Care and Management of Urinary Tract Infections (UTIs) in Adults

2026 update

This Care Process Model developed by Intermountain's Antibiotic Stewardship Program, provides a concise, evidence-based approach to diagnosing and managing UTIs across care settings. It helps clinicians distinguish uncomplicated UTIs (limited to the bladder) from complicated infections (extending above the bladder) and supports appropriate treatment decisions while avoiding unnecessary antibiotics (e.g., asymptomatic bacteriuria). Recommendations incorporate current system antibiogram data and reflect the latest Infectious Diseases Society of America (IDSA) and American Urological Association (AUA) updates to improve patient outcomes and reduce antimicrobial resistance. This guideline does not address more complex urinary tract infections (e.g., hardware-associated, obstruction, nephrolithiasis, anatomic abnormalities,) For cases that fall outside the scope of this guideline or when uncertainty exists, consider seeking input from Urology or Infectious Disease.

Key Points

- UTI is a clinical diagnosis based on the presence of localized urinary tract symptoms (e.g., dysuria, frequency). Systemic symptoms should prompt consideration of UTI only when alternative etiologies have been reasonably excluded. Refer to the diagnostic algorithm on pg. 2 for testing guidance.
- Pyuria, with or without bacteriuria, is not sufficient to diagnose UTI, and it is frequently associated with non-infectious conditions (e.g., dehydration, nephrolithiasis, acute kidney injury, indwelling catheters). Absence of pyuria is often helpful in ruling out infection.
- Asymptomatic bacteriuria (ASB), defined as laboratory-confirmed bacteriuria in the absence of urinary symptoms, should not be treated with antibiotics except in specific clinical circumstances (e.g., pregnancy, prior to invasive urologic procedures). See ASB guideline and pg 6.
- Prophylactic antibiotics are not recommended for recurrent UTI. Refer to the prophylaxis section for preferred non-antibiotic prevention strategies.

New IDSA Classification of UTI

Uncomplicated UTI	**Infection confined to the bladder** in afebrile men or women
Complicated UTI	**Infection beyond the bladder** in women or men defined as: • Pyelonephritis • Febrile or bacteremic UTI • Catheter-associated (CAUTI) • Prostatitis

Under new IDSA definitions, the presence of diabetes, male sex, immunocompromised status, or postmenopausal status alone no longer meets criteria for complicated UTI.

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Goals

- Reduce urine testing in patients without symptoms of UTI
- Reduce antibiotic treatment of asymptomatic bacteriuria
- Duration of antibiotic therapy: standard treatment of 5 days unless otherwise indicated

Key Evidence

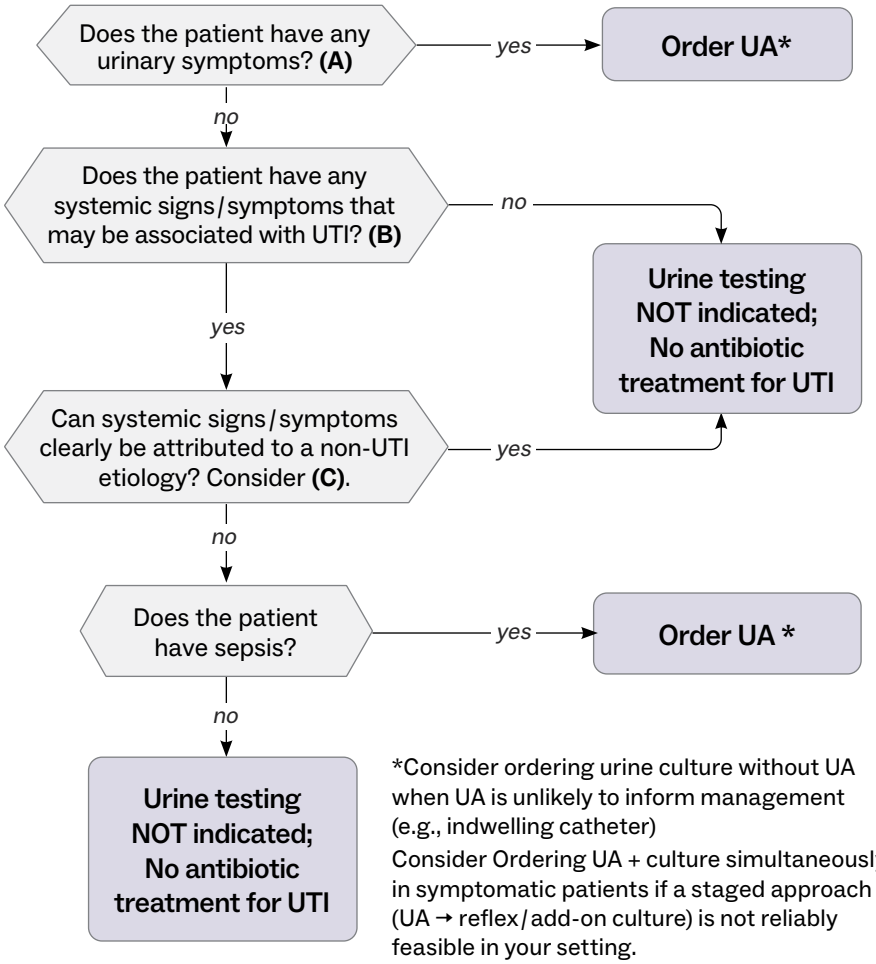
- Complicated UTI: Infectious Diseases Society of America. 2025
- WikiGuidelines Group consensus statement. JAMA Netw Open. 2024;7(11):e2444495.

