To Treat Or Not To Treat: Is That the Question???

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- No relevant financial disclosures
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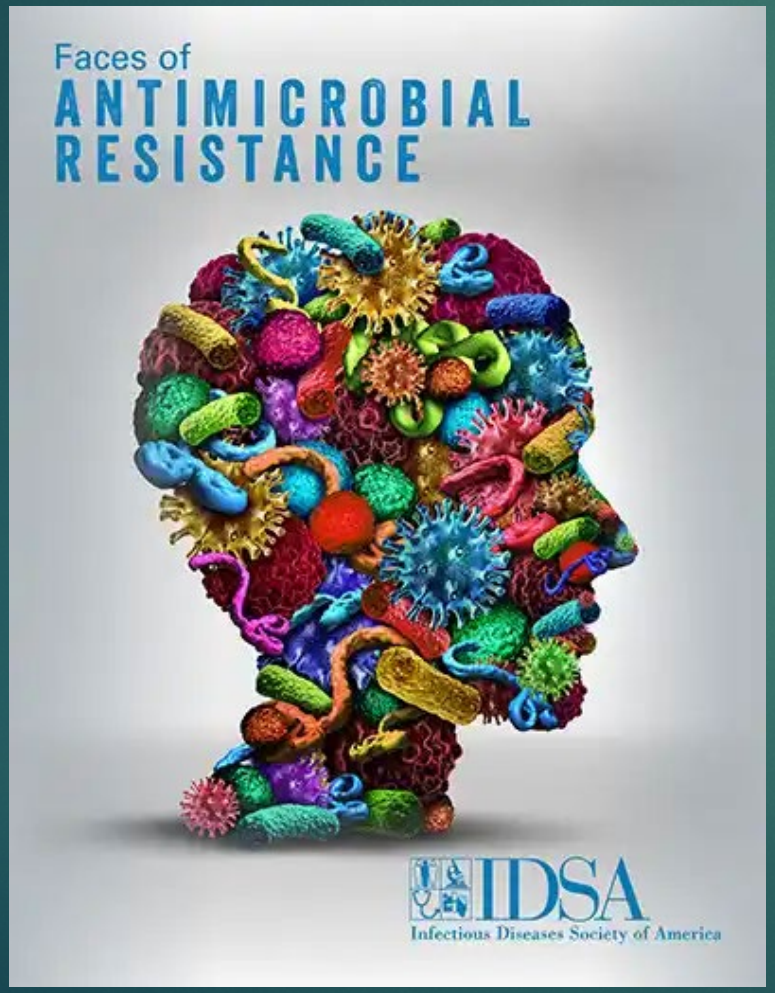
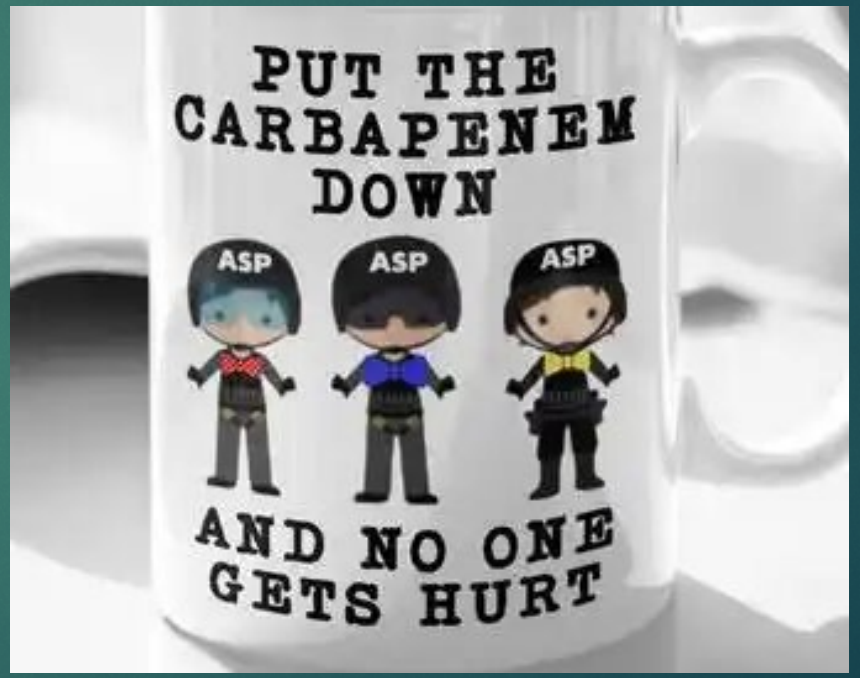
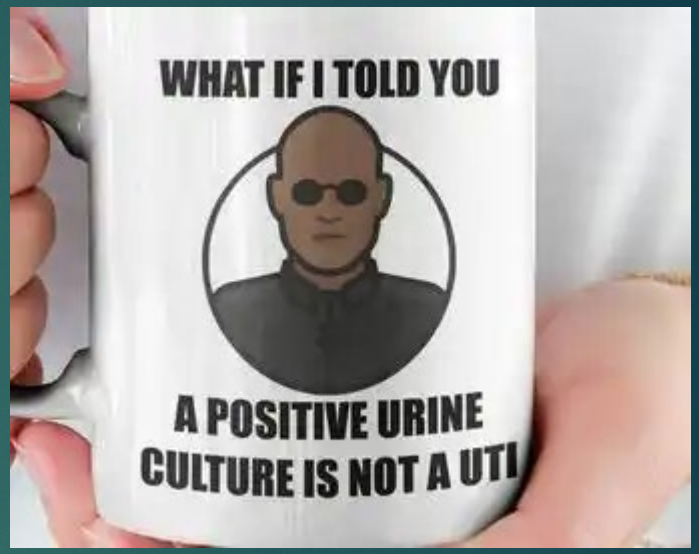
So treat?

