



MDPH Antibiotic Resistance Program and the All-Payer Claims Data

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Outline

- Massachusetts DPH antibiotic resistance work
- The Massachusetts All-Payer Claims Database
- Otitis media and inappropriate antibiotic use

MDPH Antibiotic Resistance Work

- Epidemiology and Laboratory Capacity (ELC) grant funding has helped build staffing capacity in the area of HAI/AR
- Specifically to:
 - Understand the burden of unnecessary antibiotic prescribing
 - Work with partners to increase antibiotic stewardship education

Antibiotics aren't always the answer

CDC estimates that 30% of outpatient antibiotic prescriptions are unnecessary

Get Smart: Know When Antibiotics Work in Doctor's Offices



Antibiotic resistance is a growing problem and the main cause of this problem is misuse of antibiotics. CDC's Get Smart: Know When Antibiotics Work program works to make sure antibiotics are prescribed only when they are needed and used as they should. The Get Smart program focuses on common illnesses that account for most of the antibiotic prescriptions written for children and adults in doctors' offices and other outpatient settings.

ABOUT ANTIBIOTIC USE AND RESISTANCE

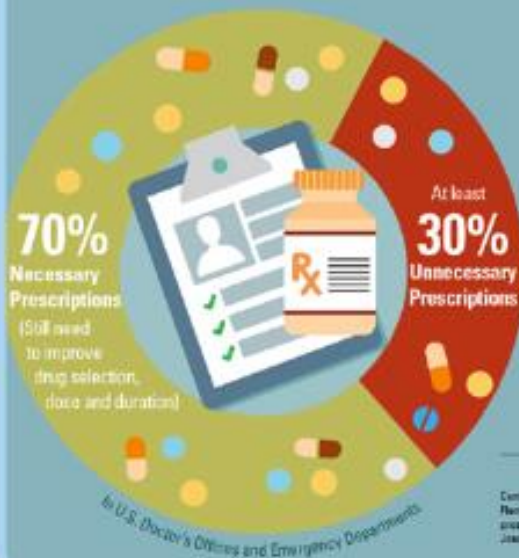
Antibiotics have transformed our ability to treat infections, but they do not work as well as they once did against some infections...

PROGRAMS AND MEASUREMENT

A look at state, national, and international efforts to track antibiotic-resistant infections and implement interventions to curb this growing threat...

<https://www.cdc.gov/getsmart/community/index.html>

Improve Antibiotic Use to Combat Antibiotic Resistance



CDC is working to reduce unnecessary antibiotic use

National Action Plan to Combat Antibiotic-Resistant Bacteria (CARB)

Goal: By 2020, reduce inappropriate outpatient antibiotic use by 50%

Find out when antibiotics are necessary. Visit: <http://www.cdc.gov/getsmart>

Centers for Disease Control and Prevention (CDC)
Hensley Doria, K et al. Prevalence of inappropriate antibiotic prescriptions among US ambulatory care visits, 2010–2011.
Journal of the American Medical Association. May 2016.



Centers for Disease Control and Prevention
National Center for Emerging and Zoonotic Infectious Diseases

PERCENT OF ANTIBIOTIC PRESCRIPTIONS THAT WERE UNNECESSARY

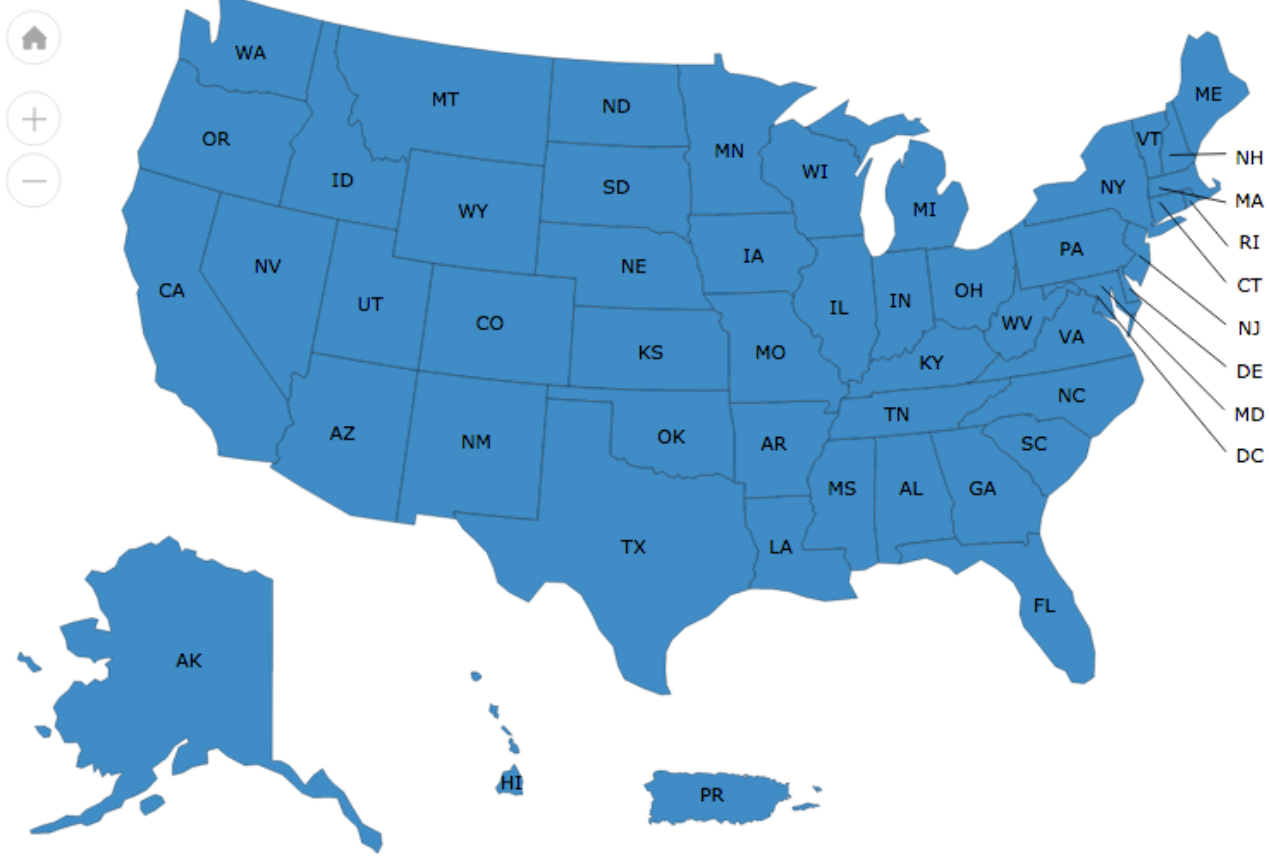
	All conditions*	Acute respiratory conditions**
0-19 year olds	29%	34%
20-64 year olds	35%	70%
≥65 year olds	18%	54%
All ages	30%	50%

