Other Opportunities for Stewardship Outside the Hospital Walls

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05/07/2024

Disclosures

Nothing to Disclose

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Roadmap for Today

- Examine opportunities for antimicrobial stewardship at hospital discharge
- Discuss opportunities to utilize existing resources to facilitate outpatient stewardship
- Review outcomes of interventions focusing on optimizing antimicrobial use in outpatient settings and dynamic care models such as virtual care, urgent care, and hospital at home

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Audience Response

Please select the response that most closely matches your hospital or health-system's current outpatient antimicrobial stewardship efforts

A. We have assembled stakeholders, but no formal program established

B. We have a core team and have established some basic goals and quality measures around stewardship in the outpatient setting

C. Formal program established in some, but not all outpatient settings

D. Comprehensive program including review of antimicrobial orders at hospital discharge (including OPAT) established in all outpatient settings

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Audience Response

Please select the response that most closely matches your antimicrobial stewardship program's (ASP's) relationship with your institution or health system's Hospital at Home or Home Hospital program?

A. My health-system has a Hospital at Home program, and our ASP is actively engaged with the program
B. My health-system has a Hospital at Home program, but our ASP is not actively engaged with the program
C. My health-system or institution does not have a Hospital at Home program

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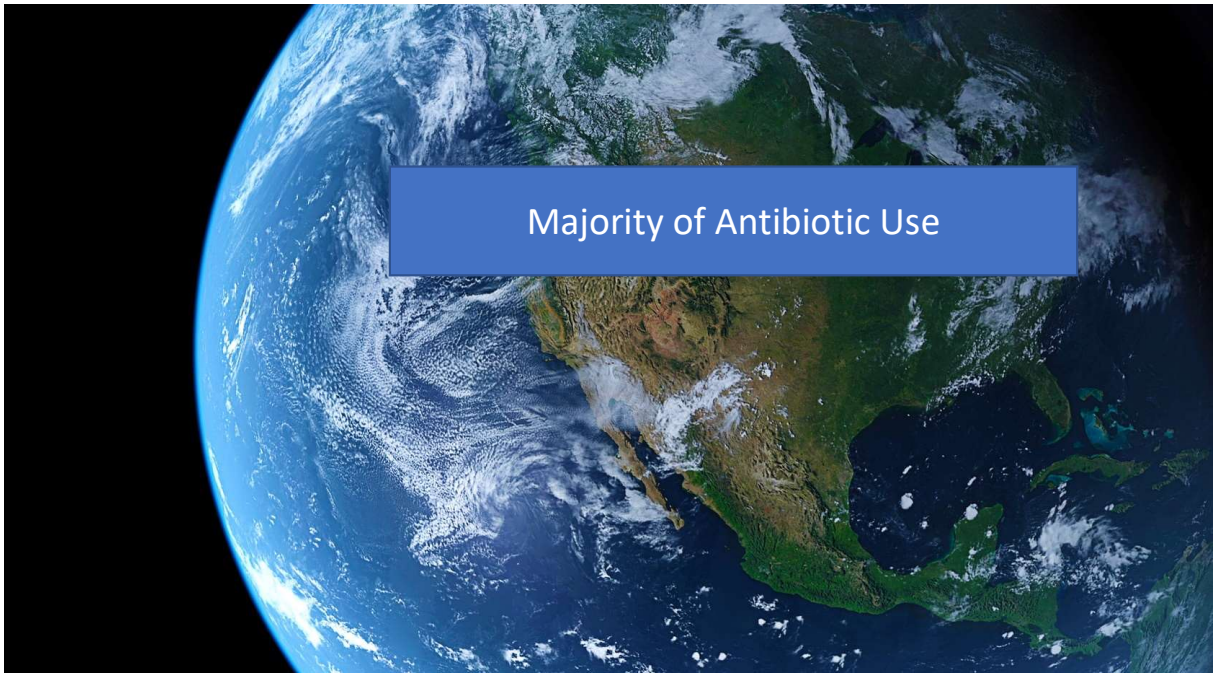
Previously on Antimicrobial Stewardship…



Majority of Antimicrobial Stewardship Programs (ASPs)

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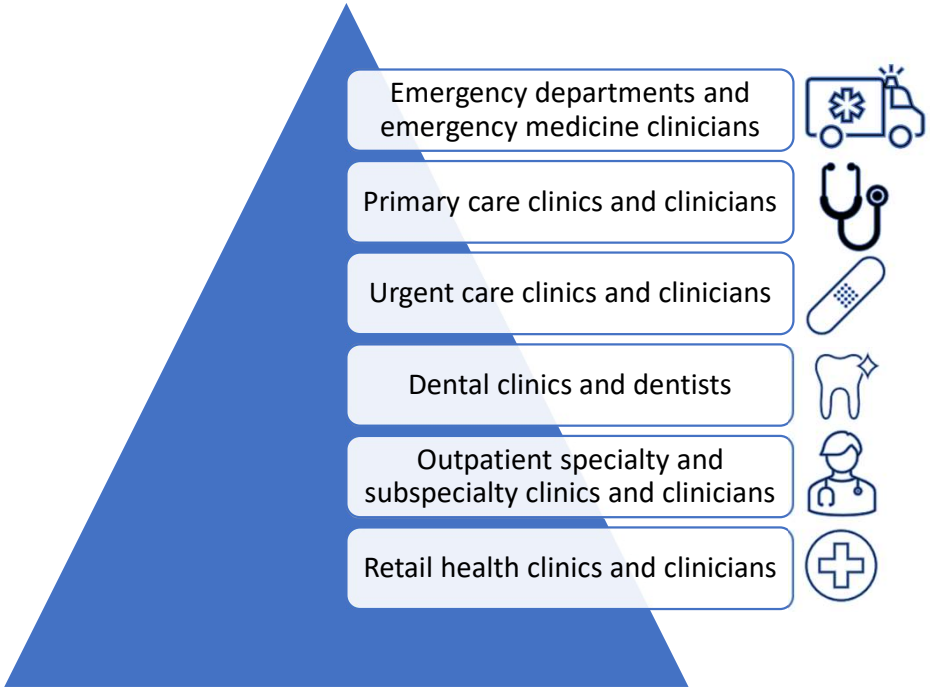
There's a Whole Antibiotic-Consuming World Outside of the Hospital Walls

Potential partners for outpatient antibiotic stewardship activities



At least 30% of antibiotics prescribed in US physician offices and emergency departments are unnecessary[1]

Therapy often prescribed for conditions where no antibiotic is indicated (never conditions) and for longer than necessary[2,3]

https://www.cdc.gov/antibiotic-use/community/pdfs/16_268900-A_CoreElementsOutpatient_508.pdf

1 Fleming-Dutra KE, et al. JAMA 2016;315:1864 – 1873
2 King LM, et al. JAMA Internal Medicine 2018;178:992 – 994
3 King LM, et al. Clin Infect Dis 2020;70:370 – 377