Have I entered an Alternate Reality?





What is the issue?



- Overuse of antibiotics in the elderly
  - MDRO colonization in LTCF in 67% of residents[1]
  - *Clostridioides difficile*
  - Adverse drug reactions
- Antibiotic stewardship
- Asymptomatic bacteriuria is common
  - 16-18% in ambulatory women over age 70[2]
  - 40% of residents of LTCF especially those with urinary incontinence and dementia[3]
- Several cohort studies have shown no clear improvement in outcomes with treatment[1,4]

[1]J Am Geriatri Soc 2015; 63 (12) 2472-2477
[2]JAMA 2014; 311 (8) 844-854.
[3]BMC Geriatrics (2019) 19:170.
[4]Archives of Gerontology and Geriatrics 72 (2017) 127-134.

UTIs are common

- UTIs account for 25% of all infections in elderly[1]
- Incidence of 0.1-2.4 cases per 1000 resident-days in LTCF[2]
- Incidence of UTI increased with age for both men and women[3]
- In LTCF, UTI accounts for 22% of all infections and 50% of antibiotic prescriptions[4]

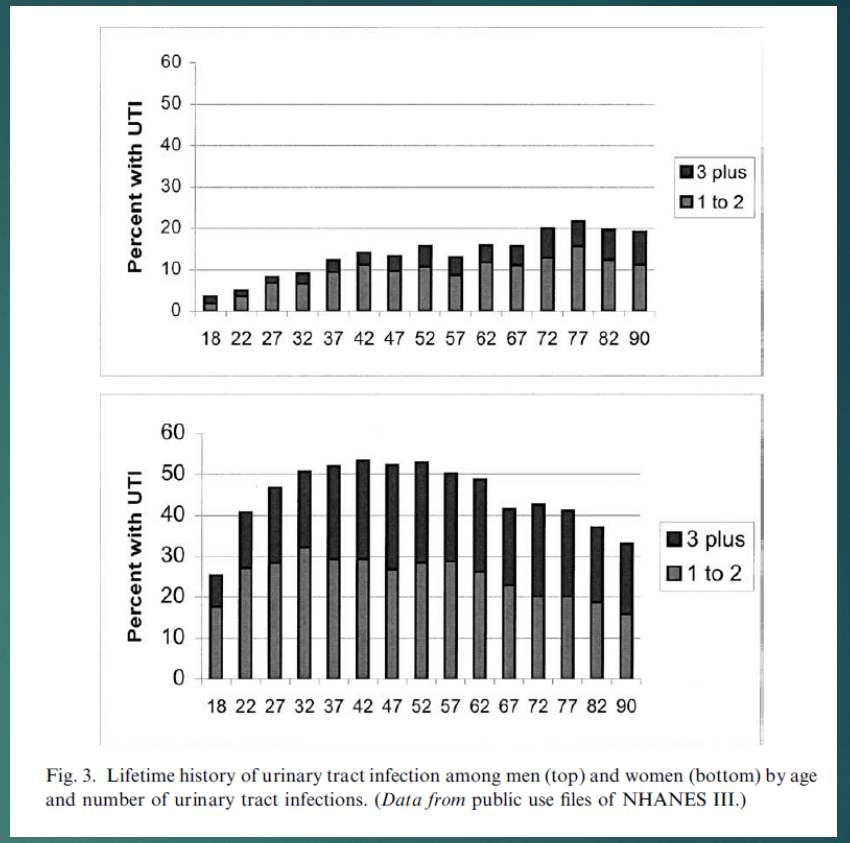
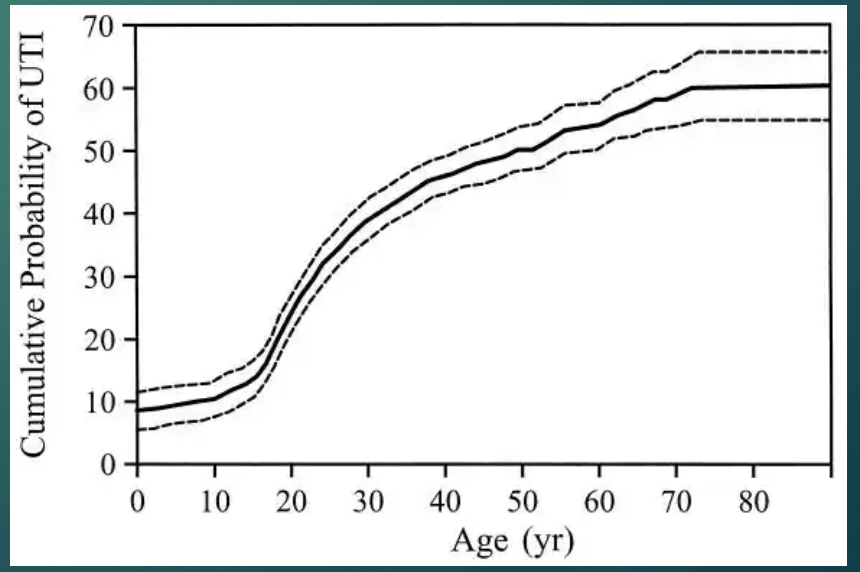


Fig. 3. Lifetime history of urinary tract infection among men (top) and women (bottom) by age and number of urinary tract infections. (*Data from* public use files of NHANES III.)



[1]Canadian Geriatrics Journal 17(1) 2014.
[2]Clin Inf Dis 2009; 48:149-71.