*All conditions included acute respiratory conditions, urinary tract infections, miscellaneous bacterial infections, and other conditions.

**Acute respiratory conditions included ear infections, sinus infections, sore throats, pneumonia, acute bronchitis, bronchiolitis, upper respiratory infections (i.e., common colds), influenza, asthma, allergy, and viral pneumonia.

Key Investments to Combat Antibiotic Resistance

*Hover over and select state for more details



[Learn more](#) about CDC activities to combat antibiotic resistance.

AR Solutions *in Action*
CDC's Investments to Combat Antibiotic Resistance Threats Nationwide

FISCAL YEAR
2016

About CDC's Work to Combat Antibiotic Resistance

With these investments, the Centers for Disease Control & Prevention (CDC), in partnership with health departments, academia, and healthcare, is transforming how the nation combats and slows antibiotic resistance at all levels, ensuring our ability to stand up a full, faster response to protect Americans from this threat.

These investments will better protect patients through:

Detection and Response

- Rapid detection and faster response to outbreaks and emerging resistance related to healthcare-associated infections, foodborne bacteria, and gonorrhea—to contain and control spread
- Gold-standard lab capacity offered to all state and regional labs through CDC's Antibiotic Resistance Laboratory Network

Prevention of Infections

- Improve prevention of healthcare-associated infections, foodborne illness, and gonorrhea
- Empowered networks for prevention across healthcare and communities for threats like *Clostridium difficile*, methicillin-resistant *Staphylococcus aureus* (MRSA), and "nightmare bacteria" carbapenem-resistant Enterobacteriaceae (CRE)
- Insights for research innovation and better patient care

Improving Antibiotic Use

- Ensure antibiotics work to protect patients from life-threatening infections or sepsis
- Protect patients from unintended consequences associated with antibiotic use, including adverse drug events

These investments work toward meeting national goals to prevent drug-resistant infections as outlined in the National Action Plan for Combating Antibiotic-Resistant Bacteria.

See CDC's AR investments by state at www.cdc.gov/ARInvestments.

Critical support empowering the nation to tackle antibiotic resistance, the global threat jeopardizing modern medicine.
www.cdc.gov/ARInvestments



Program planning

- Target education to specific providers/clinics with high inappropriate prescribing practices
 - CDC Get Smart Tools
- Analyze prescribing practices for other conditions/populations:
 - Upper respiratory infections in pediatric populations
 - Urinary tract infections in elderly populations (nursing homes)
- Re-analyze future APCD to look for any changes in prescribing rates

Massachusetts All-Payer Claims Database

- Managed by the Center for Health Information and Analysis (CHIA)
- Claims data were first collected in 2009
- Types of data collected: medical, dental, pharmacy, eligibility
- Types of payers: commercial payers, third party administrators/self-funded, Medicaid, and Medicare
- Utilized by health care providers, health plans, and researchers



Identifying Inappropriate Antibiotic Use Among Massachusetts Children Diagnosed with Otitis Media Using Claims Data, 2015

Background

- Antibiotic resistance is increasingly a problem associated with overuse of antibiotics
- Children are responsible for the largest proportion of antibiotic consumption
- Otitis media is the most common infection for which antibiotics are prescribed in children

Study Objective

- Determine prevalence of inappropriate antibiotic use and prescribing practices of clinicians
- Identify specific areas for intervention programs