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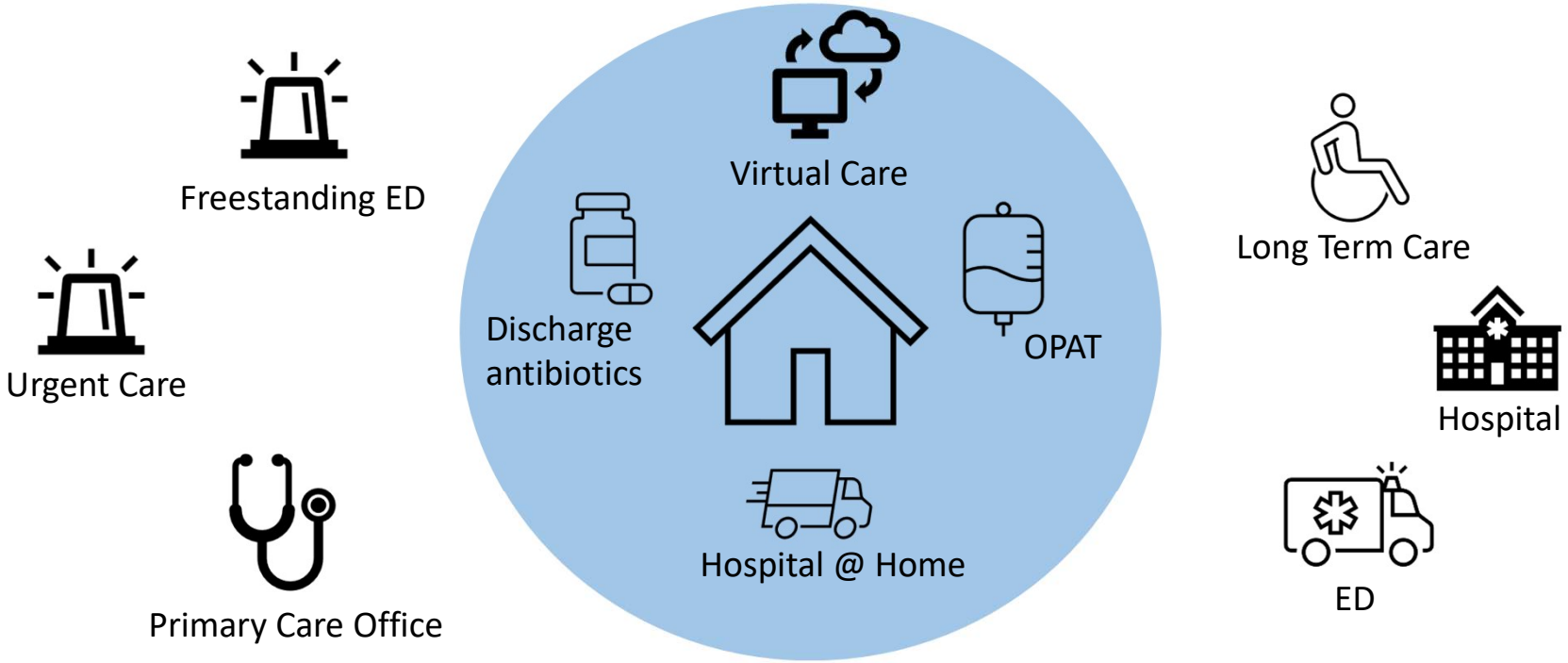
There's No Place Like Home: Changing Focus of Care Delivery



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US Oral Outpatient Prescriptions by Age Group 2011 – 2016 and 2020 – 2022

Highest Prescribing Rates

2011 - 2012

≤ 2 years

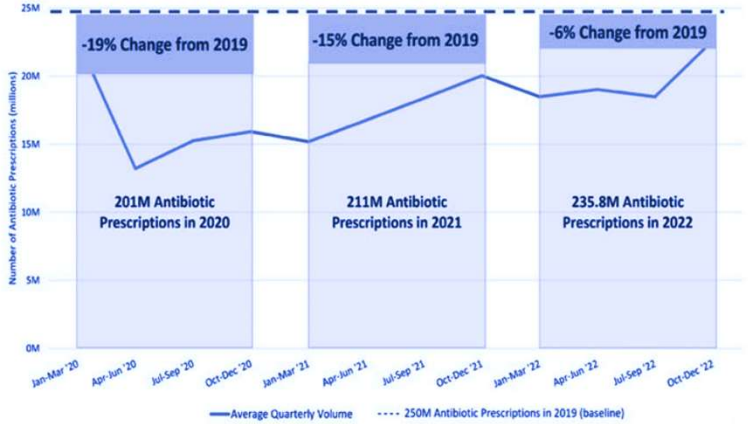
2014 - 2016

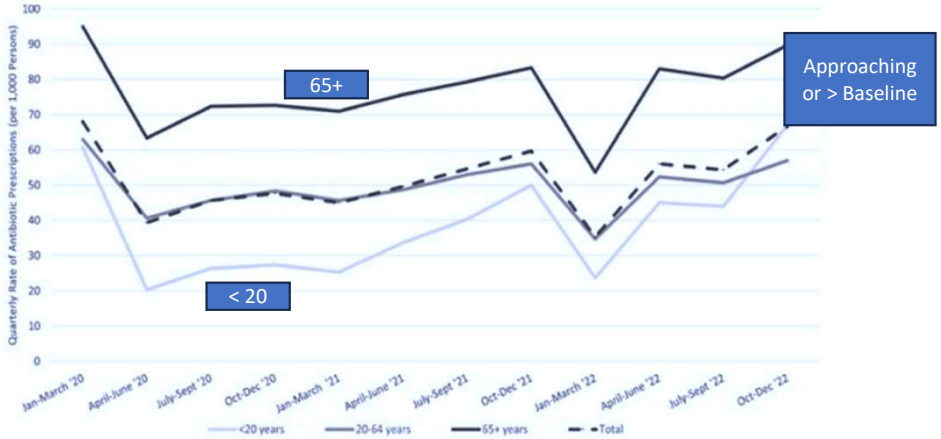
≥ 65 years

5% decrease in national rate of oral antibiotic prescriptions 2011 - 2016

Primarily driven by pediatrics (< 20 years) where rates decreased by 13%

Adult rates increased by 2%





King LM, et al Clin Infect Dis 2020;70:370 – 377

Bizune D, et al. Antimicrob Steward Healthc Epidemiol 2024;4, e193, 1 – 3

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Healthcare On Demand:

Virtual Care / Telehealth and Urgent Care

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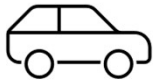
Clinician Perception of Patient Demand for Antibiotics in the Outpatient Setting

Perceived causes of unnecessary antibiotic prescribing

Perceived Patient Demand for Antibiotics



How Does Perceived Patient Demand "Cause" Prescribing?

