetic foot infections and necrotizing fasciitis.
- **Objectives**:
  - The attendee will be able to describe the clinical manifestations & treatment of common skin and soft tissue infections including cellulitis, diabetic foot infections and necrotizing soft tissue infections.

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