Methods

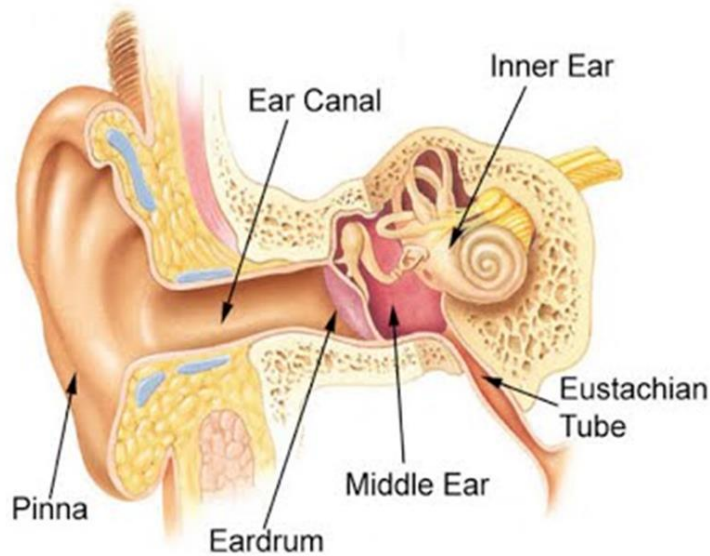
- Exposure: diagnosed with otitis media and prescribed antibiotics
- Outcome: inappropriate antibiotic use¹
- Predictors: age, sex, region of residence², insurance type, season prescription was filled, and physician type
- Statistical methods: bivariate chi-square tests

¹Katherine E. Fleming-Dutra et al. Prevalence of Inappropriate Antibiotic Prescriptions Among US Ambulatory Care Visits, 2010-2011. JAMA. 2016;315(17):1864-1873.

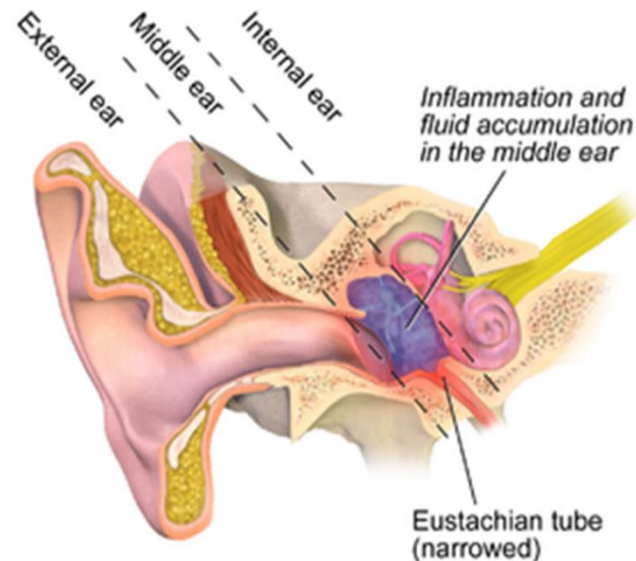
²Region of Residence defined by the MA Office of Preparedness and Emergency Management, 2004

Methods: Inappropriate Antibiotic Use

- Inappropriate use: nonsuppurative otitis media
 - 381.0 – 381.4 ICD-9CM diagnostic codes
- Appropriate use: suppurative otitis media
 - 382.0 – 382.9 ICD-9CM diagnostic codes