Satisfying patients and providing value

- Feeling that patients need to be given something to legitimize their suffering
- Desire to provide value to patients for time and money spent
- Patients behave like customers
- Urgent Care providers felt less able to counter patient demand due to lack of patient relationship

Negative Repercussions of Not Prescribing

- Concern over poor patient satisfaction scores and negative online reviews
- Strong desire to avoid confrontation about antibiotics in encounter
- Takes time and energy to explain why an antibiotic isn't needed; a clinician's resolve can wear thin having to repeatedly do this over time
- Concerns for undermining clinician-patient relationship

Belief in Inconvincible Patients

- Some patients will not be satisfied until they receive an antibiotic; efforts to engage with them are futile

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Koht MR, et al. Fam Practice 2020;37:276-282

Telehealth, Virtual Visits and Health System ASP

Virtual visits in adults have been associated with ↑ **appropriate** antibiotic prescribing for sinusitis and urinary tract infections[1,2]

Study of direct-to-consumer (DTC) telehealth in pediatrics using an independent vendor found ↑ **inappropriate** prescribing for URIs compared to PCP and UC visits[3]

Various modalities for care delivery and prescribing rates may differ[4]

Synchronous vs asynchronous vs E-visit

Collaboration with virtual home care providers is a key market and opportunity for stewardship

1.Johnson K et al. Open Forum Infect Dis 2019 DOI: 10.1093/ofid/ofz393
2.Johnson K et al. Infect Control Hosp Epidemiol 2021;42:586 – 591
3.Ray KN, et al. Pediatrics 2019;143e:20182491
4.O'Toole R, et al. Clin Infect Dis 2024;78:308 – 311

URI: upper respiratory infection
PCP: primary care provider
UC: urgent care

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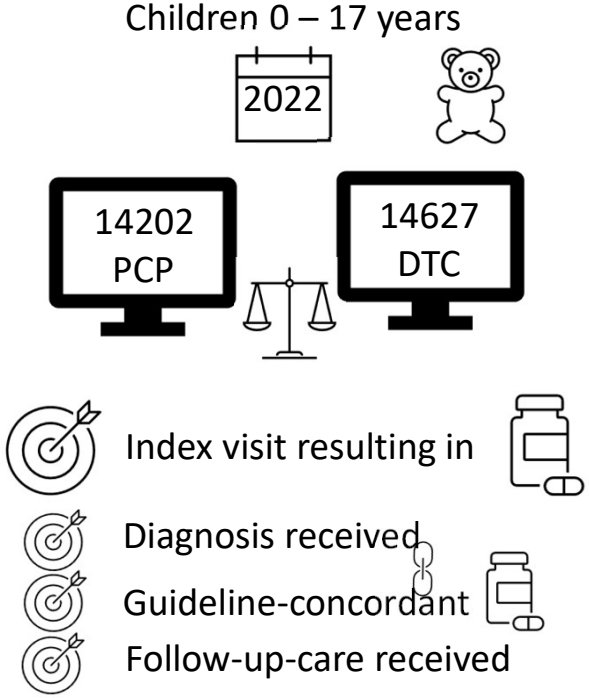
Mano a Mano Telemedicine:DTC vs PCP

Matched telemedicine visits for ARTI



Weighted % (95% CI)

Visit / Outcome	PCP TeleMed	DTC TeleMed	RR (95% CI)
Index Visit	**28.9 (28.1 – 29.7)**	**37.2 (36.0 – 38.5)**	**0.78 (0.74 – 0.81)**
Dgx where ✓	19.0 (18.4 – 19.7)	28.4 (27.3 – 29.6)	0.67 (0.63 – 0.71)
Dgx where ✗	81.0 (80.3 – 81.6)	71.6 (70.4 – 72.7)	1.13 (1.11 – 1.15)
✓ ✗	1 (0.8 – 1.2)	0.8 (0.6 – 1.0)	1.23 (0.94 – 1.61)
✗ ✓	13.6 (13.0 – 14.2)	14.5 (13.7 – 15.3)	0.94 (0.88 – 1.01)
Early Follow-up	**5.0 (4.7 – 5.4)**	**8.0 (7.3 – 8.7)**	**0.63 (0.56 – 0.70)**
Rx Filled (1 – 2 days post visit)	1.7 (1.5 – 1.9)	3.2 (2.7 – 3.6)	0.53 (0.44 – 0.64)
Later Follow-up	**8.2 (7.8 – 8.7)**	**9.6 (8.8 – 10.3)**	**0.85 (0.78 – 0.95)**
Rx Filled (3 - 14 days post visit)	3.1 (2.8 – 3.4)	4.8 (4.2 – 5.3)	0.65 (0.56 – 0.75)

ARTI: acute respiratory tract infection
Dgx: diagnosis

Wittman SR, et al. JAMA Netw Open. 2024;7(3):e242359. doi:10.1001/jamanetworkopen.2024.2359

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CDC Telemedicine-Specific Considerations for Stewardship

- Establish standards for Telediagnosis and Antimicrobial prescribing during virtual visits
- Use triage systems to redirect for conditions outside the scope of care
  Use highest level of audio/visual technology during visits
- Identify populations at risk for being underserved or excluded by antibiotic stewardship

https://www.cdc.gov/antibiotic-use/hcp/core-elements/outpatient-telemedicine-antibiotic-stewardship.html#cdc_generic_section_2-t[illegible]edicine-specific-considerations-for-antibiotic-stewardship

Core Elements of Stewardship in Outpatient Telemedicine

Commitment

-Leadership support
-Identify a Champion
-Promote public commitments across the platform
-ASP as part of performance and job responsibilities

Action for policy & practice

-Clinical decision support prompts
-Delayed prescribing or other observation strategy
-Ensure access to diagnostic and laboratory testing
-Communication for clinicians (i.e. DART training)

Tracking & Reporting

-Antibiotic prescribing quality measures to monitor
-Benchmark antibiotic use for high-priority conditions
-Incentive programs for high-quality care related to appropriate prescribing
-Report prescribing to individual providers and include peer comparisons

Education & Expertise

-Support participation in and access to education and training
-Provide timely access to expertise to assist in decision-making
-Provide patient education that includes risk of adverse drug events

https://www.cdc.gov/antibiotic-use/hcp/core-elements/outpatient-telemedicine-antibiotic-stewardship.html#cdc_generic_section_2-telemedicine-specific-considerations-for-antibiotic-stewardship

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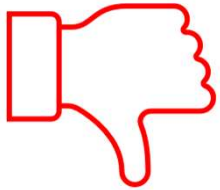
Easter Eggs in Virtual Visit Literature

Diagnostic criteria within virtual visit software

Drop-down menu of antibiotic choices or supportive care based on diagnosis



Limitations of software:
-10-day default durations
-Inability to customize according to institutional guidelines

1.Johnson K et al. Open Forum Infect Dis 2019 DOI: 10.1093/ofid/ofz393

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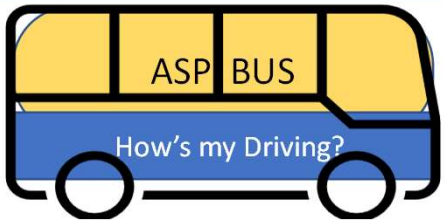
Patient Expectations, Clinician Perception of Expectations, and Satisfaction

Ref	Setting	Subject of Interest	Outcomes
1	Telemedicine 2013 - 2016	Patient satisfaction related to receipt of antibiotics in ARIs	• 66.1% of encounters resulted in an antibiotic prescription • Receipt of **antibiotic prescription** more likely to = 5-star rating vs no prescription (OR 3.23; 95% CI 2.67 – 3.91) • Receipt of a **non-antibiotic prescription** more likely to = 5-star rating vs no prescription (OR 2.21; 95% CI 1.8 – 2.71) • ↑ antibiotic prescribing = ↑ satisfaction ratings
2	Telemedicine 2021-2022	Association of antibiotic receipt and provider 5-star rating in adults with URI or bronchitis	• Visits with **antibiotic prescription** (AOR 2.56; 95% CI 2.03 - 3.23) **OR non-antibiotic prescription** (AOR 1.55; 95% CI 1.34 – 1.79) more likely = 5-star rating vs **no** prescription • Each additional minute of the visit ↑likelihood of a 5-star rating (AOR, 1.03; 95% CI 1.02 – 1.05)
3	Emergency Department	If inappropriate prescribing of antibiotics in ARI led to improved Press Ganey scores	• No differences in top box Press Ganey scores between patients who did or did not receive antibiotics • Antibiotic prescriptions were not associated with increased odds of top box scores (OR 0.78; 95% CI 0.59 – 1.14)