[3]Inf Dis Clinics of NA 17 (2003) 227-241.
[4]BMC Geriatrics (2019) 19:170.

Delirium is common and morbid

- Prevalence reported as high as 50% in hospitalized elderly patients[1]
- One of the most common sources of delirium is infection[2]
  - Patients with delirium, UTI rates were 25.9-32% vs 13% without delirium[3]
    - Balogun et al. meta-analysis concluded there was a modest association
  - Altered mental status had a LR+ 1.4-2.53 in an ED population for association with bacterial infection[4]
  - Frail institutionalized older adults – change in mental status RR 1.38 (95% CI 1.03-1.74)
- Increased morbidity (longer LOS) and mortality[4]

[1]Mayo Clin Proc 1995; 70:989-998.
[2]JAMA 1987; 258 (13):1789-1792.
[3]Canadian Geriatrics Journal 2014; 17(1) 22-26.
[4]J Am Geriatri Soc 2019; 67(3) 4840492.

UTI diagnosis in dementia

- Patients with dementia may be incapable of communicating symptoms
  - SHEA guidelines include mental status[1]
- Geriatric populations often manifest atypical symptoms
  - 28.6% of an ED population, 34% did not have fever[2]
- Cohort study of 519 women aged >85 noted delirium is associated with UTI with OR of 1.9 (95% CI 1.1-3.3)[3]
- 551 nursing home residents over 1 year[4]
  - Reason for suspecting "UTI" – 39% with altered mental status, 19% with change in behavior

