Recurrent Uncomplicated Urinary Tract Infections in Women: AUA/CUA/SUFU Guideline (2022)

Adrienne Carmack, MD, IFMCP MAVEN Project June 12, 2025

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MAVEN PROJECT

Objectives

- Describe how to diagnose UTI
- Defer antibiotic therapy when not appropriate
- Discuss the risks and benefits of antibiotic treatment with patients and have alternatives to offer them


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2022 Guidelines

01. Guidelines overview

02. 2022 changes

03. Walk through the algorithm

04. Summary

Guidelines Overview

Panel

- 14 academic urologists; 1 patient advocate
- About half female
- Joint effort of
  - American Urological Association (AUA)
  - Canadian Urological Association (CUA)
  - Society of Urodynamics, Female Pelvic Medicine & Urogenital Reconstruction (SUFU)

Methodology

- Systematic literature review
- 2019 Guideline: 1946 to 2018
- 2022: Updated with new studies published since
- Peer review performed by 50 reviewers, including “experts,” AUA members, and patients

Guidelines Overview

Recommendation certainty

- Strong
  - Net benefit or harm is substantial
- Moderate
  - Net benefit or harm is moderate
- Conditional
  - No apparent net benefit or harm, or balance is unclear

Strength of evidence

- All grades apply to most patients in most circumstances
  - If conditional, best action depends on patient
- Grade A
  - Future research *unlikely* to change confidence
- Grade B
  - Better evidence *could* change confidence
- Grade C
  - Better evidence *likely* to change confidence

Gaps in evidence

- Clinical principles
  - Widely agreed upon by urologists
- Expert opinions
  - Based on panel members' training, experience, knowledge, and judgment
- Consensus-based when opinions differed