1 Martinez KA, et al JAMA Intern Med 2018; E1-E3
2 Kambam G, et al. Open Forum Infect Dis 2024; Jun 3;11(7)DOI: 10.1093/ofid/ofae310
3 Pulia MS, et al. Open Forum Infect Dis 2020;DOI: 10.1093/ofid/ofaa214



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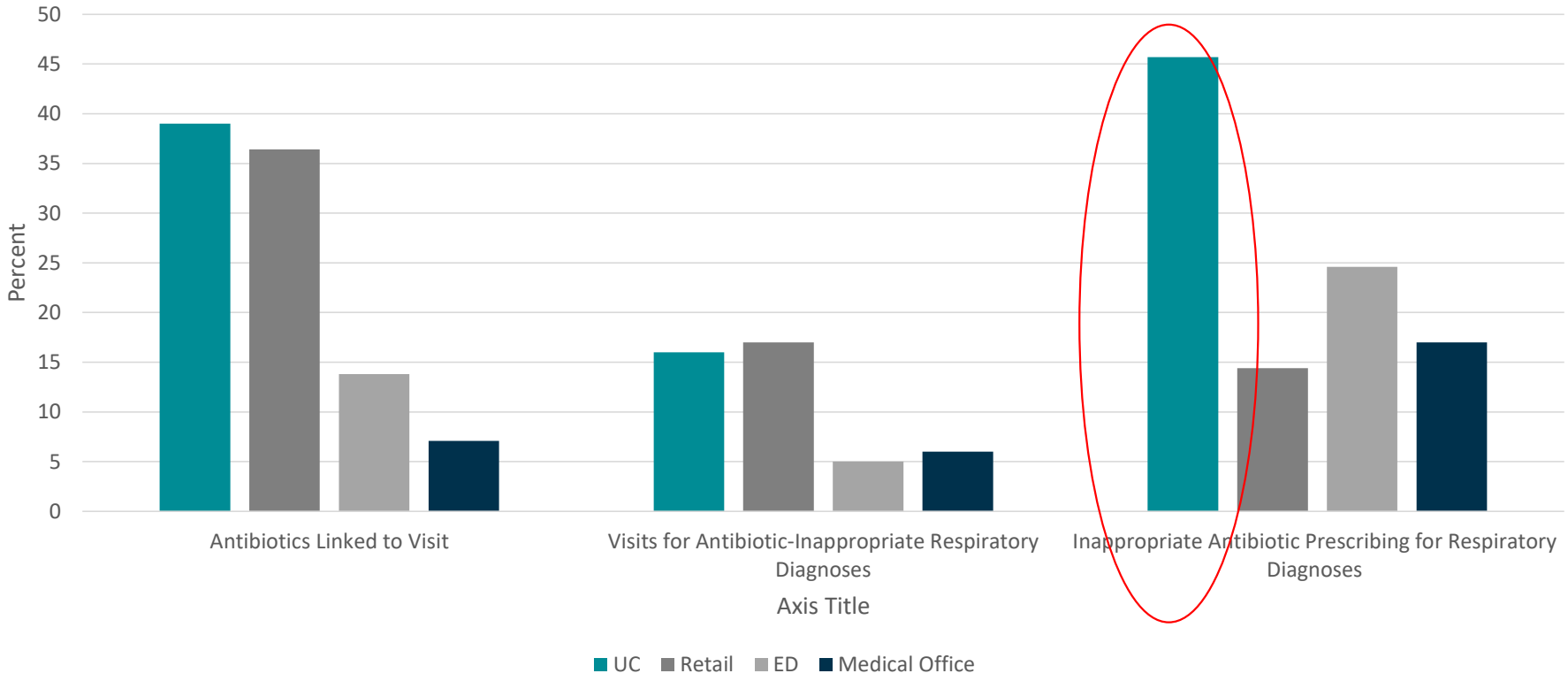
Antibiotic Prescribing in Traditional Ambulatory Care Sites, ED, Urgent Care, and Retail Clinics



Palm DL, et al. JAMA Intern Med 2018;178:1267 - 1269

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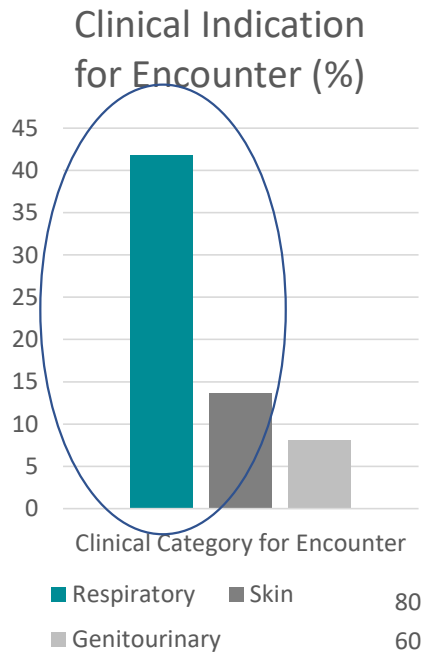
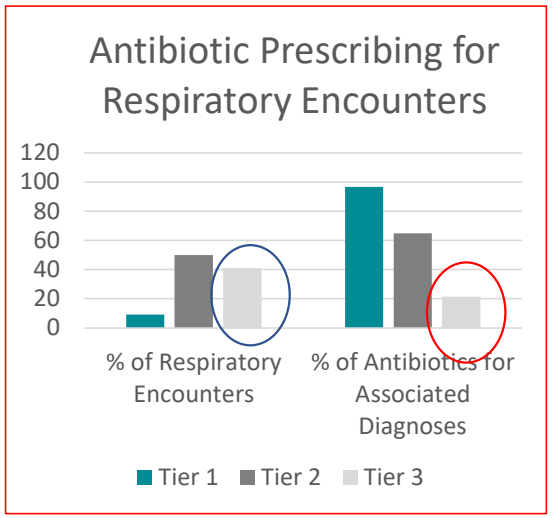
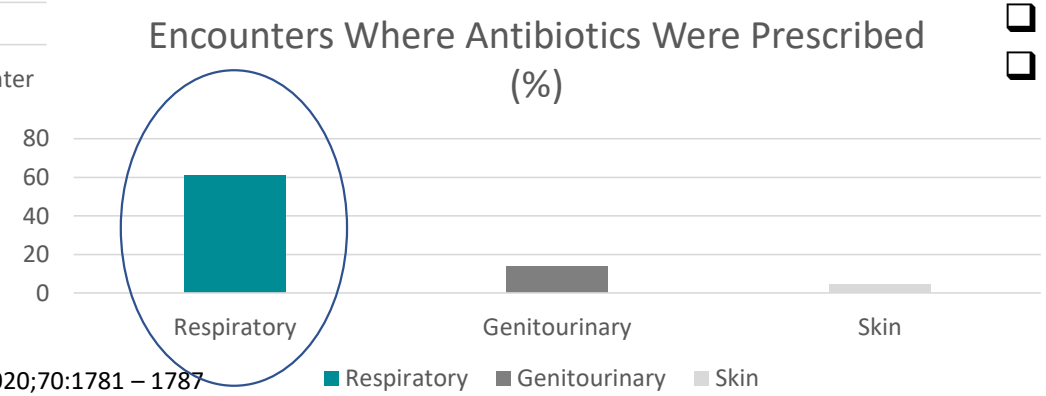
Prescribing in an UC Network