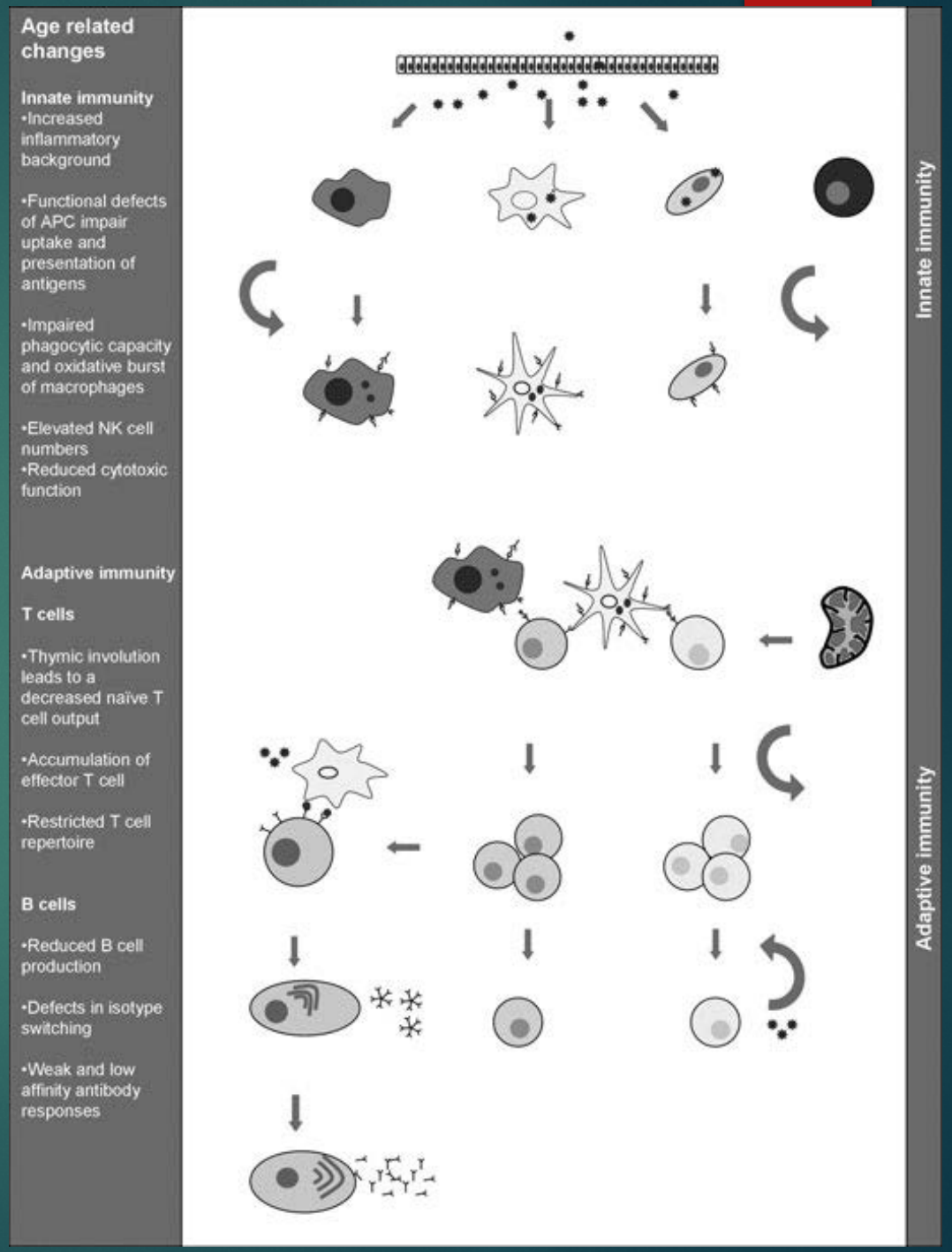
[1] ICHE, 2001; 22:167-175.
[2]Archives of Gerontology and Geriatrics 62 (2016) 97-102.
[3]International psychogeriatrics 2001; 23(3): 496-502.
[4]JAGS. 65:1650-1655, 2017.

UTIs cause morbidity

- Delirium
- Dehydration
- Impact on functional status and ability to do ADLs
- Urosepsis
- Hospitalization

UTIs cause mortality

- Infection is the primary cause of death in 1/3 of persons over 65 years
- Immunosenescence – more risk from infection in elderly[1]
- More comorbidities = more risk
- Sepsis from urinary source in community based hospital
  - 33% in hospital mortality[2]
    - Cognitive status - OR 5.67 (95% CI - 2.37-15.96)
    - Age alone was not a factor



[1]Transplant International 22 (2009) 1041-1050
[2]Journal of Infection 50(4), 2005, 296-305

So are you going to treat?