2022 Changes

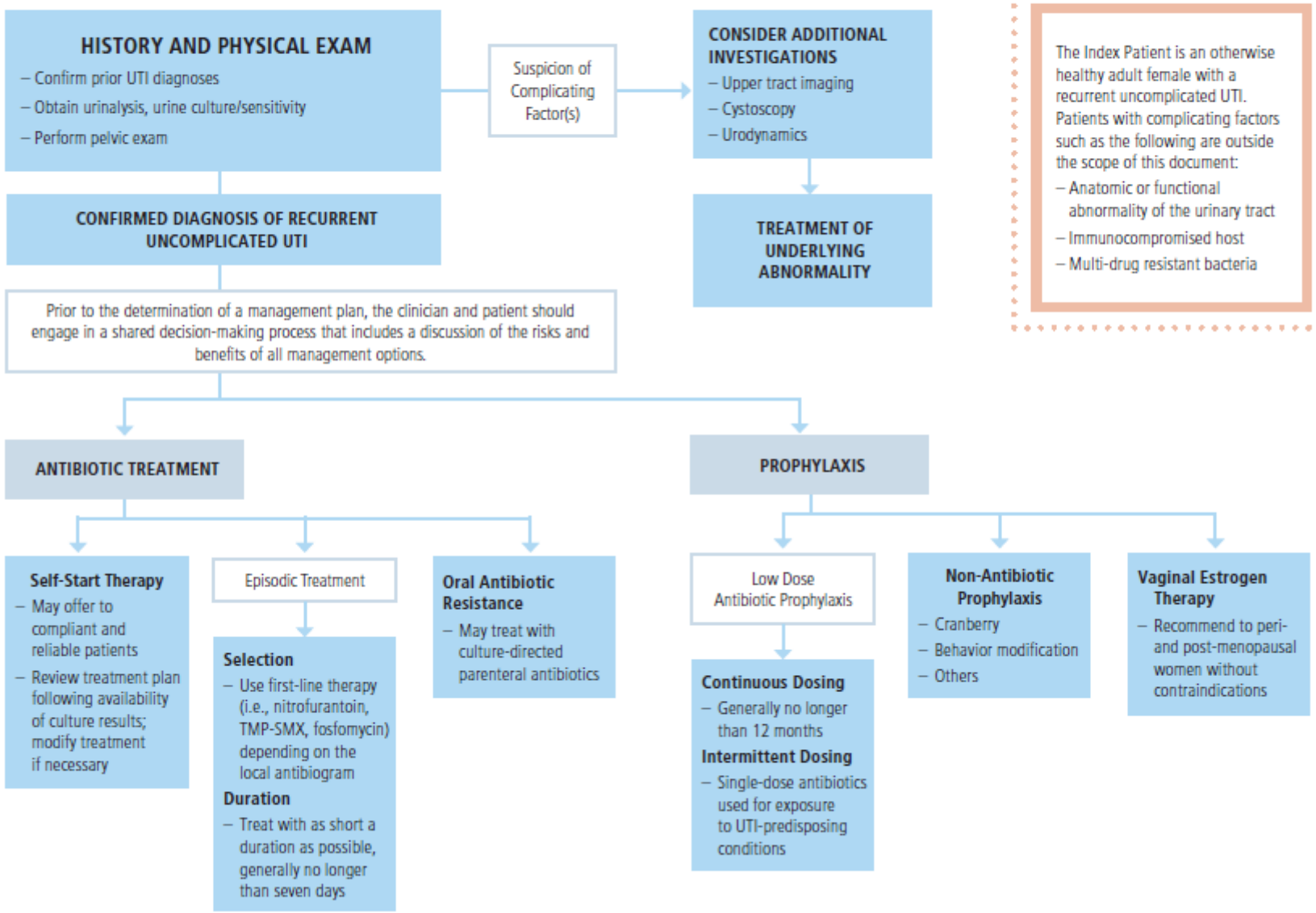
New insights

- Pathophysiology of rUTI
- Appreciation of adverse effects of repetitive antimicrobial therapy
- Rising antimicrobial resistance
- Better reporting of natural history and clinical outcomes

Goals

- Prevent inappropriate use of antibiotics
- Decrease risk of antibiotic resistance
- Reduce adverse effects of antibiotic use
- Provide guidance on non-antibiotic strategies for prevention
- Improve outcomes and QoL by reducing recurrence

Recurrent Uncomplicted Urinary Tract Infections in Women: AUA/CUA/SUFU Diagnosis & Treatment Algorithm



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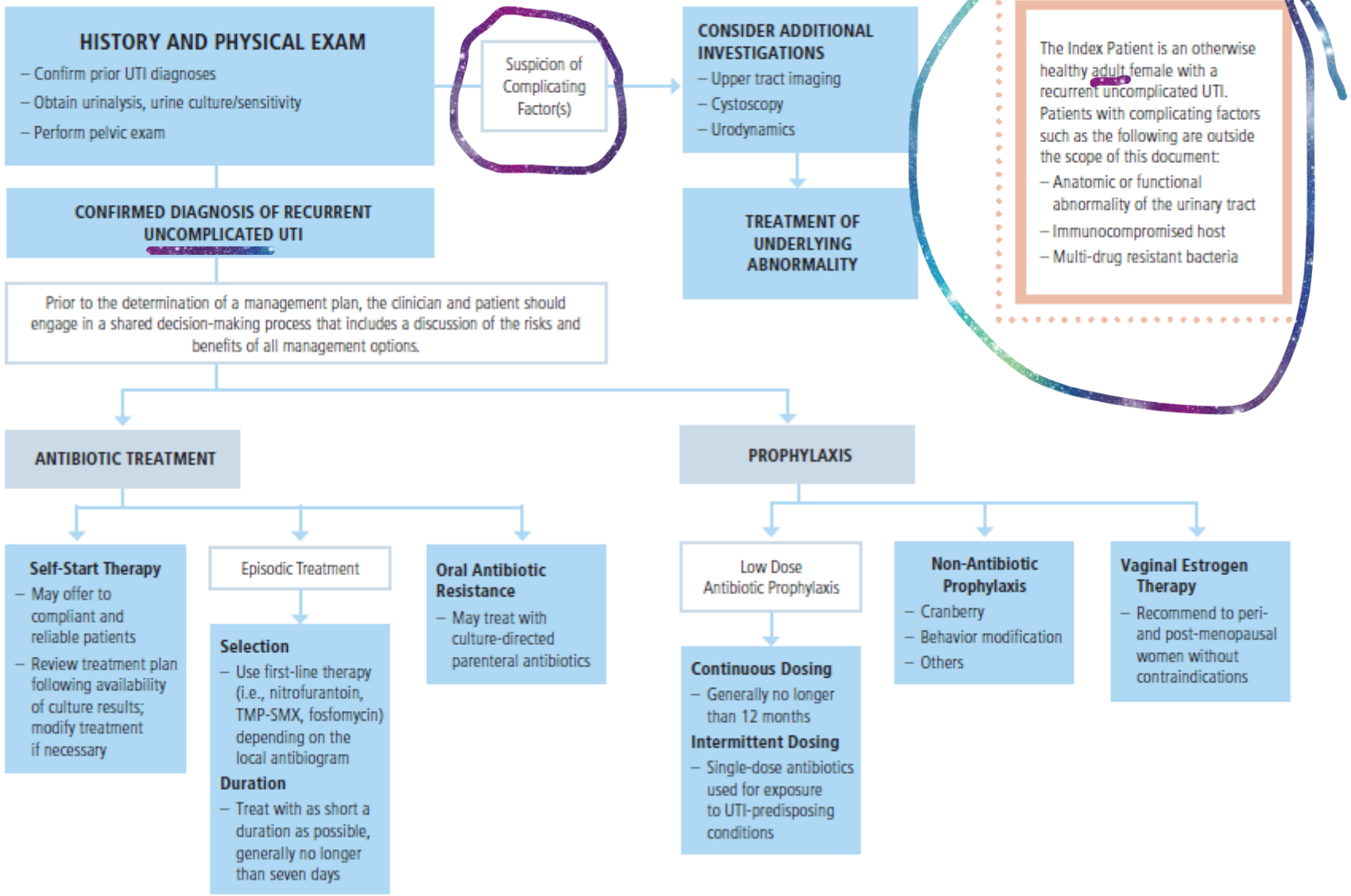