- ❑ 34.1% of UC visits included antibiotic prescription or an administered antibiotic
- ❑ Most common antibiotics prescribed overall
  - ❑ Amoxicillin (27.9%)
  - ❑ Cephalexin (11%)
  - ❑ Doxycycline (9.8%)
- ❑ Most commonly prescribed antibiotics for respiratory conditions
  - ❑ Amoxicillin (44.6%)
  - ❑ Doxycycline (14%)
  - ❑ Azithromycin (12.7%)

Tier 1 diagnoses =always indicated
Tier 2 diagnoses = potentially indicated
Tier 3 diagnoses = never indicated

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Stenehjem E et al. Clin Infect Dis 2020;70:1781 – 1787

Intervention Domains of UC Stewardship in Respiratory Conditions

Education

- Peer to Peer In-clinic education
- Guidelines, handbook, lectures, podcasts

Patient education including

EHR Tools

- Azithromycin justification prescribing alert
- Added delayed antibiotic prescription in EHR
- Templated notes for respiratory conditions

Clinician Dashboard

- Transparent prescribing dashboard
- All clinicians, clinics, system level metrics
- Dashboard links
- Biennial data review with leaders

Media

- Local
- Social Media
- Print media
- Posters in Waiting room

Financial Incentive

- Goal to individually prescribe in < 50% of respiratory encounters
  - Previous median rate of 50% prescribing

Clinician + Patient Interventions Clinician Intervention

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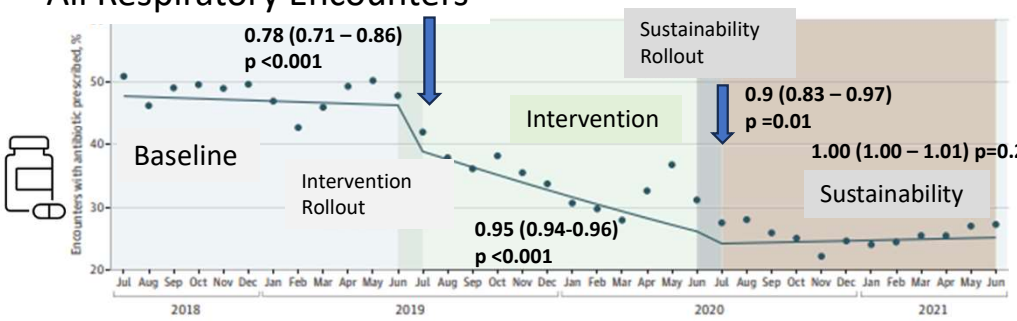
Stenehjem E et al. JAMA Netw Open 2023;6(5)e2313011.doi:10.001/jamanetworkopen.2023.13011

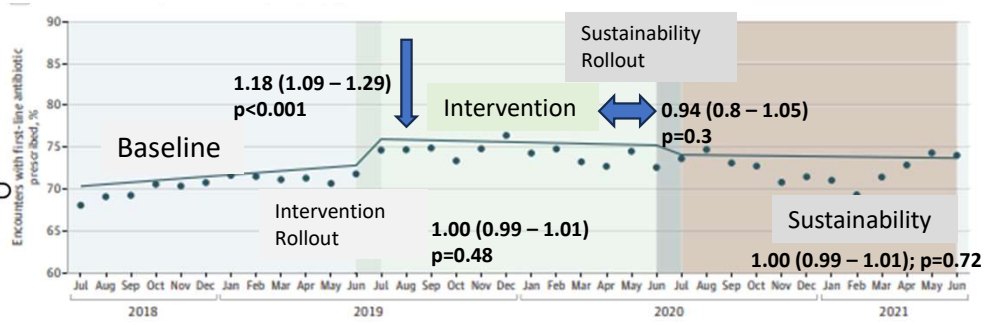
Association of Intervention with Antibiotic Prescribing

OR or change in OR for antibiotic prescribing per month (95% CI)

All Respiratory Encounters

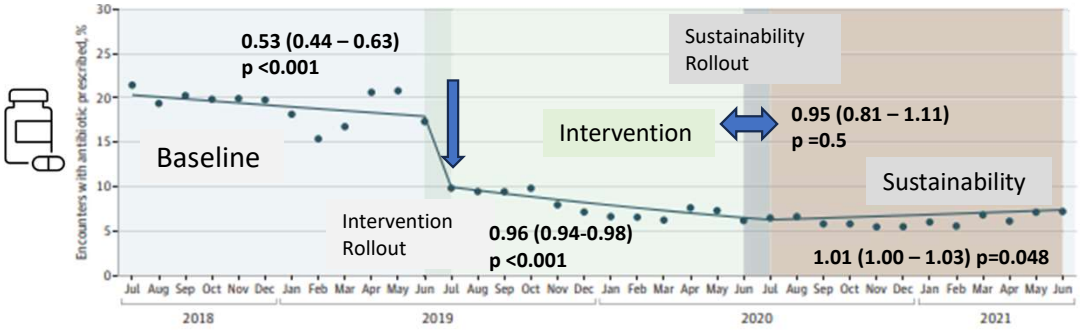


Sinusitis, AOM, Pharyngitis With 1st Line Antibiotics Prescribed



Tier 3 Respiratory Encounters

OR for antibiotic prescribing per month (95% CI)



Antibiotic prescriptions ↓ by 5% monthly during intervention
Prescribing for Tier 3 encounters ↓ additional 4% each month

● = Observed % of encounters receiving antibiotic per month
— = Fitted interrupted time series model
Tier 3 diagnoses = antibiotics not indicated

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Stenehjem E et al. JAMA Netw Open 2023;6(5)e2313011.doi:10.001/jamanetworkopen.2023.13011

Mind the Gap: Non-Visit-Based and Non-Infection Related Ambulatory Prescribing

- Much work around outpatient stewardship has relied on review of appropriateness by assigned ICD-9 or 10 code looking a select indications based on actual visits

- Prescribing does exist outside of these parameters
  - Two-year review of oral antibiotic prescribing in cohort of privately insured
  - > half of antibiotic use was non-visit based or non-infection related
  - 31% of antibiotics fills were non-visit based
  - Non-infection related prescribing accounted for 22% of antibiotic fills

Fischer MA, et al. Open Forum Infect Dis 2021:ofab412.doi.10.1093/ofid/ofab412

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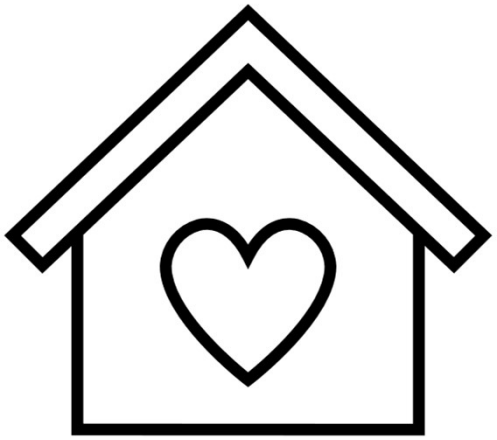
How Can I Work from the Inside the Hospital Walls to Impact Outpatient Use?



