



# Nursing Home Providers' Empiric Antibiotic Choices for Residents with Urinary Tract Infections: A National Survey

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## ABSTRACT

**Introduction:** Urinary tract infections (UTIs) are the most common indication for antibiotic prescriptions in nursing homes (NHs) and frequently result in fluoroquinolone (FQ) prescriptions. We performed a vignette-based survey of NH providers to better understand empiric UTI treatment decision-making.

**Methods:** Study participants were recruited nationally through professional organizations and snowball sampling from December 2021 to April 2022. Clinical vignettes depicting four UTI presentations in NH residents (1. simple cystitis, 2. pyelonephritis with cephalosporin allergy, 3. catheter-associated UTI and 4. cystitis with history of resistant organism) were developed and distributed via electronic survey. Respondents provided free-text antibiotic choice, which two physicians independently reviewed and implicitly determined if a preferred or not-preferred antibiotic was selected. A panel of three physicians adjudicated discrepancies between the primary reviewers. Analysis was performed in R.

**Results:** Of 101 respondents, 74% were physicians and 26% were advanced practitioners. Half of respondents (49%) had >10 years NH experience, 41% were geriatrics trained, and none were infectious disease trained. **Figure 1** details antibiotic choices and preferred agents for each case. Overall, 69% of antibiotic choices were deemed preferred antibiotics, with the least number of preferred choices observed for case 3 depicting catheter-associated UTI (49%). FQs (42%) and nitrofurantoin (12%) were the most frequent non-preferred choices. Case 2 received the greatest proportion of FQ prescriptions (43%), but this was a preferred agent. In cases where FQs were not a preferred choice, they comprised 17% of antibiotic choices. There was no difference in FQ or preferred prescribing choices by role. Providers with >10 years NH experience were more likely to prescribe a non-FQ antibiotic and a preferred antibiotic than those with less experience, however, neither of these were statistically significant.

**Conclusions:** This sample of NH providers made mostly preferred empiric antibiotic choices, however, FQ use remained high, particularly in providers with less NH practice experience. Further exploration of empiric antibiotic prescribing decision-support tools may improve prescribing in this setting.

## BACKGROUND

Urinary tract infections (UTIs) are the most frequent indication for antibiotics in nursing homes (NHs), and fluoroquinolones (FQs) are the most commonly prescribed agent (1)

Little is known about NH providers' empiric antibiotic prescribing decision making for residents with UTIs

With the goals to better understand (i) empiric UTI antibiotic choice and (ii) frequency of preferred empiric antibiotics, we performed a vignette-based electronic survey of NH providers.

## METHODS

- Vignettes (**Table 1**) were developed through an iterative process (2).
- Study participants were recruited nationally through professional organizations and snowball sampling from 12/2021 to 4/2022.
- Respondents provided empiric antibiotic choices for each vignette.
- Two physicians independently reviewed antibiotic choices and implicitly determined if the agent was the best empiric antibiotic choice based on syndrome, spectrum, cost, route of administration, and patient level factors. Three other physicians reviewed discrepancies and provided final adjudication.