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UTI Testing: When is it Clinically Indicated?

This algorithm is for adult patients who are not pregnant, and do not have a catheter or a renal transplant.
See page 7 for guidance for these and other special clinical circumstances



*Consider ordering urine culture without UA when UA is unlikely to inform management (e.g., indwelling catheter)

Consider Ordering UA + culture simultaneously in symptomatic patients if a staged approach (UA → reflex/add-on culture) is not reliably feasible in your setting.

(A) Urinary symptoms

- Dysuria
- Urgency
- Increased frequency
- New incontinence
- Suprapubic pain/pressure
- Hematuria
- Flank pain

Note: Dark, smelly, or cloudy urine is not a urinary symptom of UTI

(B) Nonspecific signs/symptoms that may be associated with UTI

- Fever
- Abdominal pain
- Nausea/vomiting
- Leukocytosis

Elderly patients may also exhibit

- Weakness
- Altered mental status

(C) Differential diagnoses for non-specific signs/symptoms include but are not limited to:

Abdominal pain: constipation, IBD, GERD, gastroenteritis, choleithiasis, pancreatitis

Weakness/dizziness: orthostasis, dehydration, medication effects, vertigo, hypoglycemia

In elderly patients also consider: dehydration, polypharmacy, CVA/TIA, anemia, uncontrolled pain, hypoxemia, hypothyroidism, depression

Interpreting Urinalysis Results

CHARACTERISTIC	CLINICAL CONSIDERATIONS
Negative UA	• Generally excludes UTI. Exceptions include: current/recent antibiotics, neutropenia, urinary obstruction or renal abscess.
Pyuria	• Consider pyuria positivity when ≥10 WBCs/high-power field or leukocyte esterase positive. • Use pyuria to support a diagnosis of UTI only when urinary symptoms are present. Do not use pyuria alone to diagnose UTI in the absence of urinary symptoms. • Pyuria can also result from non-infectious causes such as dehydration, renal failure, urologic procedures, kidney stones, or catheters.
Nitrites	• Nitrite-positive results with urinary symptoms and pyuria support diagnosis of UTI. • Negative nitrite results do not rule out UTI, particularly if infectious agent is a non-nitrate-reducing organism or has had a short incubation time in the bladder.
Bacteria	• Bacteria in visual field during microscopy does not confirm or rule out UTI.
When to consider contamination	• Microscopy shows >5 squamous epithelial cells per high-power field.