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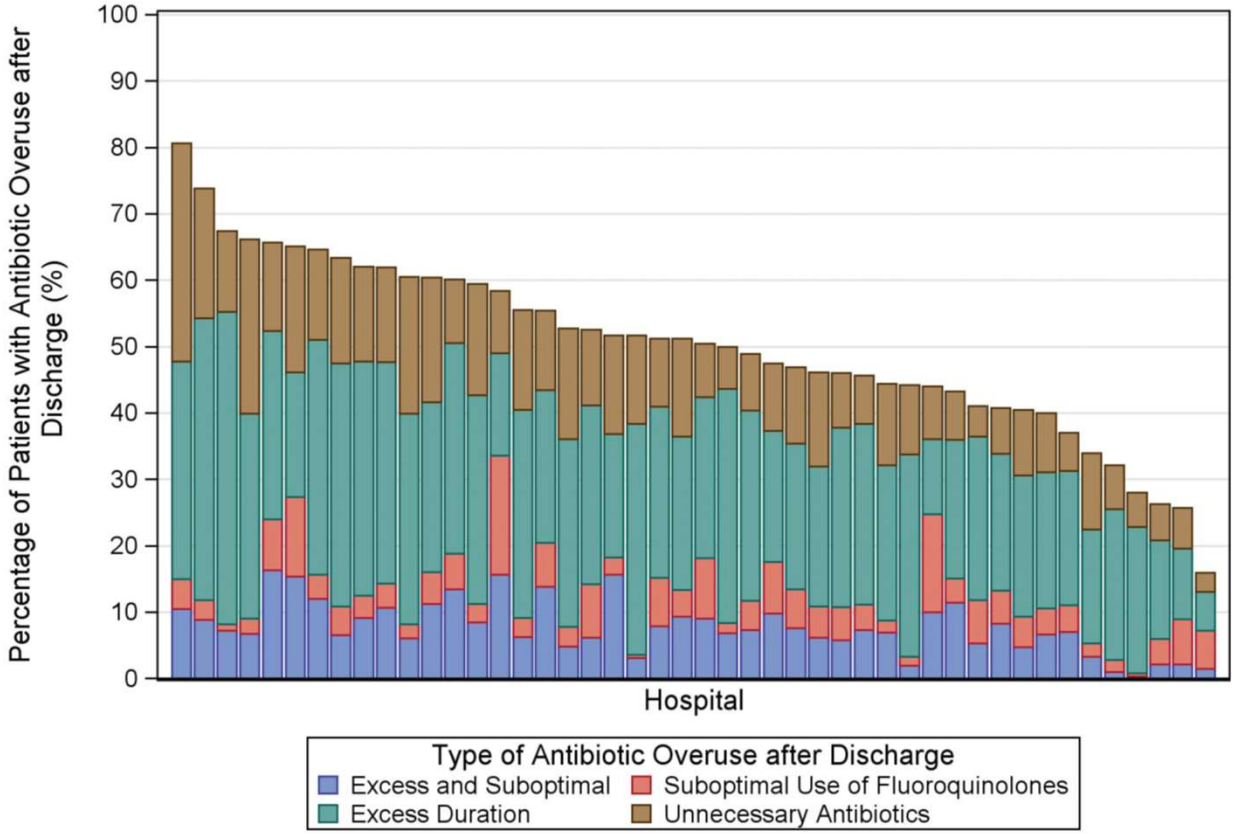
Overuse After Hospital Discharge



n = 21, 825

72.4% prescribed antibiotic at hospital discharge

49.1% experienced overuse after hospital discharge

56.9% 38.7%

Median overuse = 4 days

Fluoroquinolones most commonly prescribed antibiotic (34%)

--17% of patients with asymptomatic bacteriuria

--22% who did not meet diagnostic criteria for pneumonia

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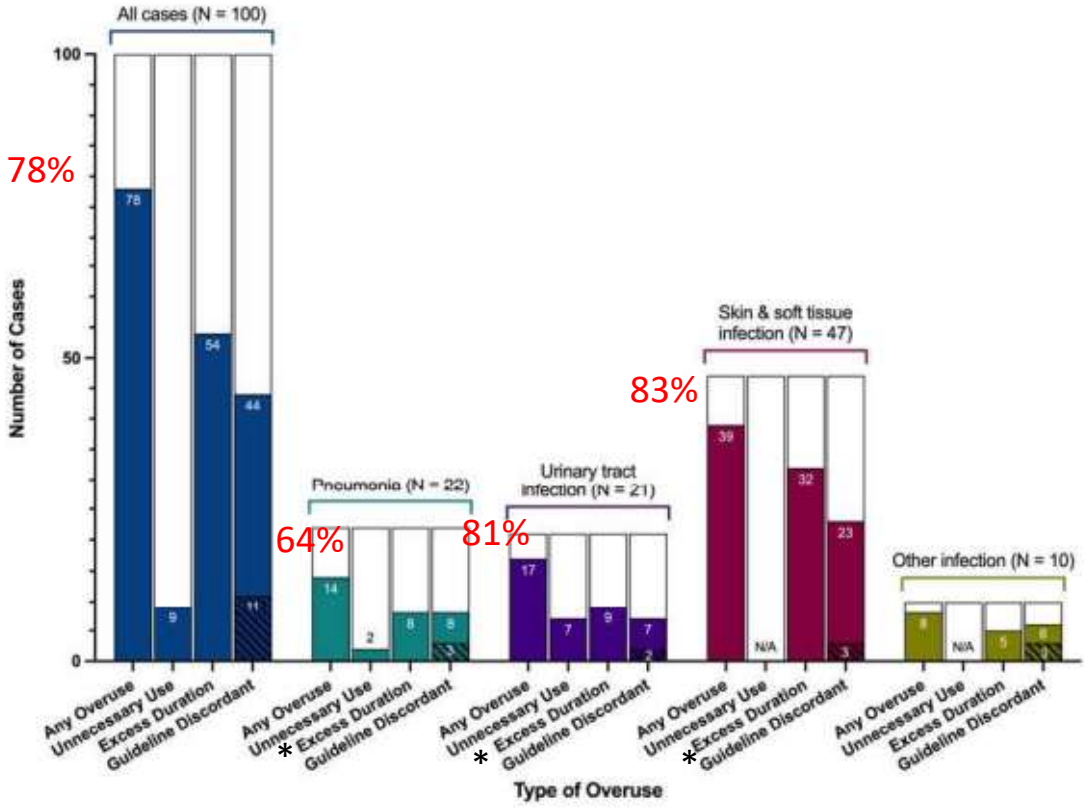
Vaughn V, et al. Clin Infect Dis 2021;73(11):e4499-506

Short Stay, Long Course

N = 100; discharged from SSU

Median stay = 3 days

78% with antibiotic overuse
54% Duration
44% Selection



Soper NS, et al. Infect Control Hosp Epidemiol 2022;43:1689 – 1692

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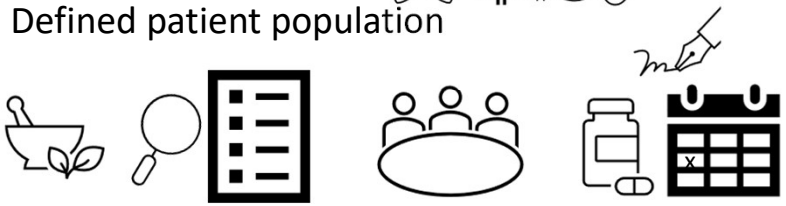
SSU = Short Stay Unit; SSTI = Skin and Soft Tissue Infection

