National Prescribing Trends among Adults with Urinary Tract Infections

Findings from the Urologic Diseases in America Project

Lydia Feinstein, Brian R. Matlaga, Kevin C. Abbott, Tamara Bavendam, Ziya Kirkali, Erline Martinez-Miller, and Julia B. Ward

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Introduction

- Urinary tract infection (UTI) is one of the most ubiquitous outpatient infections
  - Deleterious effects on quality of life
  - Large economic impact
  - Burden particularly high among women

- High lifetime incidence and rates of recurrence of UTI raise concerns about multidrug resistance

- Concerns of multidrug resistance may be influencing prescribing practices for UTI, but knowledge of recent trends is limited

Objective

- The Urologic Diseases in America project sought to address this knowledge gap by drawing on data from multiple, large, administrative claims databases

- Specifically, we assessed 10-year trends in pharmacotherapy for UTI among a large sample of US adults treated in outpatient settings
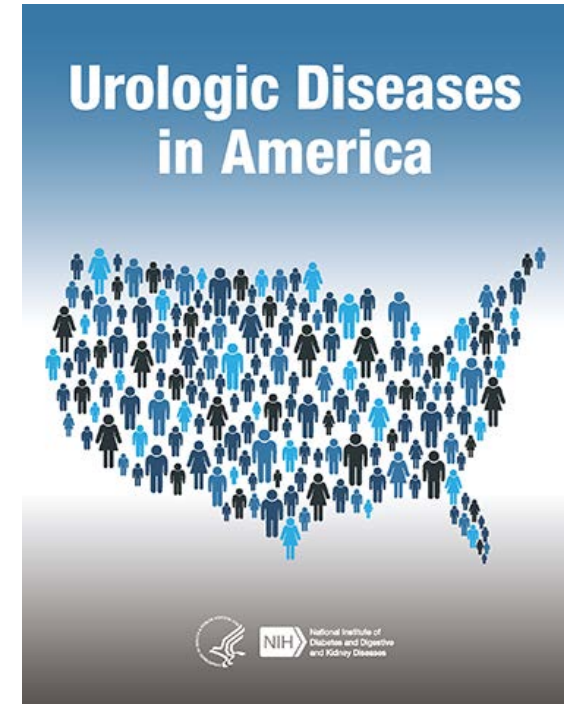
Study Design

- **Data sources & study population**
  - Optum© Clinformatics® Data Mart Database (CDM) for privately insured individuals aged 18-64 years (N= 2,691,529 UTI episodes)
  - Centers for Medicare & Medicaid Services Medicare 5% Sample (CMS) for Medicare beneficiaries aged ≥65 years (N=874,043 UTI episodes)
  - Continuously and fully enrolled for at least one full calendar year

- **Definitions**
  - UTI was defined as an outpatient claim with a UTI-related diagnosis code followed by a pharmacy claim for an anti-infectious agent within 72 hours
  - Anti-infectious agents were identified using American Hospital Formulary Service classifications

- **Statistical analysis**
  - Prevalence of UTI-related prescription fills from 2007 to 2016
  - Distribution of medication type and duration
  - Frequency of recurrence

Table 1. Medication use for episodes of urinary tract infection occurring among Medicare beneficiaries and adults enrolled in private insurance, overall and by gender, 2007 – 2016[a]

Anti-Infectious Agent [b]	% with Medication			Mean Medication Duration in Days (Standard Deviation)
	Overall (N=3,565,572)	Male (N=389,424)	Female (N=3,176,148)	
Quinolones	41	54	40	7 (4)
Urinary Anti-Infectives	21	7	23	10 (9)
Sulfonamides	17	15	17	8 (6)
Cephalosporins	6	7	6	9 (6)
Penicillins	4	5	3	9 (5)
Azoles	2	1	2	5 (8)
Macrolides	1	2	1	5 (4)
Tetracyclines	1	4	1	12 (9)
Other [c]	<1	1	<1	9 (7)
Combination therapy [d]	6	4	6	8 (6)
Including Azoles	4	<1	4	16 (14)
Not including Azoles	2	3	2	7 (4)

[a] Data from 2012 were excluded due to a one-time shift in the sources of enrollment data that resulted in poor enrollment matching in this year.

[b] Based on American Hospital Formulary Service classes.

[c] Includes Aminoglycosides, Antifungal Antibiotics, Miscellaneous B-Lactam Antibiotics, Miscellaneous Antibiotics, Miscellaneous Antifungals.

[d] Defined as two concurrent anti-infectives.