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Interpreting Urine Culture Results

CHARACTERISTIC	CLINICAL CONSIDERATIONS
Positive urine culture	• Typical threshold limits for significance are >100 K CFU / mL clean catch. • Positive urine culture in presence of urinary symptoms supports diagnosis of UTI. • Positive urine culture without symptoms should not be treated; exceptions include pregnancy, and prior to urological procedures. See full guideline on Asymptomatic Bacteriuria for details.
Negative urine culture	• Negative urinary culture without pyuria makes UTI unlikely.
Staphylococcus aureus	• S. aureus is not a common cause of primary UTI. • If S. aureus isolated, assess for bacteremia or deep-seated infection. This is especially true if persistent or recurring infection or in men with prostate symptoms.
Limitations of urine culture	• Urine samples can be contaminated by skin or vaginal flora during collection. • Bacterial colonization (without infection) is common in elderly adults, diabetic women, and in those with long-term catheterization.
When to consider contamination	• Low bacterial numbers (<10 k CFU / mL) • Mixed culture (≥3 species cultured at >10 k CFU / mL) • Identification of common contaminants including: – *Candida spp.* – *Lactobacillus spp.* – Diphtheroids (except *Corynebacterium urealyticum*) – Viridans group streptococcus – *Micrococcus spp.* – *Bacillus spp.* – *Staphylococcus spp.* (except *S. aureus* and *S. saprophyticus*)
Culture Notes	• Avoid automatic reflex urine cultures after UA unless you are unable to follow up on UA results (e.g. in clinic setting). Order cultures based on clinical context / symptoms. • Do not repeat urine cultures after treatment to confirm clearance unless symptoms persist or recur.

Making a Diagnosis

UTI is a clinical diagnosis. Laboratory findings alone are not sufficient to diagnose a UTI in the absence of urinary symptoms. Abnormal UA results may reflect colonization, specimen contamination, or non-infectious causes of pyuria.

Classification of UTI as uncomplicated or complicated is based on the anatomic location of infection; uncomplicated (confined to bladder) and complicated (spread beyond bladder).

DIAGNOSIS	DESCRIPTION
Uncomplicated UTI	• **Infection confined to the bladder. (cystitis)** • Often indicated by urinary symptoms WITHOUT signs of spread such as fever, flank pain, systemic signs of infection, or costovertebral angle tenderness. • Risk scores such as the Acute Cystitis Symptoms Score can aid with diagnosis. • Cystitis mimics include vaginitis, atrophic vaginitis, sexually transmitted infections, malignancy, interstitial cystitis, overactive bladder, irritant contact dermatitis, stricture, and bladder diverticulum. • Under new IDSA definitions, the presence of diabetes, male sex, immunocompromised status, or postmenopausal status alone does not meet criteria for complicated UTI.
Complicated UTI	• **Infection beyond the bladder** including: pyelonephritis, febrile or bacteremic UTI, CAUTI, or prostatitis. • This is often indicated by urinary symptoms WITH signs of spread such as fever, flank pain, systemic signs of infection, or costovertebral angle tenderness.
Asymptomatic Bacteriuria (ASB)	• **Positive urinary culture WITHOUT urinary or systemic infection symptoms.** • Treatment of ASB is harmful and offers no benefit except in select circumstances (e.g. pregnancy, prior to urological procedures). See Asymptomatic Bacteriuria guideline for details and pg 6 for documentation guidance and tips for talking with patients.

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Choosing Empiric Antibiotic Treatment