Uncomplicated UTI in Women

Define “uncomplicated”

- Female
- Cystitis only
  - NO systemic bacteremia signs/symptoms, such as fever or flank pain
- Adult
- Healthy
- Bacterial

Does not apply to women with

- Pregnancy
- Immunocompromise
- Anatomic or functional abnormalities of the urinary tract
  - Need to cath
  - Peripheral neuropathy, diabetes, spinal cord injury
- MDR bacteria
- Basically, no known factors that make a woman more susceptible to UTI

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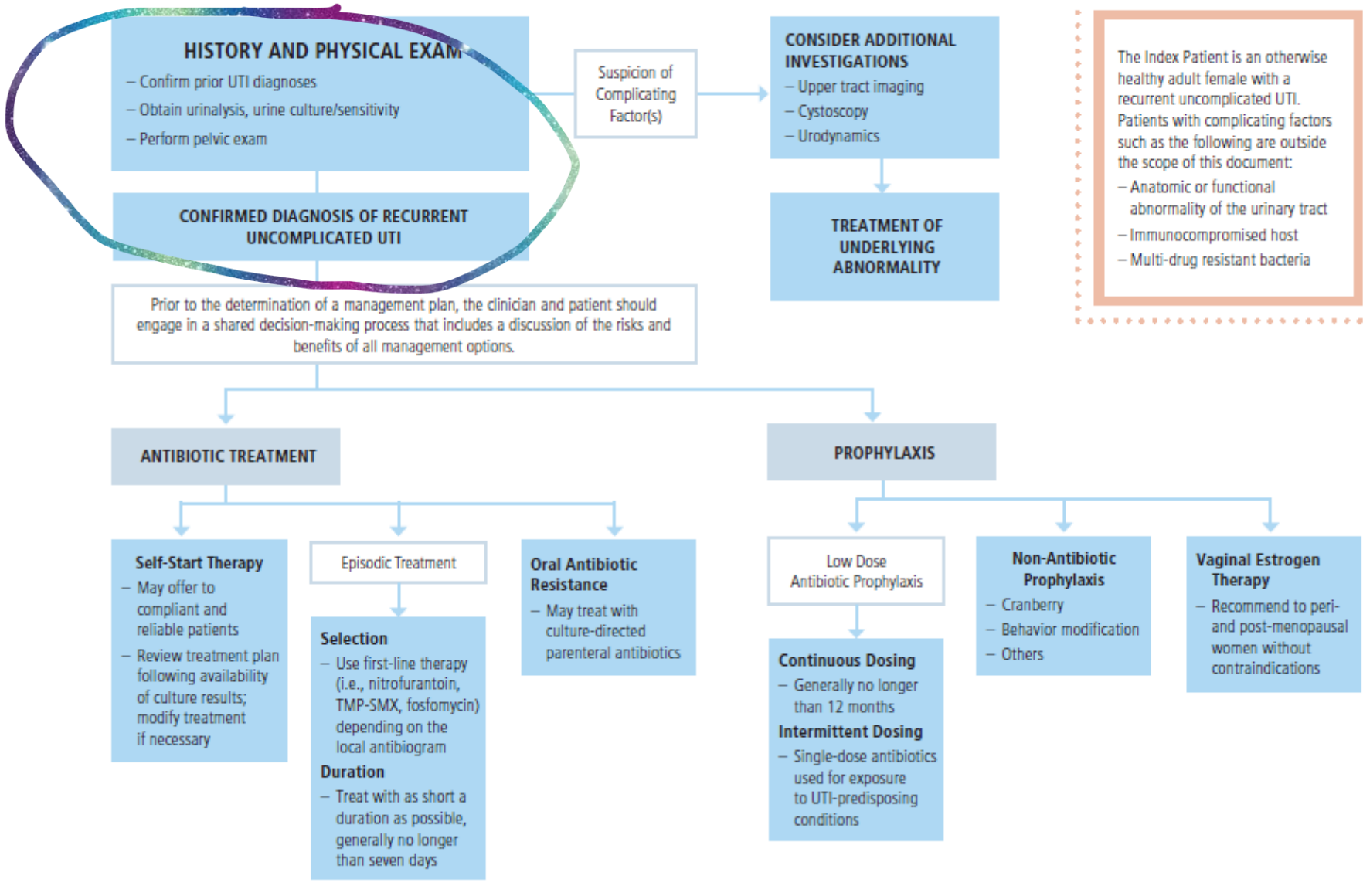

Diagnosing Recurrent UTI

UTI

- Culture-proven acute bacterial cystitis and associated symptoms
- Lab evidence of significant bacteriuria
- Acute-onset symptoms in the urinary tract
  - *NOT asymptomatic bacteriuria*