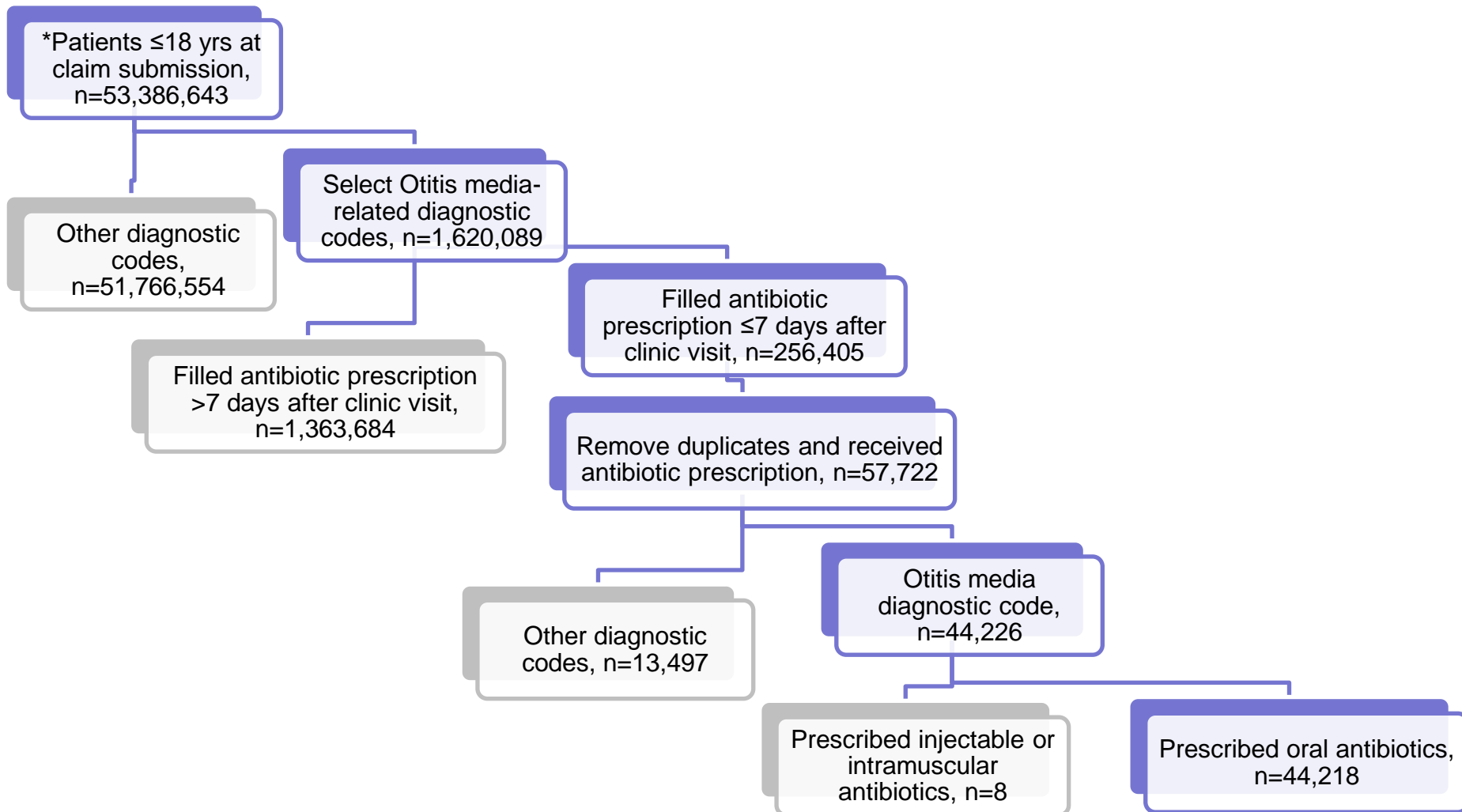


Normal Ear Anatomy³



Otitis media⁴

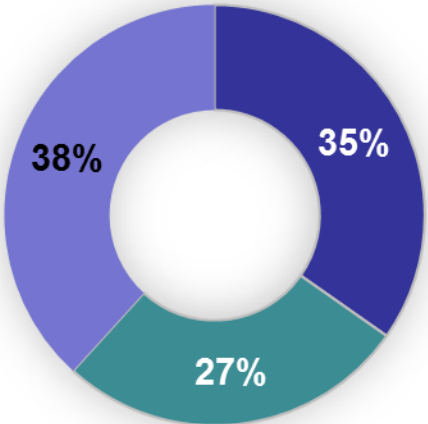
Results: Study Sample



*Claims reported 12/26/14 to 10/7/15, submitted date in 2015

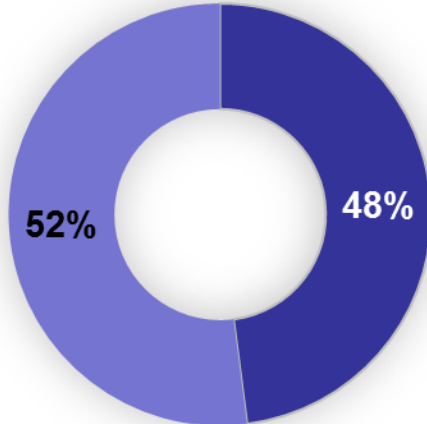
Results: Sample Distributions

Age
n=44,218



■ 0-2 years (%) ■ 3-5 years (%) ■ 6-18 years (%)

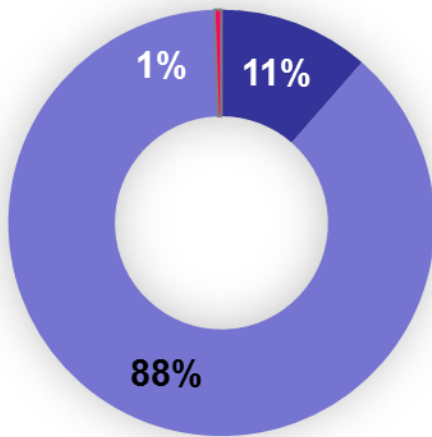
Sex
n=44,218



■ Female (%) ■ Male (%)

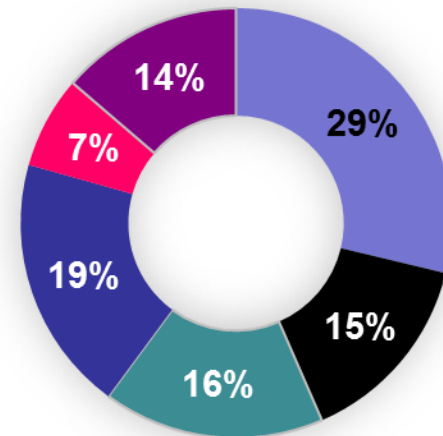
Results: Sample Distributions

Type of Insurance
n=44,218



■ Medicaid (%) ■ Private (%)
■ Medicare/Other (%)

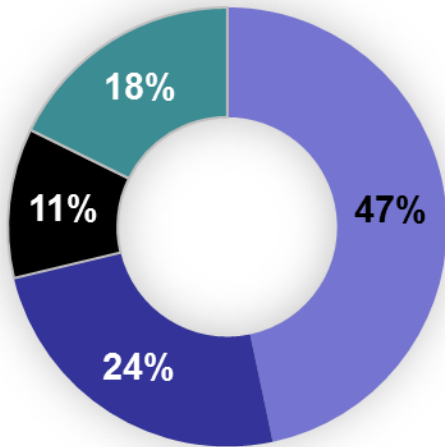
Region of Residence
n=44,218



■ Boston/Metro Boston ■ Central
■ Northeast ■ Southeast
■ West ■ Out of State/Unknown