Rebuttal

Rebuttal

- Caterino et al. showed LR+ 1.4-2.53, which is "too low" to make a difference in post-test probability[1]
  - Observational cohort study = hello hydroxychloroquine!
  - Secondary analysis, so not powered to look at the outcome
- Rely on objective indicators – temperature
  - Blunted febrile response in 20-30% of older patients[2]
  - In fact, what is a "normal" temperature in older adults?
    - Lower AM basal body temperature especially noted in frail, institutionalized patients
  - If not blunted then delayed → 12% delayed > 12 hours from presentation

[1]J Am Geriatr Soc 2019 March 67 (3): 484-492.
[2]Clinical Infectious Disease 2000; 31:148-51.

Rebuttal

- SHEA position paper (2001)[1]
  - Diagnosis recommendation 1b - In residents with clinical deterioration, including fever, no localizing genitourinary findings, and a positive urine culture, a diagnosis of UTI is possible, but not definite. (AII)
- IDSA Guidelines on LTCF (2009)[2]
  - 2. Infection should be suspected in LTCF residents with:
    - A. Decline in functional status, defined as new or increasing confusion, incontinence, falling, deteriorating mobility, reduced food intake or failure to cooperate with staff (BII)
  - 14. In residents with long-term indwelling urethral catheters, evaluation is indicated if there is suspected urosepsis (i.e. fever, shaking chills, hypotension, or delirium)…(AII)
- Loeb criteria – New or worsening onset delirium (in combination with elevated WBC count) still in criteria in patients with indwelling urinary catheters[3]

[1]ICHE 22(3), 2001. 167-175
[2]Clin Inf Dis 2009; 48:149-71
[3]CDC Guidance UTI in Long Term Care Facilities. Jan 2020

Rebuttal

- Mayne et al. meta-analysis concluded that all studies looking at the association of delirium and UTI were methodologically flawed.[1]
  - In fact that was the first statement in their discussion!
  - No accurate conclusion can be drawn between confusion and UTI
- And remember….
  - UTIs in the elderly are common
  - UTIs cause morbidity
  - UTIs cause mortality

[1]BMC Geriatrics (2019) 19:32.

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Thank You!

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Rebuttal

Table 1
Comparison of Criteria for Diagnosing and/or Treating Noncatheter-Related Urinary Tract Infection (UTI) in Long Term Care (LTC) Settings

	1991 McGeer[10]	2012 Stone (Updated McGeer)[11]	2005 Loeb Diagnostic[9]	2005 Loeb Treatment[9,†]
Intended Purpose of Criteria	Surveillance and Benchmarking	Surveillance and Benchmarking	Minimum Criteria for Ordering a Urine Culture	Minimal Criteria for Initiating Antimicrobials
Criteria	Resident has at least 3 of the following signs and symptoms: • Fever ≥38°C or chills • New or increased burning pain on urination, frequency, or urgency • New flank or suprapubic pain or tenderness • Change in character of the urine • Worsening of mental or functional status	Both criteria 1 and 2 must be met. 1. At least 1 of the following signs and symptoms: a. Dysuria OR acute pain, swelling, tenderness of the testes, epididymis, or prostate b. Fever* or leukocytosis AND at least 1 of the following: i. CVAT ii. Suprapubic pain iii. Gross hematuria iv. New or increased incontinence v. New or increased urgency vi. New or increased frequency c. If no fever or leukocytosis, then 2 or more of the following: i. Suprapubic pain ii. Gross hematuria iii. New or increased incontinence iv. New or increased urgency v. New or increased frequency 2. One of the following: a. ≥10^5 CFU/mL of no more than 2 organisms in a voided urine b. ≥10^2 CFU/mL of any number of organisms in an in/out catheter sample	Fever >37.9°C and 1 or more of the following, order a urine culture: • Dysuria • Urgency • Flank pain • Shaking chills • Urinary incontinence • Frequency • Gross hematuria • Suprapubic pain OR If no fever, order urine culture if there is new onset burning on urination, or 2 or more of the following: • Urgency • Flank pain • Shaking chills, • Urinary incontinence • Frequency • Gross hematuria • Suprapubic pain OR If fever >37.9°C but 2 or more symptoms of non-UTI infection, DO NOT ORDER A URINE	Positive urine culture (>10^5 CFU/mL) and dysuria, OR Positive urine culture (>10^5 CFU/mL) and 2 or more of the following: • Fever • Urgency • Flank pain • Urinary incontinence • Shaking chills • Frequency • Gross hematuria • Suprapubic pain

JAMDA 15 (2014) 133-139.