Recurrent

- 2 episodes in 6 months OR 3 in 1 year
- Separate infections with resolution of symptoms between episodes
- Does not count if due to failure to respond to inappropriate initial or empiric treatment
- *Patients who recur within 2 weeks of treatment or have bacterial persistence without symptom resolution despite treatment are complicated and may need work-up*

Diagnosing Recurrent UTI

Symptoms

- Acute-onset dysuria is the most specific – 90% accuracy (in the absence of vaginal discharge or irritation)
- Increased urgency and frequency
- Hematuria
- New or worsening incontinence

Treatment

- Reserve treatment for acute-onset (<1 week) dysuria or fever with other specific UTI-associated symptoms and signs
  - Gross hematuria
  - New or worsening urgency, frequency, and/or incontinence
  - Suprapubic pain

Diagnosing Recurrent UTI

Culture

- Must be diagnosed with culture
- Urinalysis does not improve diagnostic accuracy
- If **high** suspicion of UTI, $>10^2$ CFU/mL of a **single** uropathogen is appropriate cut-off (88-93% PPV)

- Not all bacteria in the urine are pathogenic

Uropathogens

- *E. coli* by far most common (75-95%)
- Enterobacteriaceae
- *P. mirabilis*
- *K. pneumoniae*
- *S. saprophyticus*
- Others are rare

Diagnosing Recurrent UTI

Diligent Culturing

- Obtaining cultures for **each** symptomatic episode
  - Reduces overtreatment
  - Aids appropriate antibiotic selection
  - Reduces need for further treatment due to inappropriate empiric therapy
  - Minimizes collateral damage

Collateral Damage

- Altering normal gut microbiome helps select drug-resistant organisms & promotes their colonization/infection
- Note *E. coli* is usually susceptible to nitrofurantoin, fosfomycin, and methicillin
  - These have minimal effects on gut microbiome
- TMP-SMX and fluoroquinolones alter fecal flora and promote antimicrobial resistance

Diagnosing Recurrent UTI

Clinicians should obtain repeat urine studies when an initial urine specimen is suspect for contamination, with consideration for obtaining a catheterized specimen. (Clinical Principle)

- Likely to be contaminants
  - Lactobacilli
  - Group B Streptococci
  - Corynebacteria
  - Non-saprophyticus coag-negative Staphylococci
- Spread the labia
- Prep meatus with antiseptic wipe
- Don’t touch cup to skin/vagina
- Only catch midstream, not initial void
- Mid-stream urine is normally adequate
  - If collected properly, should be <1% contamination rate
- Main source of contamination is post-collection processing!
  - Samples should not sit at room temp for more than 30 minutes
  - Transport to lab or refrigerate immediately
  - Discourage bringing samples from home
- Consider cath if atrophic vaginitis, morbid obesity, wheelchair-bound

History

Clinicians should obtain a complete patient history and perform a pelvic examination in women presenting with rUTIs. (Clinical Principle)

- LUTS
  - Dysuria, frequency, urgency, nocturia, incontinence, hematuria, pneumaturia, fecaluria
- Bowel symptoms
  - Diarrhea, bowel leakage, constipation
- Recent use of antibiotics
  - Hx of abx-related problems (such as *C. diff*)
  - Abx allergies/sensitivities
- Back or flank pain
- Catheter usage
- Vaginal discharge or irritation
- Menopausal status
- Post-coital UTI
- Contraceptive method, including use of spermicides
- Use of estrogen- or progesterone-containing products
- Travel history
- Prior urinary tract or pelvic surgery
- Long work hours
- GU sx between infections
  - #voids/day, sensation, straining, incomplete emptying, pelvic pressure, vaginal bulge, dysuria, dyspareunia, pelvic pain
- UTI history – frequency, abx usage, positive cultures
- Risk factors for complicated UTI
- What patient considers UTI sx
- Relationship to triggers such as sex, travel, long work/walk, diarrhea, constipation
- Responses to treatment
- Relationship to hormones (menstruation, menopause, exogenous hormones)
- Concomitant medications including antimicrobials, immunosuppressants, spermicides

Physical

Clinicians should obtain a complete patient history and perform a pelvic examination in women presenting with rUTIs. (Clinical Principle)

- Abdominal
- Focused neurologic exam
- Evaluation for incomplete bladder emptying (PVR)
- Pelvic
  - Pelvic support for bladder, urethra, vagina, rectum
  - Bladder/urethra palpation for urethritis, diverticulum, Skene's gland cyst, vulvar or vaginal cysts
  - Vaginitis, vulvar dermatitis, vaginal atrophy
  - Pelvic floor musculature check for tone, tenderness, trigger points

Differential Diagnosis

To make a diagnosis of rUTI, clinicians must document positive urine cultures associated with prior symptomatic episodes. (Clinical Principle)

- Interstitial cystitis/bladder pain syndrome
- OAB
- GU syndrome of menopause
- Urinary calculi
- Bacterial or fungal vaginitis
- Vulvar dermatitis