**Table 1.** Vignettes

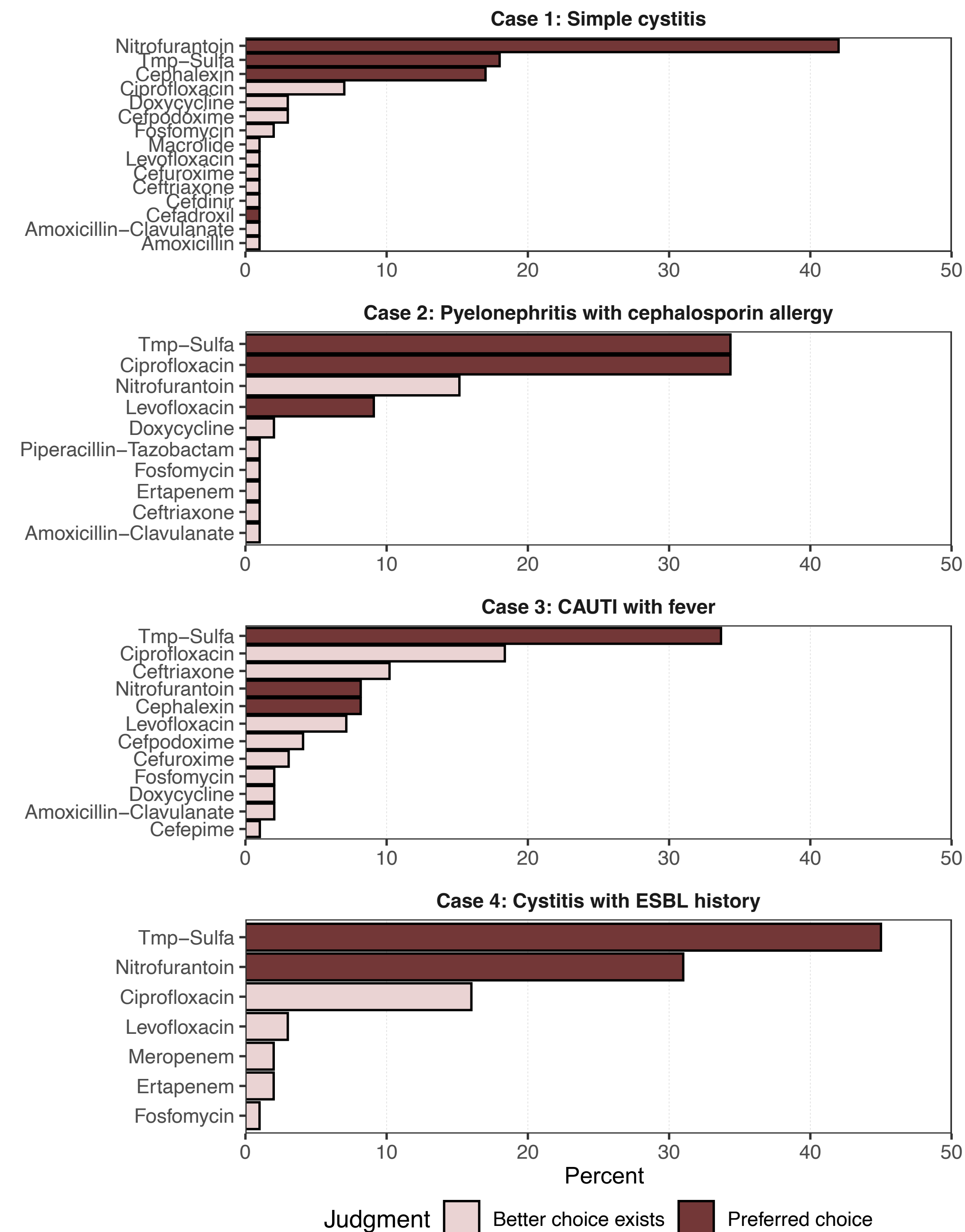
Case	Patient level factors	Preferred Antibiotic Choices
1. Simple cystitis	History of <i>Clostridioides difficile</i> infection	<ul style="list-style-type: none"> <li>Oral 1<sup>st</sup> gen cephalosporin</li> <li>TMP-sulfa</li> <li>Nitrofurantoin</li> </ul>
2. Pyelonephritis	Severe cephalosporin allergy	<ul style="list-style-type: none"> <li>TMP-sulfa</li> <li>Fluoroquinolones</li> </ul>
3. Catheter-associated UTI (CAUTI) with fever	None	<ul style="list-style-type: none"> <li>Oral 1<sup>st</sup> gen cephalosporin</li> <li>TMP-sulfa</li> <li>Nitrofurantoin</li> </ul>
4. Cystitis	Recent UTI with ESBL-producing <i>Klebsiella</i> spp.	<ul style="list-style-type: none"> <li>TMP-sulfa</li> <li>Nitrofurantoin</li> </ul>

## RESULTS - 1

- Of 101 respondents who completed the survey, none were trained in infectious diseases (**Table 2**).
- Most respondents chose preferred antibiotics across the 4 cases (69%). Case 3 had the fewest preferred choices (49%) (**Figure 1**).
- Among all 4 cases, the most frequently chosen non-preferred agents were fluoroquinolones (33%) and nitrofurantoin (12%).
- The respondent's role (*i.e.*, advanced practitioner vs. physician) did not correlate with selection of fluoroquinolones or preferred prescribing choices (**Table 2**).
- Compared to those with ≤ 10 years of experience, respondents with >10 years of nursing home experience were more likely to prescribe (i) a non-FQ antibiotic (80% vs. 72%, p=0.08) and (ii) a preferred antibiotic (74% vs 66%, p=0.12). Neither were statistically significant.

## RESULTS - 2

**Figure 1.** Empiric antibiotic choices for each per case



**Table 2.** Respondent characteristics & antibiotic choice judgments

Characteristic <sup>a,b</sup>	All Respondents (n = 101)	Physicians (n = 75)	Advanced Practitioner (n = 23)
<b>Specialty Training</b>			
Geriatrics	43 (43%)	43 (57%)	0 (0%)
Family Medicine	27 (27%)	27 (36%)	0 (0%)
Internal Medicine	37 (37%)	37 (49%)	0 (0%)
<b>NH practice experience</b>			
<1 year	10 (10%)	9 (12%)	1 (4%)
1-5 years	21 (21%)	15 (20%)	6 (26%)
5-10 years	18 (18%)	11 (15%)	7 (30%)
>10 years	49 (49%)	40 (53%)	9 (39%)
<b>Chose Preferred Antibiotic</b>			
Case 1	76 (75%)	61 (81%)	15 (65%)
Case 2	77 (76%)	59 (79%)	17 (74%)
Case 3	49 (49%)	38 (51%)	11 (48%)
Case 4	76 (75%)	58 (77%)	16 (70%)
<b>No. Preferred Antibiotic</b>	2.77 (1.02)	2.88 (0.97)	2.57 (1.12)
<b>No. of Fluoroquinolones</b>	0.95 (0.92)	0.93 (0.86)	1.00 (1.13)

<sup>a</sup>Values presented as No. (%) or mean (SD), <sup>b</sup>3 respondents did not respond to demographic questions.

## CONCLUSIONS

- Most NH providers selected preferred agents as their empiric antibiotic choice.
- Empiric FQ use was high (33%), particularly in NH providers with less experience.
- Further exploration of decision-support tools for empiric antibiotic prescribing in this setting is needed. Implementation of such tools may improve selection of empiric antibiotic choices.

## REFERENCES

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