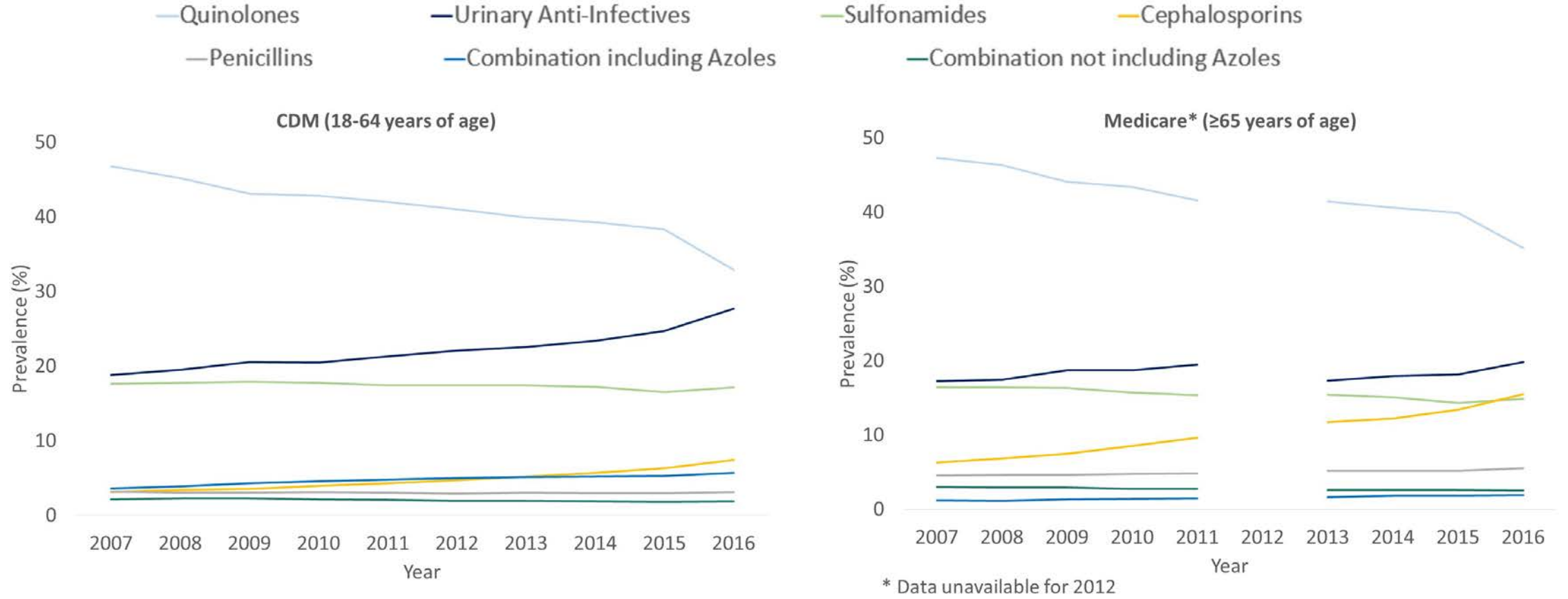# Figure 1. Annual medication use for episodes of UTI

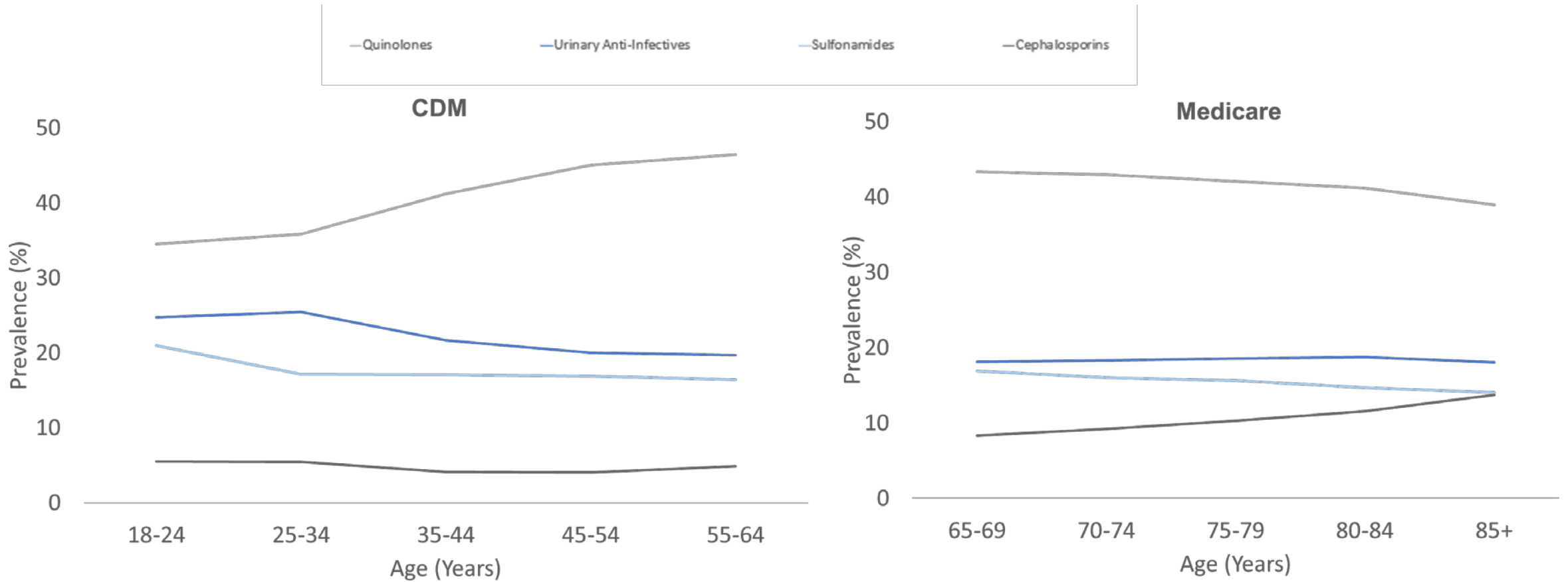# Figure 2. Medication use for episodes of UTI by age