ANTIBIOTIC	DOSE	DURATION	*E. coli* susceptibility*	NOTES
Uncomplicated UTI (cystitis)				
nitrofurantoin monohydrate (Macrobid)	100 mg PO BID	5 days	92–99%	• First-line agent for cystitis (↑efficacy and ↓resistance) • Active against most ESBL *E. coli* isolates. • Do NOT use for CrCl < 30 mL/min. • Do NOT use for pyelonephritis, febrile UTI, or prostatitis.
cephalexin	500 mg PO TID	5 days	77–90%	• 500 mg BID dosing is reasonable for healthy females. • Less resistance but higher relapse rate. • Do NOT use for prostatitis.
trimethoprim/ sulfamethoxazole (Bactrim double strength)	1 DS tablet (160 mg/800 mg) PO BID	5 days	67–85%	• Effective when susceptible, but resistance is common. • In healthy females, consider a 3-day course.
ciprofloxacin (alternative)	500 mg PO BID	5 days	63–84%	• Effective but higher risk of adverse effects (FDA black-box warnings; use an alternative agent if possible). • Use only if history of multidrug-resistant organisms or unable to use alternatives. • In healthy females, consider a 3-day course.
oral fosfomycin (alternative)	3g (mixed in water) PO	Q48h x 2 doses	N/A	• Active against most ESBL *E. coli, Proteus, Citrobacter*, and *Enterococcus spp.* • Limited/no activity in *Klebsiella spp., P. aeruginosa, M. morganii,* or *A. baumannii.* • Less effective than nitrofurantoin for cystitis. • Do not use for pyelonephritis. • Requires sending out for susceptibility testing. • Higher cost (roughly $30–$70 per dose). • In healthy females, consider a single dose 3g x1 PO.
Complicated UTI (pyelonephritis, febrile)				
ceftriaxone or ertapenem single IV dose followed by one of the following:				
cephalexin	500 mg PO QID	7 days**	77–90%	• Increase to 1 g PO QID for bacteremia or obesity. • Less resistance but higher relapse rate.
trimethoprim/ sulfamethoxazole (Bactrim double strength)	1 DS tablet (160 mg/800 mg) PO BID	7 days**	67–85%	• Effective when susceptible, but resistance is common. • Consider using 2 DS tabs BID for morbid obesity.
ciprofloxacin	500 mg PO BID	5–7 days**	63–84%	• Increase to 750 mg PO BID for bacteremia (alternative: levofloxacin 750 mg daily).

*Based on Intermountain Health system averages. For city or county-specific antibiograms in the Intermountain Health footprint go to https://intermountainhealthcare.org/for-professionals/antimicrobial-stewardship and scroll down to the bottom of page to see local antibiograms. Each patient's individual urine culture history should also be considered when choosing empiric therapy.

**Longer duration is likely needed for complicating factors such as kidney/ureteral stones, ureteral stent/nephrostomy tube, or renal abscess.

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What to Do When Culture Results Return

Patient is improving	Patient is NOT improving
Organism tests RESISTANT to antibiotic	**Organism tests RESISTANT to antibiotic**
• Consider completing current antibiotic course with close follow-up; some patients respond to therapy despite reported resistance. • Consider adjusting antibiotic therapy based on culture and susceptibility results, especially if patient's symptoms are partially improved, but not completely resolved. • Consider alternative diagnoses.	Adjust antibiotic therapy based on culture and susceptibility results.
Organism tests SUSCEPTIBLE to antibiotic	**Organism tests SUSCEPTIBLE to antibiotic**
Complete current antibiotic regimen.	• Consider cystitis mimics (vaginitis, STIs, malignancy, interstitial cystitis, overactive bladder, irritant contact dermatitis, urethral stricture, bladder diverticulum, prostatitis). • Repeat urine culture. • In the interim, if cystitis mimics ruled out, adjust antibiotic therapy based on culture and susceptibility results.

Targeting Drug-Resistant Pathogens

URINE CULTURE RESULT	FIRST-LINE (if susceptible)	SECOND-LINE (if susceptible)	THIRD-LINE (if susceptible)
Yeast	Yeast isolation in urine cultures is typically contamination/colonization. IF patient is asymptomatic, antifungals are not recommended. Remove or change indwelling catheters if present.	If suspect true fungal cystitis (e.g. after multiple positive cultures), consider fluconazole 200 mg PO daily for 7–14 days for *C. albicans.* If symptoms persist despite antifungals, evaluate for fungal ball, prostatitis, or systemic fungal infection. Contact infectious disease specialist for treatment of other species or fungal infections beyond the bladder.	
Enterococcus faecalis OR ***Enterococcus faecium***	amoxicillin 500–1,000 mg PO TID for 5–7 days (including for VRE and ampicillin resistance)	nitrofurantoin 100 mg PO BID for 7 days (cystitis only) **OR** fosfomycin* 3 g PO 1x (cystitis only)	linezolid 600 mg orally two times per day for 5 – 7 days
Gram-negative extended spectrum beta-lactamase (ESBL)	nitrofurantoin 100 mg PO BID for 5 days (cystitis only) **OR** trimethoprim/sulfamethoxazole DS (160 mg TMP/ 800 mg SMX) PO BID for 5–7 days **OR** ciprofloxacin 500 mg PO BID for 3 – 7 days	fosfomycin* 3 g PO q48 hrs 2 x (cystitis only); consider 1x dose in healthy females	ertapenem 1 g IV daily for 5 – 7 days OR aminoglycoside 1 dose (cystitis only)

Notes

- Check patient allergies and relevant contraindications prior to prescribing. Move to next-line treatment option if the first- or second- line options are not appropriate.
- If the organism is not susceptible to any listed agent, or the patient cannot tolerate these options, contact your Antimicrobial Stewardship pharmacist for guidance.