- Non-infectious vulvovestibulitis
- Vulvodynia
- Hypertonic pelvic floor muscle dysfunction
- *Carcinoma in situ* of the bladder

- These can coexist with cystitis

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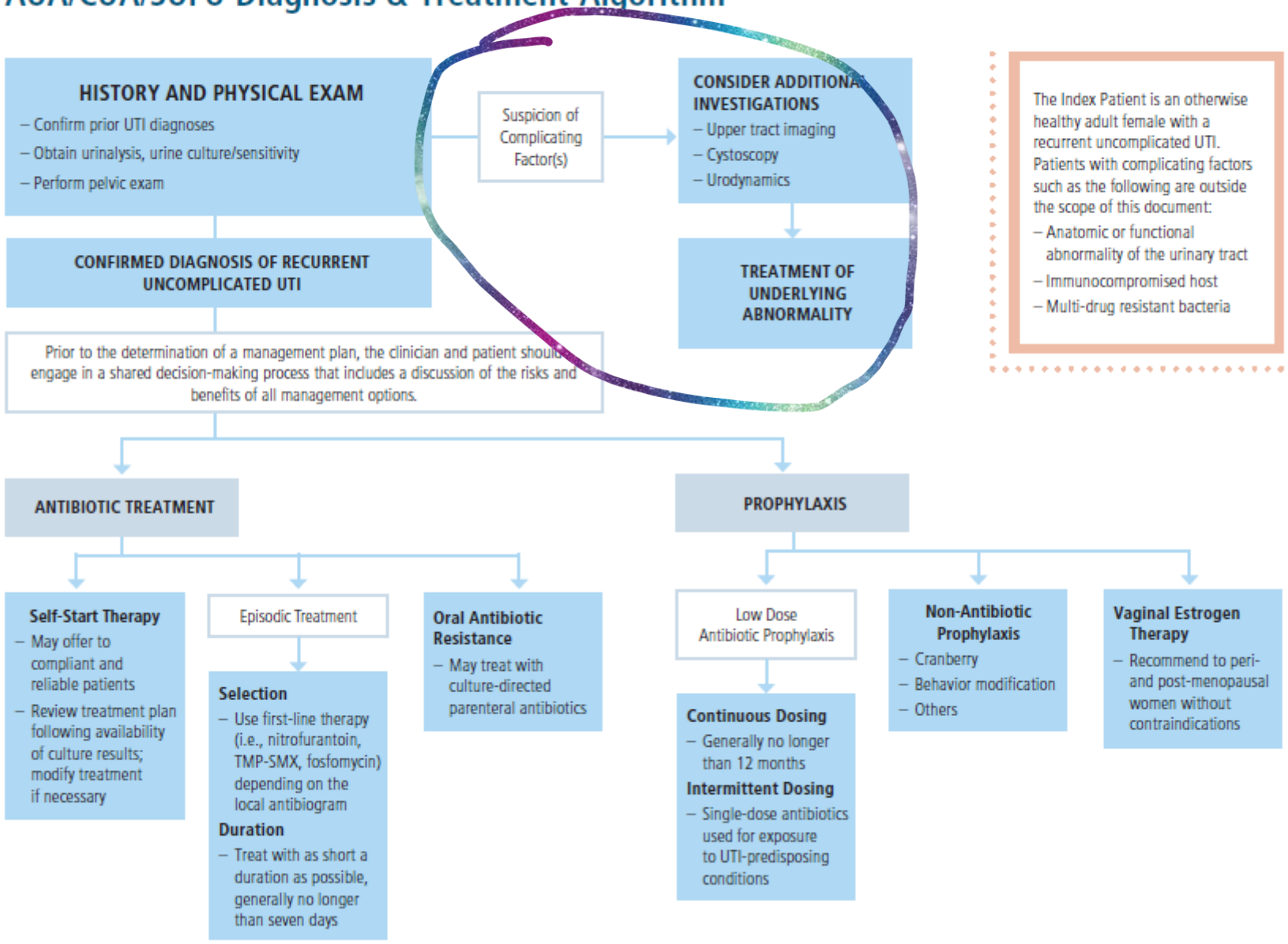

The Index Patient is an otherwise healthy adult female with a recurrent uncomplicated UTI. Patients with complicating factors such as the following are outside the scope of this document:

– Anatomic or functional abnormality of the urinary tract
– Immunocompromised host
– Multi-drug resistant bacteria

Work-up?