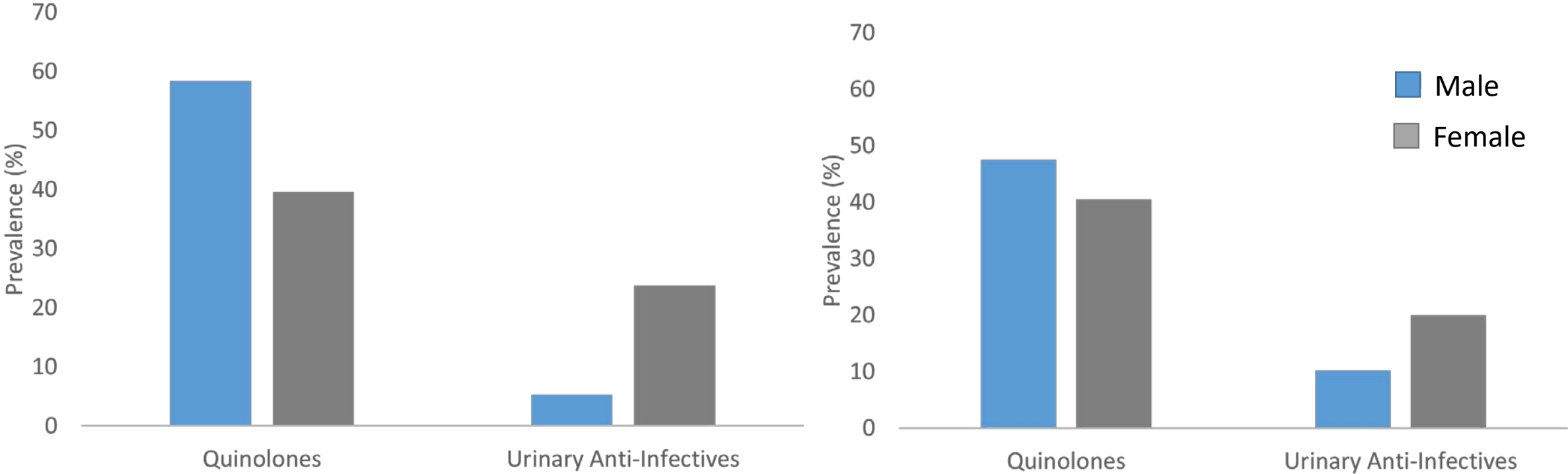# Figure 3. Medication use for episodes of UTI by sex