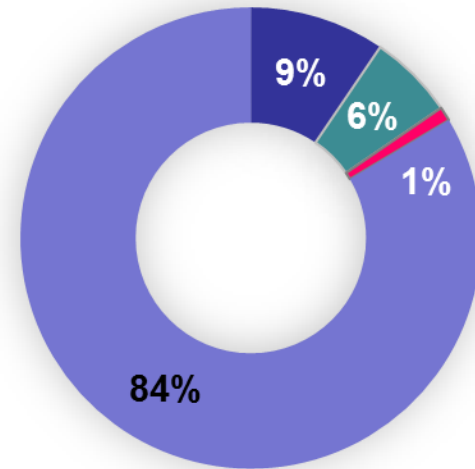
Results: Sample Distributions

Month Prescription Filled
n=44,218



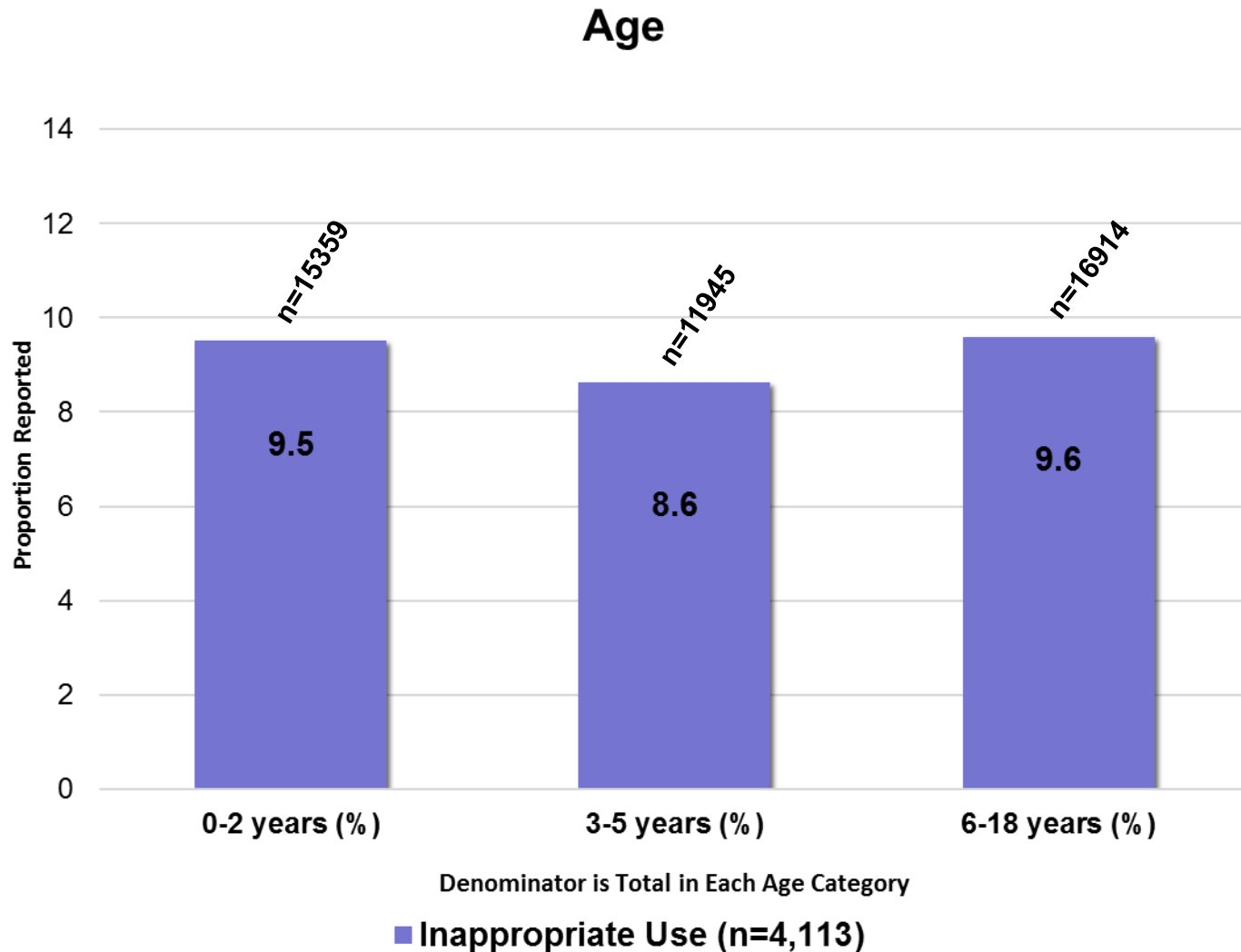
- Spring (Feb.-April)
- Summer (May-July)
- Fall (Aug.-Oct.)
- Winter (Nov.-Jan.)

