Antibiotic Stewardship in Dentistry

- General antibiotic prescribing
  - U.S. outpatient antibiotic prescribing
    - Health care providers prescribed an ~263 MM courses of antibiotics (2011)
    - Most frequently prescribed
    - Estimated 30%-50% of prescribed antibiotics are not optimally prescribed or unnecessary

- Antibiotic prescribing in dentistry
  - Dentists prescribe ~10% of antibiotic courses in community ~est. 25MM courses (2013)
  - Most frequently prescribed
  - Clinical rationale
    - Periodontitis
    - Acute infections
    - Prophylaxis

- Unintended consequences of antibiotic prescribing
  - Antibiotic resistance global health threat
  - Est. 2MM infections due to antibiotic resistant bacteria annually
  - 23,000 deaths
  - Adverse drug events
    - ED visits
    - C. difficile infections (CDI)
    - Antibiotic allergy
    - Microbiome disruption

- Antibiotic stewardship in dentistry
  - Responsible prescribing to prevent antibiotic resistance is not a new issue
    - ADA participation in 2015 White House Forum on Antibiotic Stewardship
    - Suggestions to support stewardship
    - ADA has adopted evidence-based approach to guideline development
      - Prophylaxis indications have decreased
• Status of antibiotic prophylaxis for prosthetic joint replacement patients – Where are we?
  o Total joint arthroplasty
    ▪ Projected annual rates (est. 2030)
      • Hip ↑ 174% → 572,000
      • Knee ↑ 673% → 3.48 MM
    ▪ 7MM Americans living with hip or knee replacements
  o Total joint arthroplasty revision
    ▪ Projected annual revision rates
      • Hip ↑ 137% → 97,000
      • Knee ↑ 601% → 260,000
    ▪ Etiology
      • Mechanical
      • Infection
  o Prosthetic joint infection (PJI) rates
    ▪ Est. 0.3% to 8+%
    ▪ Early → late infections
    ▪ Substantial morbidity
    ▪ PJI prevention

• Evolution of antibiotic prophylaxis guidance
  o 1997 Advisory Statement “Antibiotic Prophylaxis (AP) for Dental Patients with Total Joint Replacement (TJR)”
    ▪ ADA and AAOS
    ▪ Major issues
      • Bacteremia and PJI risk
      • Identifying patients at higher PJI risk
      • Procedures with higher bacteremia risk
      • AP strategies
      • Analogy with IE invalid
    ▪ Patients potentially at increased PJI risk
      • TJR within last 2 years
      • Increased medical risk
    ▪ Guidelines supplement clinical judgement
    ▪ Lack of supporting scientific evidence
    ▪ Legal commentary when physician recommendation ≠ dentist judgement
2003 Advisory Statement
  - 1997 Advisory Statement update
    - Minor modifications/emphasis
      - Classification of patients at risk
      - Bacteremic dental procedures
    - AP recommendations
      - All patients first two years post-surgery
      - High risk patients/high risk procedures beyond two years

2009 AAOS Information Statement “Antibiotic Prophylaxis for Bacteremia in Patients with Joint Replacements”
  - Educational tool developed independently by AAOS
    - Recommended life-time prophylaxis
    - Substantial criticism from dentistry

2012 AAOS/ADA Clinical Practice Guideline “Prevention of Orthopaedic Implant Infection in Patients Undergoing Dental Procedures”
  - Collaborative effort
  - Formal evidence-based guidelines
    - Limited recommendations with graded rationale
  - Educational tool for clinicians
    - Clinician uncertainty
    - No clear advice on AP need
    - No population distinctions
    - Antibiotic selection and dosing lacking
  - ADA recognition practitioners needed improved clinical guidance

2015 ADA Evidence-based Clinical Practice Guideline for Dental Practitioners
  - ADA convened expert panel
  - Evidence review
    - Updated literature review
    - Case-control studies
  - No AAOS endorsement
  - Recommendations
    - In general, AP not recommended prior to dental procedures to prevent PJI
    - Consider clinical circumstances
    - Integrate recommendations with professional judgement, patient needs and preferences
  - Not intended to be standard of care
2016 AAOS/ADA Appropriate Use Criteria (AUC)
  - Web-based application/decision support tool
    - Identify indications for at-risk patients
    - Antibiotic prophylaxis recommendations
    - Practical clinical scenarios

Conclusion
  - Antibiotic prophylaxis issue is unresolved
    - Clinician experience, judgement and patient preferences likely to remain important for foreseeable future
  - AP guidelines will continue to evolve
    - Supplemented by Appropriate Use Criteria and Cost-effectiveness studies