Figure 4. Prevalence of recurrent UTI within 12 months among Medicare beneficiaries and private insurance enrollees, 2007-2016
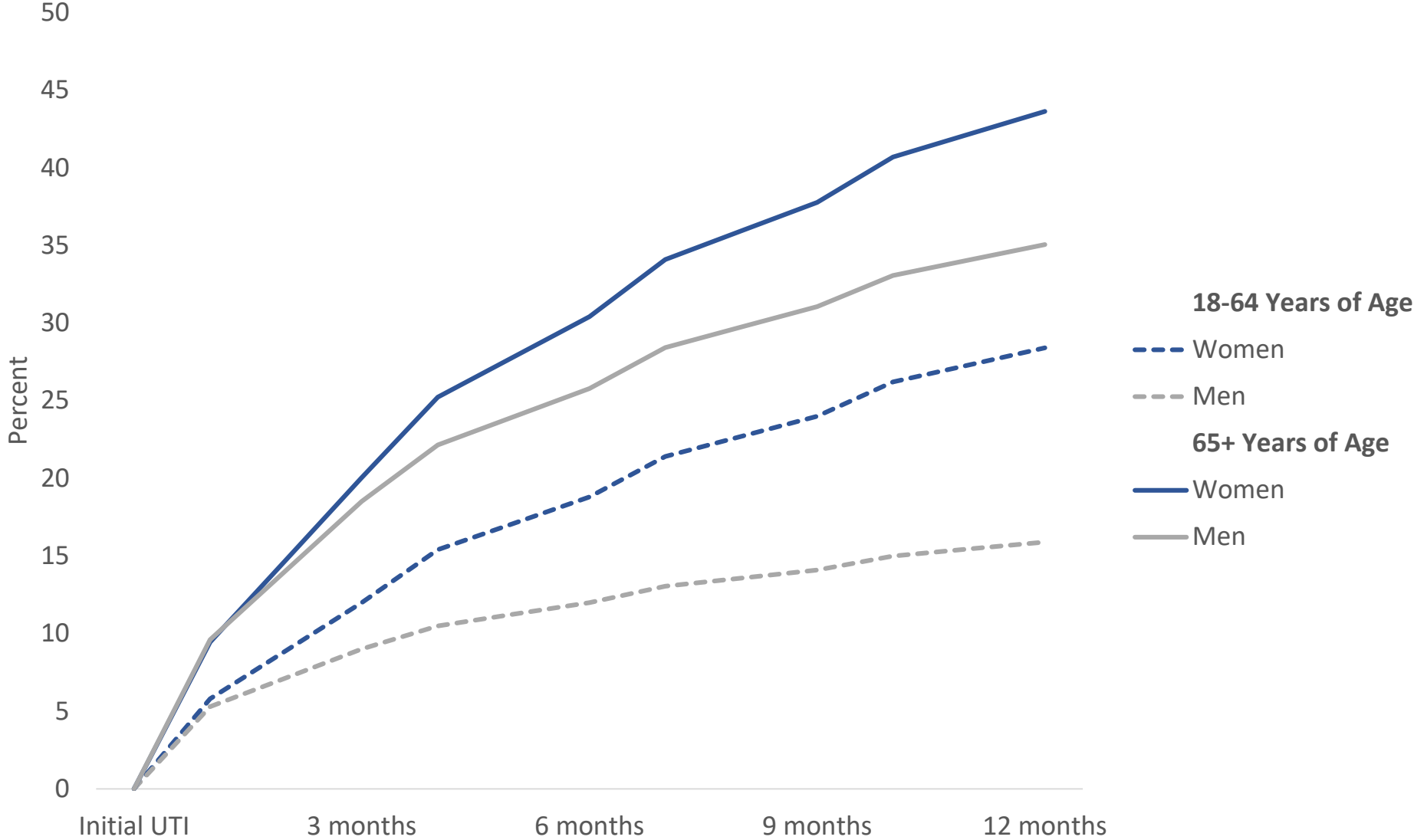
Table 2. Prevalence of recurrent UTI within 12 months among Medicare beneficiaries and private insurance enrollees with an initial UTI infection, 2007-2016.

		CDM Database (18-64 years of age)	CMS Database (65+ years of age)
Anti-infectious agents	Quinolones	11	39
	Urinary Anti-Infectives	13	48
	Sulfonamides	12	41
	Cephalosporins	11	47
	Penicillins	11	46
	Azoles	10	45
	Macrolides	7	33
	Tetracyclines	8	47
	Other	9	53
	Combination therapy w/ Azole	33	46
	Combination therapy w/o Azole	83	48
Medication duration (days)	1	21	43
	2-3	26	37
	4-5	27	39
	6-7	28	43
	>7	27	44

Conclusions

- Pharmacological treatment of UTI evolved over the 10-year study period
    - Shift from a primarily quinolone-based treatment paradigm to a more diverse pharmaceutical armamentarium
    - Increasing reliance on cephalosporin agents
    - Differences by sociodemographic indicators

- Evolution may have been driven by resistance patterns that particularly impact the effectiveness of quinolone agents

- Treatment duration appeared to be longer than what guidelines typically suggest, representing an opportunity for practice improvement

- Prevalence of UTI recurrence is high, with differences by type of anti-infectious agent
    - Lowest 12-month prevalence among those who received macrolides for their initial infection

- Future research on which antiinfectives offer greatest protection against recurrence is warranted