Cystoscopy and upper tract imaging should not be routinely obtained in the index patient presenting with a rUTI. (Expert Opinion)

- If a patient doesn't respond appropriately to treatment, they are considered to have a complicated UTI and work-up is appropriate
- Women with **gross** hematuria and a positive urine culture do not require cysto unless >40, smoker, or high environmental risk
- Upper tract imaging recommended if pyelonephritis, history of gross hematuria, persistent microhematuria, or renal calculi

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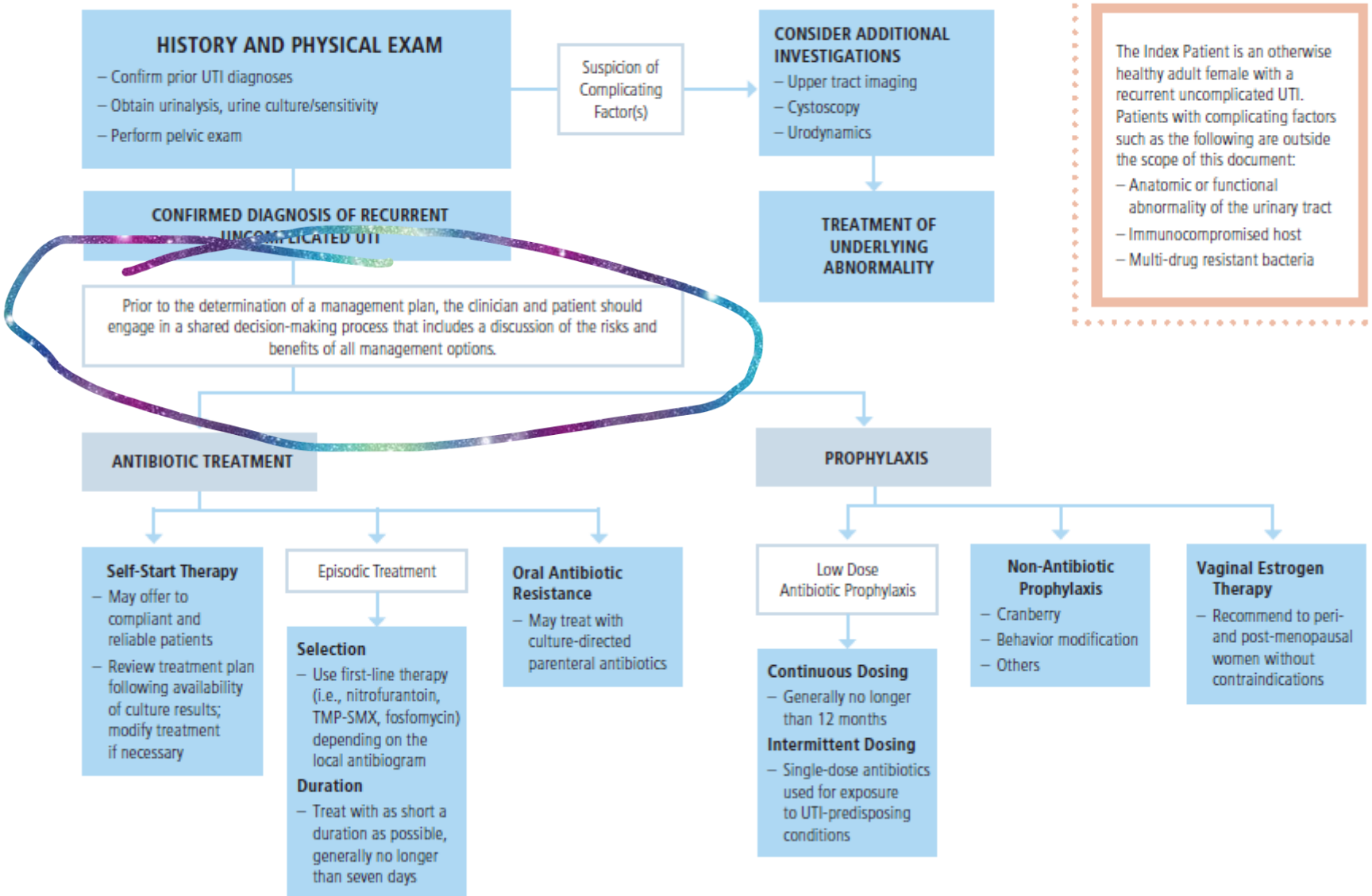

Risks of Treatment

Continued intermittent courses of antibiotics

- Adverse events
  - Allergic reactions
  - Organ toxicities
  - Future infection with resistant organisms
  - *C. difficile* infections
- Avoid unnecessary treatment

Asymptomatic bacteriuria (ASB)

- Treatment of ASB compared to placebo associated with
  - Higher antibiotic resistance
  - Higher incidence of pyelonephritis
  - Poorer QoL
  - More symptomatic cystitis episodes

Risks of No Treatment

Uncomplicated acute cystitis

- Minimal risk of progression to tissue invasion or pyelonephritis
- Does not increase risk of urosepsis
- Only mildly faster symptom improvement compared to placebo per multiple RCTs
- In other words, it is safe to defer treatment with antibiotics and manage with supportive care (analgesics and hydration*) while awaiting culture results
  - *and maybe other things

Shared decision-making

- Many women elect supportive care when they understand the risks of antibiotics
- Discuss diagnostic inaccuracies, benefits and risks of antimicrobials, and alternatives to standard antibiotics
- Acute cystitis is often self-limited and rarely progresses
- Goals of care: amelioration of symptoms, prevention of long-term complications, & judicious use of antibiotics