Pharmacist-Driven TOC for Oral Antibiotics at Hospital Discharge

5 Hospitals Henry Ford System

Adults admitted to med/surg wards, discharging on oral antibiotics

Select Infection Types
Defined patient population



Optimal Prescription at Discharge in all groups

Prolonged duration
Treatment of asymptomatic bacteriuria
Non-guideline-concordant selection
Suboptimal dose
Adverse Events

30 or 90-day

30-day including infection-related

30-day or unplanned

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Mercuro, et al. JAMA Netw Open 2022;5:e2211331

Pharmacist-Led Stewardship at Discharge Med Rec – Advocate Health

26 Hospitals

Pre

Go-Live

EHR Alert for patients discharging on oral antibiotics

Adult IV to PO Step-Down Guidelines

System Pharmacist Education

Outcome	PRE (N = 300)	POST (N = 260)	P-value
Guideline-discordant Regimens	64.3%	39.6%	<0.001
30-day Readmission	6.7%	8.8%	0.345
Treatment Associated-Adverse Events	15%	6.5%	0.002
Treatment Failure	11.3%	5%	0.009
Durations of Therapy, days median (IQR)			
Inpatient Durations	4 (3 – 6)	3 (2 – 5)	<0.001
Outpatient Duration	6 (5 – 7)	5 (3 – 7)	0.013
Total Duration	10 (8 – 13)	8 (7 – 12)	<0.001

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Patel AR, et al. Open Forum Infect Dis 2024. ofae631.1894 ID Week 2024, Los Angeles, CA

Thinking

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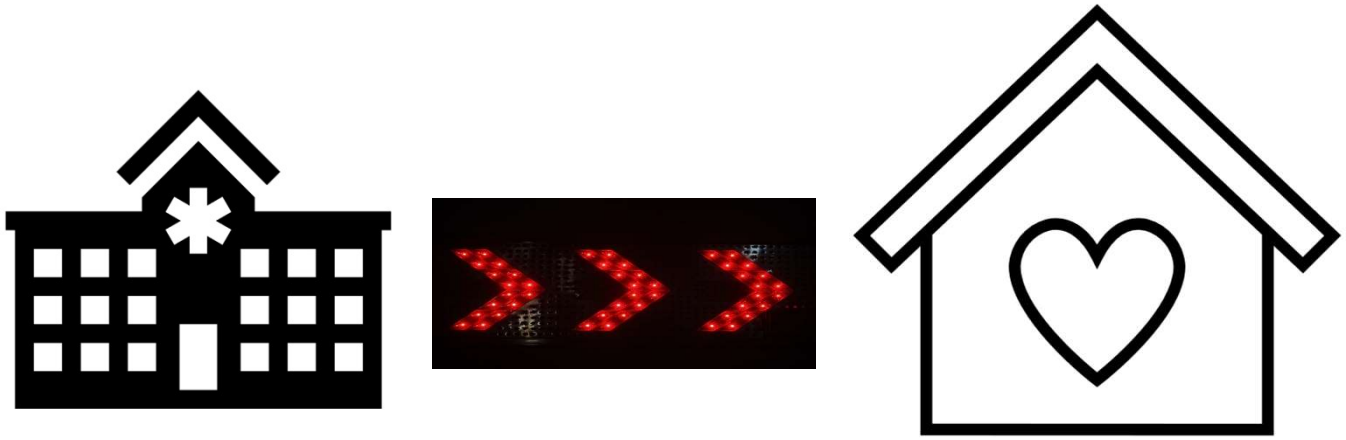
How Can I Use Hospital ASP to Extend to Outpatient Setting?



Hospital @ Home and Non-traditional Transitions of Care Work

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Hospitalized At Home, But Not Far From ASP

Large community hospital network

Jan – March 2021 Control
Jan – March 2022 Intervention

ASP pharmacist performed audit and feedback

Provided recommendations to clinicians via EHR

Antibiotic use (DOT/1000 patient days)

-Broad-spectrum antibiotic use
-Appropriateness of indication, dose, duration
-Compliance with institutional guidelines
-Treatment failure
-Antibiotic-associated adverse events
-$$ of antibiotic therapy

N = 73 patients Control
N = 127 patients Intervention

ASP Pharmacist reviewed ~ 8 patients per day

Antibiotic use (DOT/1000 patient days) ⟷

↑ Inappropriate antibiotic indication intervention vs control group 46(36%) vs 15(19%) p = 0.01

-Most common infection types
-Respiratory, UTI, SSTI

63% acceptance rate
Most common intervention type was stop antibiotic

DOT = Days of Therapy

Nguyen V, et al Open Forum Infect Dis Abstract Citation ID: ofac492.1383 ID Week 2022

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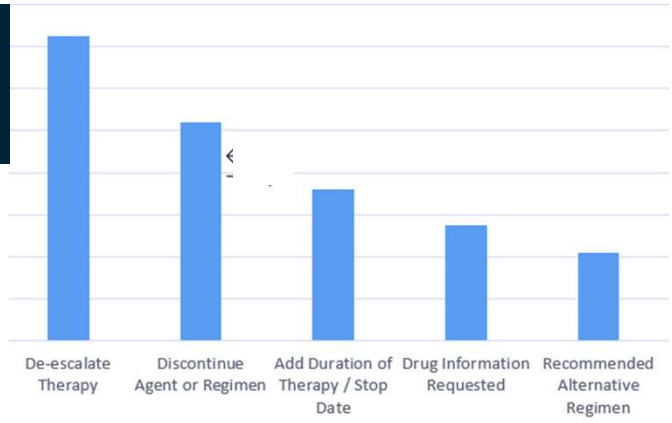
Atrium Health Antimicrobial Support Network Hospital at Home Experience

- Ongoing relationship since early days of COVID-19 pandemic
  Leadership engagement ↑ on both sides
- ASP team frequently contacted to assess antimicrobial regimen during evaluation for transition to Hospital at Home
- Pharmacist stewards covering respective facility engage with providers via EMR messaging and phone

Top 5 Intervention Types in 2024 for Hospital at Home



55% of interventions

89% Acceptance Rate

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Unpublished data; internal Atrium Health

OPAT at Transitions of Care

- Single-center review of 1 year of OPAT courses[1]
  - 60% of courses qualified for definite or possible modification
  - 41% of OPAT courses were potentially avoidable
    - Including 22% involving ID consultation

- Opportunities for de-escalation prior to discharge!
  - Up to 50% of one institution's select broad-spectrum OPAT regimens had potential for de-escalation[2]
    - ~ 81% of patients who could have been narrowed had a once daily regimen

Spivak ES, et al. Infect Control Hosp Epidemiol 2015;36:1103 – 1105
Brenon JR, et al. Antimicrob Steward Healthc Epidemiol 2021;1, e36, 1–3doi:10.1017/ash.2021.204

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Review of Inpatient Outpatient Parenteral Antimicrobial Therapy (OPAT) Orders

ASP pharmacists perform review once weekly
3 pharmacists
Patients Identified via Epic Patient List (shown above)
-Inpatient with active orders for OPAT

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ASN Transitions of Care Pilot

Megan Shah, Jenn Onsrud, Rohit Soman

(Feb-Apr 2023)

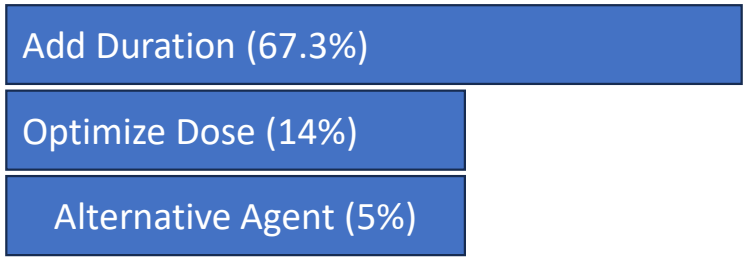
Population

359 OPATs Reviewed

Locations

South Division 49
North Division 108
Central Division 202

Common Intervention Types



145 patients
162 interventions

Lessons learned

- ✓ First Dose
- ✓ Daptomycin at SNF
- ✓ Renal dosing
- ✓ Dalbavancin

Unpublished Data - Slide courtesy of Jennifer Onsrud, PharmD, MSCR, BCIDP

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What if I don’t have enough ID Pharmacist Bandwidth?