*For recurrent cystitis: If renal function > 50 ml / min, give 3 g every 48 hours for 6 days (3 total doses). If renal function is 10 – 50 ml / min, give 3 g every 72 hours for 9 days (a total of 3 doses). Fosfomycin susceptibility is not routinely tested and must be requested. It has high activity against *E. coli, P. mirabilis,* and *Citrobacter* spp., allowing empiric use for cystitis despite delayed results; request susceptibilities for recurrent cases. It has limited to no activity against *M. morganii, P. aeruginosa,* and *A. baumannii.*

**In the setting of *Enterococcus spp.* isolated in complicated or upper-tract infections (such as catheter-associated infections or pyelonephritis) or patients with severe penicillin allergies, contact your antimicrobial stewardship or clinical pharmacist for antimicrobial recommendations.

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Choosing UTI Prophylaxis

Avoid prophylactic antibiotics in adults given the lack of efficacy and risk of antibiotic resistance.

Pharmacotherapy Prophylaxis	
Vaginal estrogen therapy	• Vaginal estrogen therapy is effective at reducing UTIs in peri-/post-menopausal women. • Limited data available comparing one formulation to another.
Methenamine hippurate	• 1000 mg PO twice daily may reduce the risk of recurrent UTIs. • Use caution in patients with renal or hepatic dysfunction due to accumulation of formaldehyde and ammonia metabolites. • Long-term safety data are lacking.
Adjunct Prophylaxis (OTC)	
Cranberry products	• Evidence is mixed and dosing is variable. No standard dose is established. • Limited data is available in elderly patients and those with bladder dysfunction.
D-mannose	• Limited data to support or refute use in preventing UTIs. • Standard dose is 2000 mg/day. • A sugar that may interfere with bacterial adherence to bladder wall.

Documentation and Counseling Patients: Asymptomatic Bacteriuria

Chart documentation suggestion:

Positive urinalysis/urine culture noted. Patient denies dysuria, new urgency or frequency, suprapubic pain, flank pain, fever, chills, or systemic symptoms. Findings are consistent with asymptomatic bacteriuria. Antibiotics are not recommended at this time. Patient counseled on symptoms that should prompt reevaluation.

Patient counseling scripts:

"Your urine test shows bacteria, but you don't have symptoms. This is common and usually does not need antibiotics."

"A true UTI means bacteria and symptoms, like burning, needing to go often, pain, or fever."

"Antibiotics would not help now and can cause harm, like side effects or harder-to-treat infections later."

"We are not ignoring this. We will watch for symptoms and check again if needed."

"Please call us if you have burning, more urgency or frequency, pain, fever, chills, back pain, vomiting, or feel very sick."

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Special Clinical Circumstances