Treatment Alternatives & Adjuncts

Modifiable behaviors

- Changing contraception (barriers and spermicides increase UTI)
- Increasing water intake (>1.5L/day)
  - *and maybe other things

What doesn't seem to matter

- Front to back wiping
- Pre- and post-coital voiding
- Hot tubs
- Tampons
- Douching

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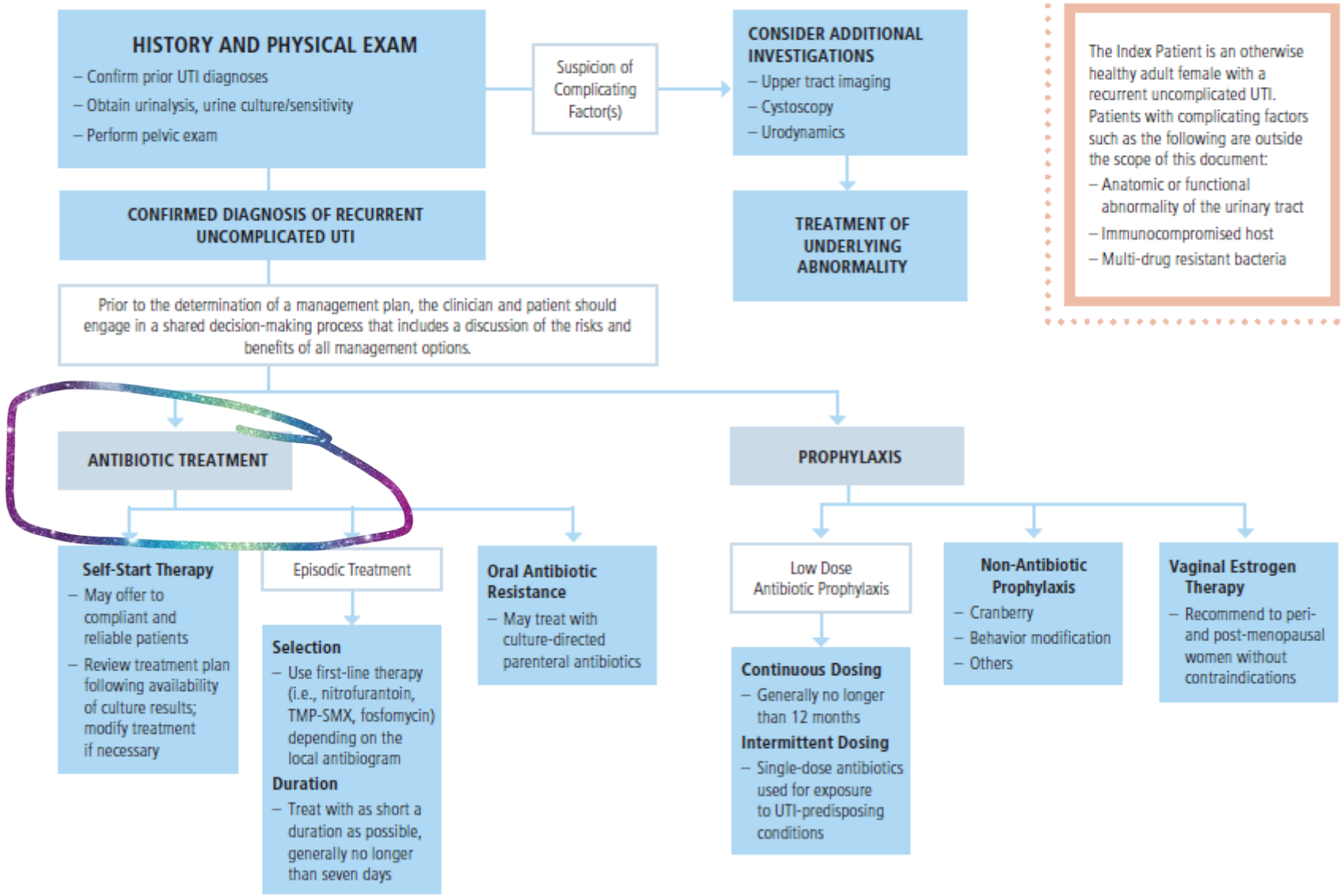

Treatment

Clinicians should obtain urinalysis, urine culture and sensitivity with each symptomatic acute cystitis episode prior to initiating treatment in patients with rUTIs. (Moderate; Grade C)

- In select patients, presumptive treatment can be initiated based on prior speciation, susceptibilities, and antibiogram.
- Shared decision-making regarding deferring therapy until culture results is recommended.
- Urinary analgesics and hydration are reasonable if patient safety is not compromised; progression to pyelo is uncommon.
- Dipstick diagnosis at point-of-care or home is unreliable and discouraged.
- If no prior info on microbes exists and it is decided to treat empirically, culture should be obtained, response should be monitored, and adjustments made as indicated.