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Utilize Existing Relationships and Resources to Guide Outpatient ASP

- Ambulatory Care Pharmacists embedded in Family Medicine Clinic
- 2 Pharmacists = 1 FTE
- 0.1 FTE devoted to audit and feedback
- Supported by health-system ASP champions
- Education and guideline distribution
- Targeted URIs, UTIs, and SSTIs

- Feedback spanned audits over 2 week period
- Sent via electronic messaging system
- Included both positive and constructive feedback
- Included specific patient examples with identifiers
- Did not include peer comparison

	URI	UTI	SSTI
Indication			
Drug			✓
Dose	✓		✓
Duration		✓	
Regimen			✓

✓ Denotes statistically significant increase post ASP

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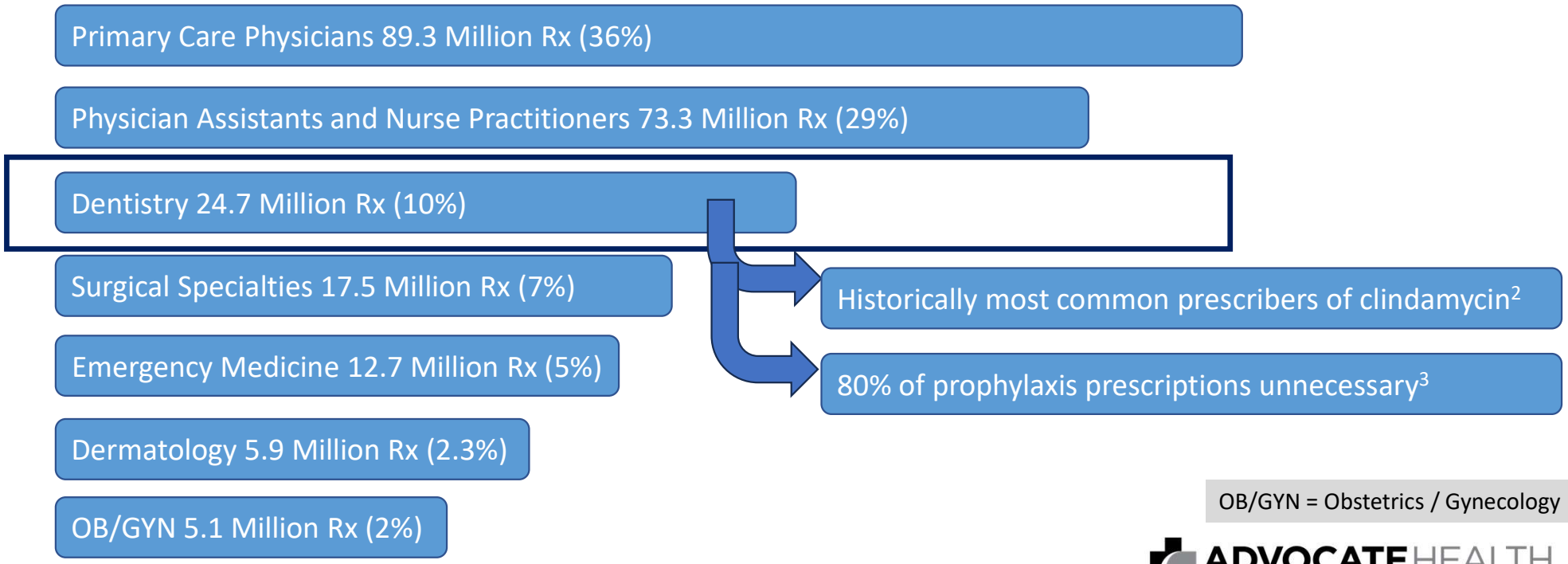
Westerhof LR, et al Infect Control Hosp Epidemiol 2020, doi:10.1017/ice.2020.1275

US Prescriptions by Provider 2018: That's a Mouthful….

249.8 Million Total Antibiotic Rxs = 763 Rx/1000 Persons[1]



OB/GYN = Obstetrics / Gynecology

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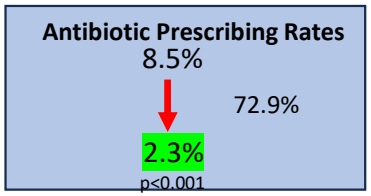
1 https://www.cdc.gov/antibiotic-use/community/pdfs/Annual-Report-2018-H.pdf

2 Hicks LA, et al. Clin Infect Dis 2015;60:1308 - 1316

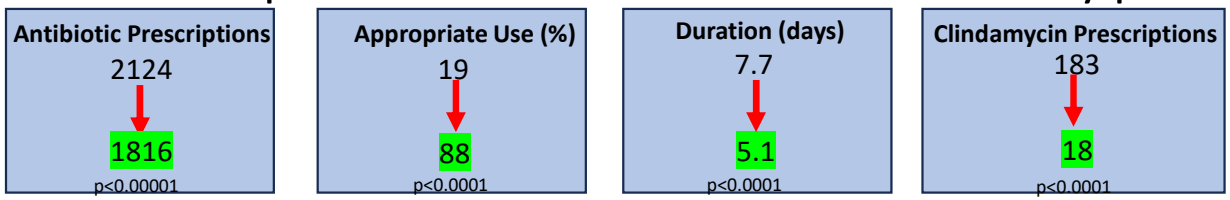
3 Suda KJ, et al. JAMA Netw Open 2019; 2:e193909

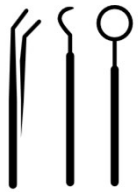
Taking a Bite of Resistance: ASP in Dental Practice

- Gross et al. implemented ASP within academic dental practice
  - Team included dentist, pharmacist, and MD leaders
  - Multimodal intervention
    - "Monday Minutes" and educational session
    - CDC "7 Ways Dentists Can Act Against Antibiotic Resistance"
    - CDS tool for antimicrobial use for acute dentoalveolar conditions



- Goff et al. **Private Practice Dentists**
  - Dental study clubs via evening Zoom sessions
  - Prospective audit and feedback followed by postsurvey





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Gross AE, et al Open Forum Infect Dis 2019 DOI: 10.1093/ofid/ofz067
Goff DA, et al. Open Forum Infect Dis 2022 DOI: 10.1093/ofid/ofac361

How Do I Choose?


Where / in what is your organization investing?


Where is your organization's growth occurring?


What are your organization's strategic goals?


Where are your existing resources?


Where are your existing relationships?


What are your biggest opportunities?

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Questions?

Thank you for you time and attention!

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