Physician Speciality
n=44,218

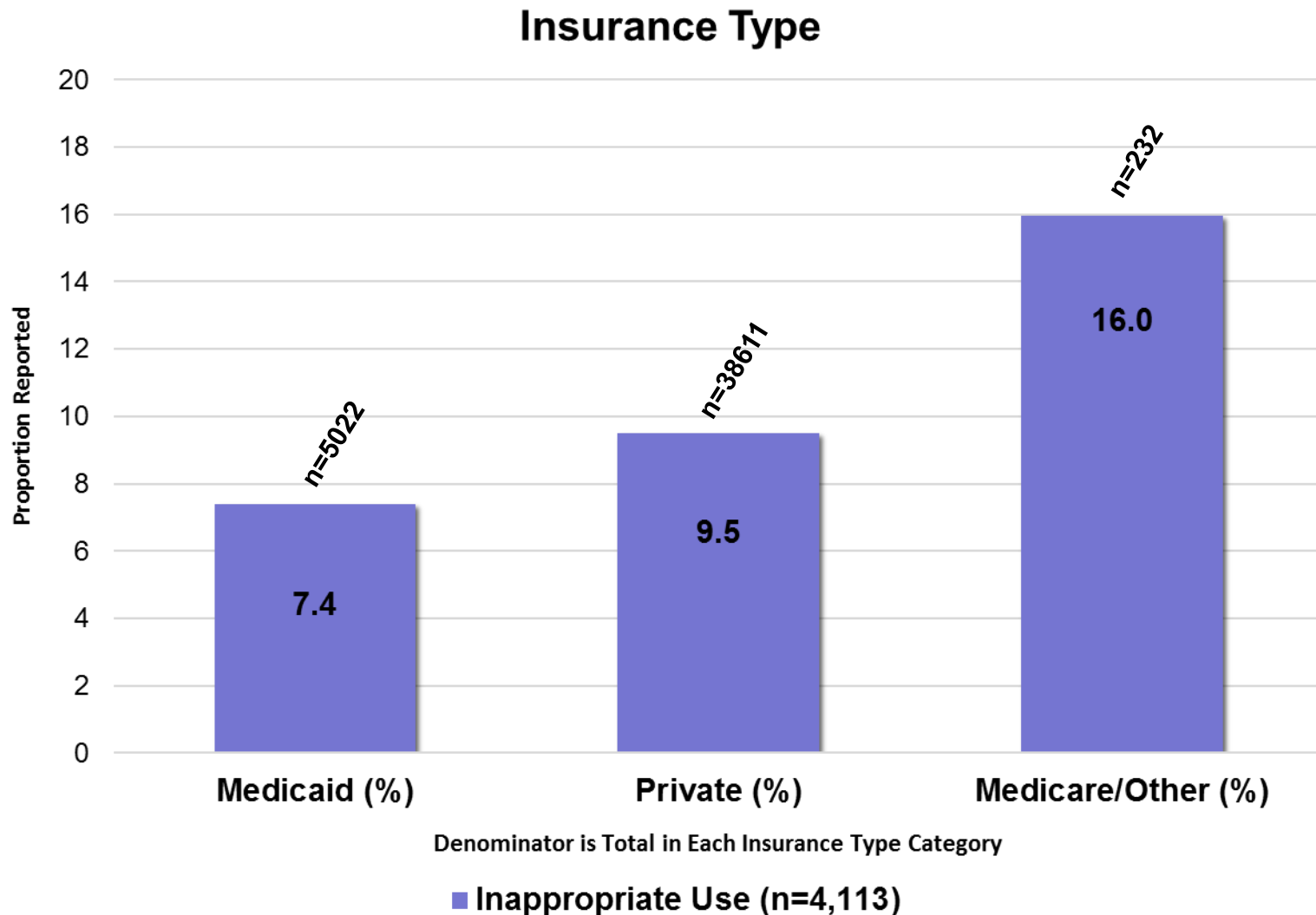


- General/Primary (%)
- Specialist (%)
- Non-Physician (%)
- Unknown (%)

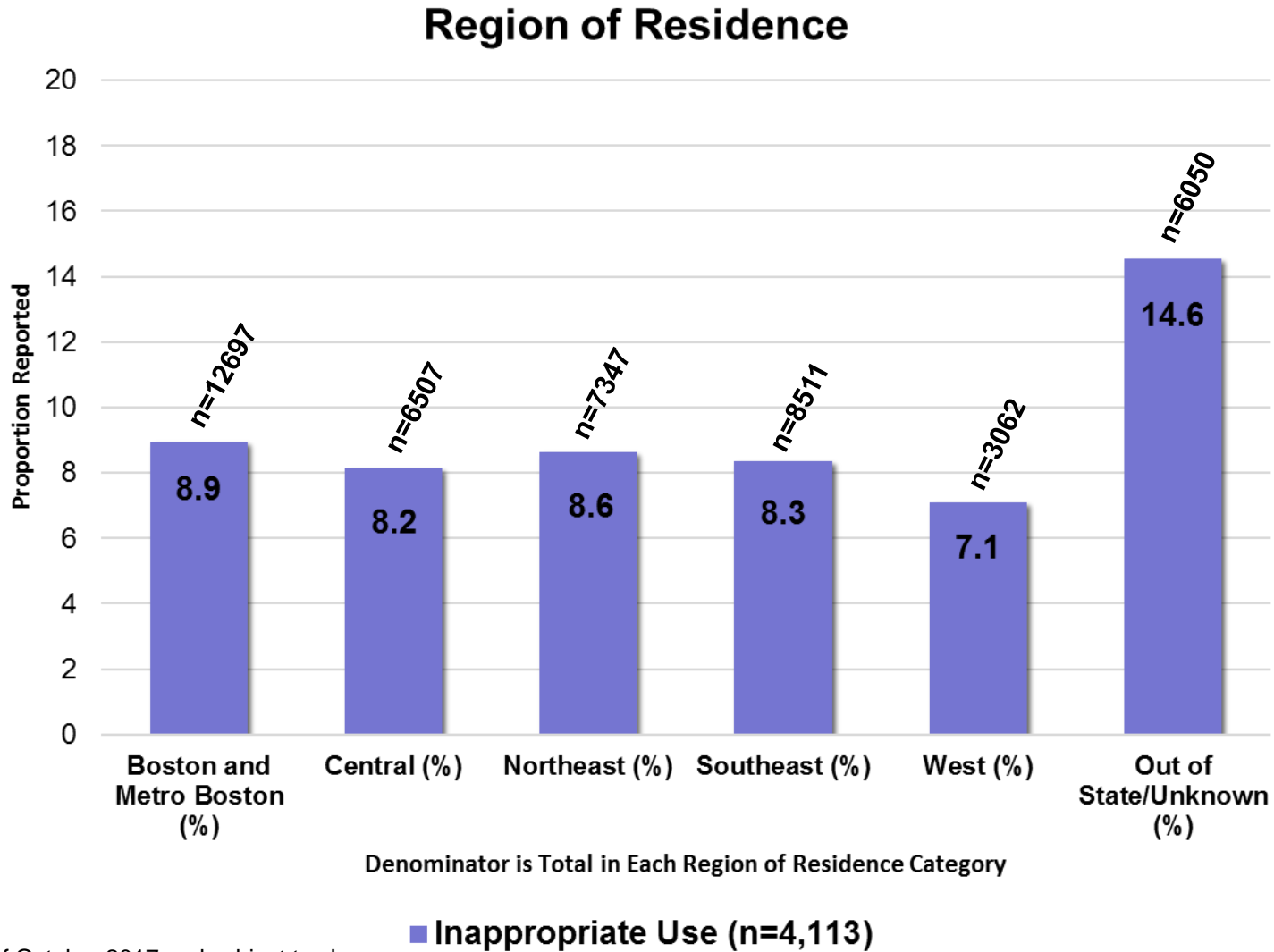
Results: Proportion of Inappropriate Antibiotic Use by Age, 2015