POPULATION	NOTES
Sexually Transmitted Infections (STIs)	• Always assess STI risk when evaluating patients with UTI symptoms as STIs. Chlamydia, gonorrhea, and trichomoniasis particularly, can mimic UTI symptoms. • A positive UA or urine culture does not exclude an STI. Consider vaginal swabs or NAAT testing when symptoms are atypical, recurrent, or unclear. • Consider STI testing in patients with persistent genitourinary symptoms and a negative UA. A negative UA does not rule out an STI.
Gram-negative bacteremia	• Gram-negative bacteremia commonly arises from ascending urinary tract infection. • Short-course therapy (7 total days) is generally sufficient when adequate source control is achieved and the patient demonstrates early clinical stability. • Oral step-down therapy is appropriate once the patient is stable and the blood isolate is susceptible to a high-bioavailability oral agent (e.g. fluoroquinolones, trimethoprim-sulfamethoxazole (TMP-SMX), appropriately dosed oral beta-lactams.) • *Gram-Negative Bloodstream Infection: Adult criteria for short course (7 days) and/or oral stepdown antibiotic therapy* guideline
Prostatitis	• Assess for obstructive urinary symptoms. New difficulty starting urination, weak stream, or retention should raise concern for acute prostatitis. • If fever plus irritative voiding symptoms, consider a digital rectal exam and/or imaging to evaluate. Prostatitis requires antibiotics with good prostatic penetration (e.g., fluoroquinolones or TMP-SMX) for longer durations. • Prostate tenderness strongly supports the diagnosis, but absence does not exclude it, particularly when irritative and obstructive symptoms have an abrupt onset. • Consider acute prostatitis even with negative urinalysis or culture. New irritative voiding symptoms in men with a negative UA should prompt consideration of acute prostatitis versus noninfectious lower urinary tract symptoms. Diagnosis is primarily clinical, as urine cultures may be negative.
Catheter-associated urinary tract infection (CAUTI)	• Do not order urine cultures unless clinically indicated, such as when localizing urinary symptoms or systemic signs of infection are present. • Changes in urine appearance (color, odor, sediment, or turbidity) are not signs of infection and should not prompt culturing or treatment without symptoms. • Duration of antibiotic treatment in CAUTI: 5–7 days. • Assume colonization with prolonged catheterization. The risk of bacteriuria increases by approximately 5–10% per day that a catheter remains in place. • In patients with a long-term indwelling catheter (>2 days) who require urine culture for clinical reasons, replace the catheter prior to urine collection to obtain a fresh specimen.
Renal Transplant	• Treat symptomatic UTIs promptly, especially in the first 6 months post-transplant. • Limit ASB treatment to the first month post-transplant, unless specific indications exist. • Follow individualized risk-based decisions for prophylaxis and recurrent UTI management.
Pregnancy	• Screen for ASB in all pregnant patients. Urine culture is the gold standard for diagnosis. • Treat ASB during pregnancy. Unlike non-pregnant individuals, treatment in pregnancy reduces the risk of complications that impact the fetus. • First-line treatment options for uncomplicated UTI or ASB in pregnancy: – Nitrofurantoin 100 mg PO every 12 hours for 5 days – Cephalexin 500 mg PO every 8 hours for 5 days – Amoxicillin/clavulanate 875 mg PO every 12 hours for 5 days – Fosfomycin 3 g PO as a single dose Refer to the *Antimicrobials in Pregnancy and Lactation* guideline for additional details.

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ASB – Asymptomatic bacteriuria, AUA – American Urological Association, BID – Twice daily, CAUTI – Catheter-associated urinary tract infection, CFU – Colony-forming units, CPM – Care Process Model, CrCl – Creatinine clearance, CVA – Cerebrovascular accident, DS – Double strength, ESBL – Extended-spectrum beta-lactamase, FDA – Food and Drug Administration, GERD – Gastroesophageal reflux disease, HIV – Human immunodeficiency virus, IBD – Inflammatory bowel disease, IDSA – Infectious Diseases Society of America, IV – Intravenous, NAAT – Nucleic acid amplification test, PO – By mouth (oral administration), Q48h – Every 48 hours, QID – Four times daily, TIA – Transient ischemic attack, TID – Three times daily, TMP-SMX – Trimethoprim-sulfamethoxazole, UA – Urinalysis, UTI – Urinary tract infection, WBC – White blood cell

This CPM presents a model of best care based on the best available scientific evidence at the time of publication. It is not a prescription for every physician or every patient, nor does it replace clinical judgment. All statements, protocols, and recommendations herein are viewed as transitory and iterative. Although physicians are encouraged to follow the CPM to help focus on and measure quality, deviations are a means for discovering improvements in patient care and expanding the knowledge base. Send feedback to Whitney Buckel PharmD, Intermountain Health; Antimicrobial Stewardship Program Manager (Whitney.Buckel@imail.org) or Payal Patel, MD MPH; Intermountain Health, Medical Director of Antimicrobial Stewardship (Payal.Patel@imail.org).

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