Results: Proportion of Inappropriate Antibiotic Use by Insurance Type, 2015

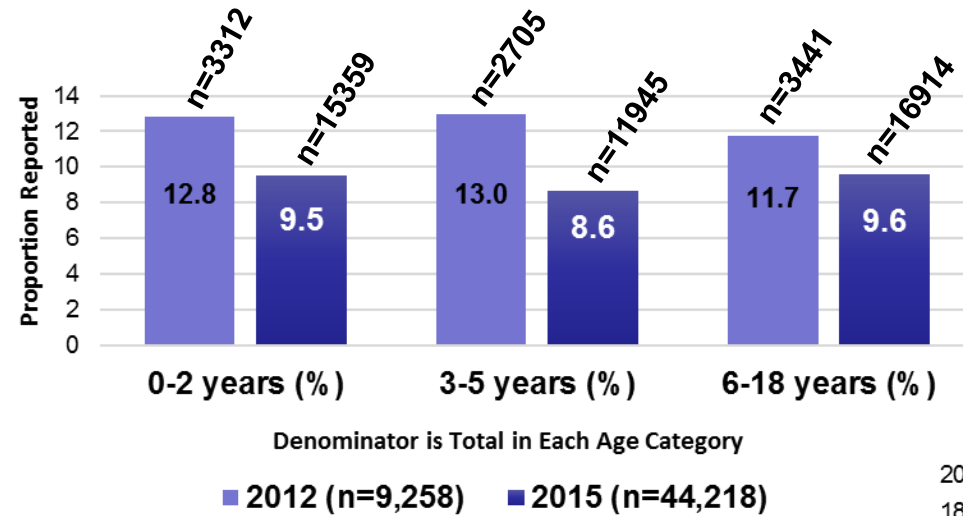


Results: Proportion of Inappropriate Antibiotic Use by Region of Residence, 2015

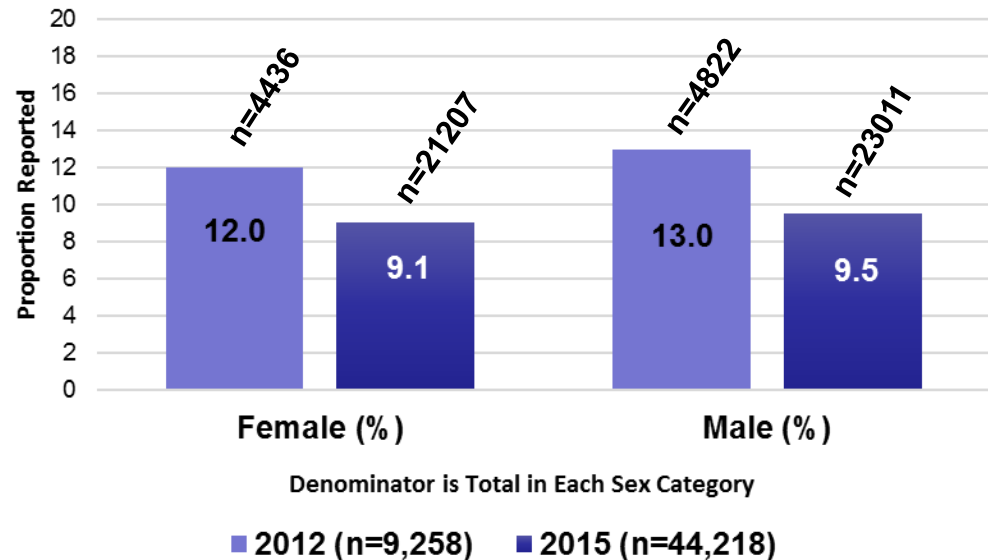


Results: Proportion of 2012 vs. 2015 Inappropriate Antibiotic Use

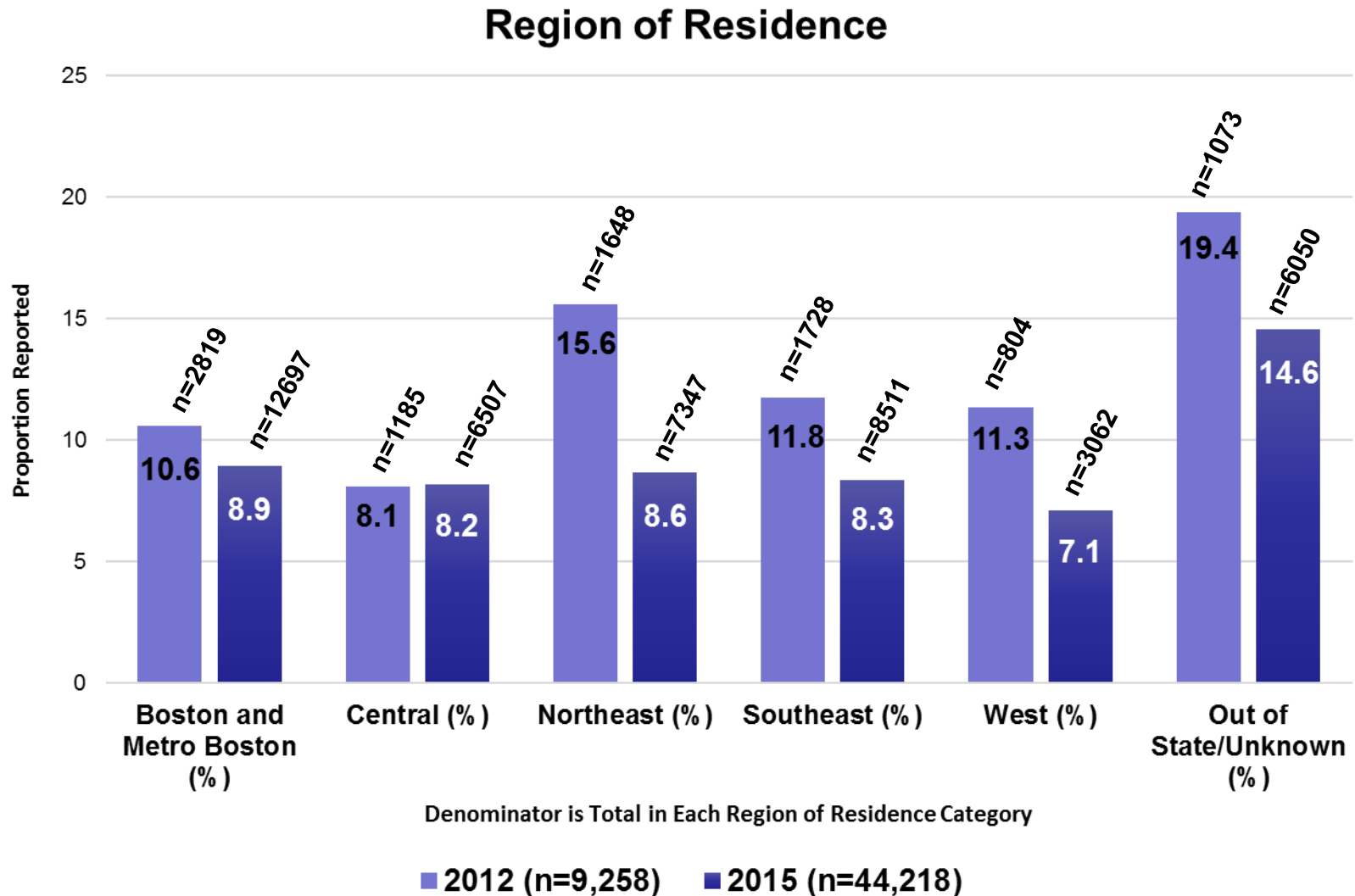
Age



Sex



Results: Proportion of 2012 vs. 2015 Inappropriate Antibiotic Use



Next Steps

- Ongoing data validation / data checks
- Multiple logistic regression modeling
- GIS
- Trends over time for 2012-2015
- Analysis of antibiotic type

Strengths

- APCD is a useful tool for program evaluation, as it contains codes for diagnosis, procedures, etc. Strengths include (but not limited to):
 - Sample size
 - Longitudinal data
 - Detailed prescription drug information
 - Detailed diagnostic information

Limitations

- Challenging to access and analyze
- Missing data for select variables
- Data validation studies needed due to potential misclassification
- Misclassification due to miscoding at billing
- Population level data

References

1. Katherine E. Fleming-Dutra et al. Prevalence of Inappropriate Antibiotic Prescriptions Among US Ambulatory Care Visits, 2010-2011. *JAMA*. 2016;315(17):1864-1873.
2. Region of Residence defined by the MA Office of Preparedness and Emergency Management, 2004
3. Truong, AQ. Normal ear anatomy. *Middle Ear Infection (Otitis Media)*. 2007.
sites.google.com/site/dranhtruong/middle-ear-infection. Accessed on August 11, 2017.
4. Wikipedia. Otitis Media. August 11 2017.
[en.Wikipedia.org/wiki/Otitis_media](https://en.wikipedia.org/wiki/Otitis_media). Accessed on August 11, 2017.

Acknowledgements

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