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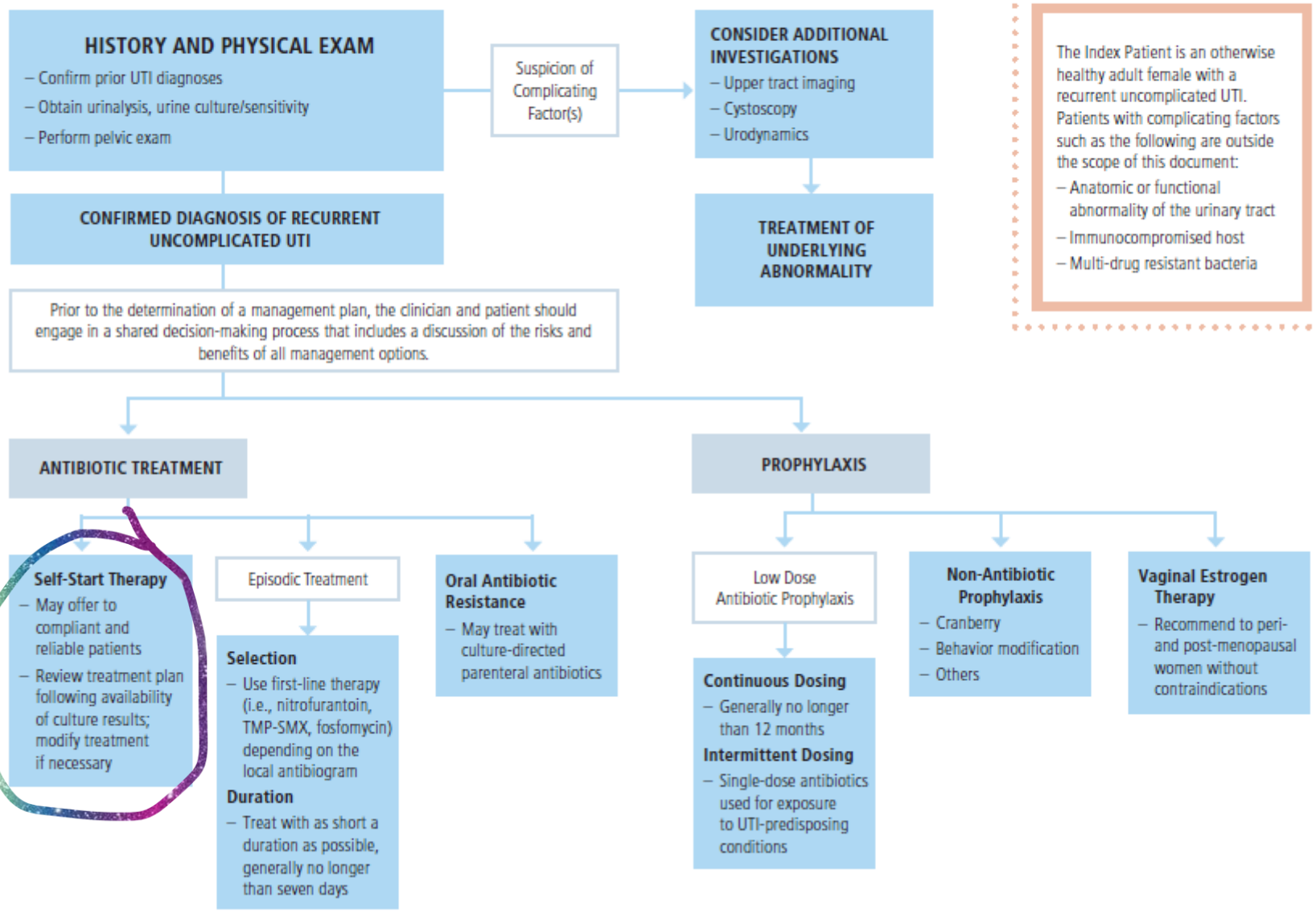

Self-start Therapy

Clinicians may offer patient-initiated treatment (self-start treatment) to select rUTI patients with acute episodes while awaiting urine cultures. (Moderate; Grade C)

- It is ideal to always get a culture.
- If culture truly not feasible, reliable patients may be trusted with empiric self-start therapy.
- Patients must be aware of antibiotic risks.
- Consider patient's prior cultures when choosing an agent.

Asymptomatic Bacteriuria

Clinicians should omit surveillance urine testing, including urine culture, in asymptomatic patients with rUTIs. (Moderate; Grade C)

- Asymptomatic bacteriuria should only be treated in pregnant women or those undergoing invasive urinary tract procedures.
- Substantial evidence shows no benefit in other populations, including women with diabetes or who residence in long-term care facilities.

Clinicians should not treat ASB in patients. (Strong; Grade B)

- Only evaluate and treat if symptomatic.
- Treatment clearly causes harm without benefit.
- The ***only*** exceptions are pregnancy and plans to undergo urologic procedures.

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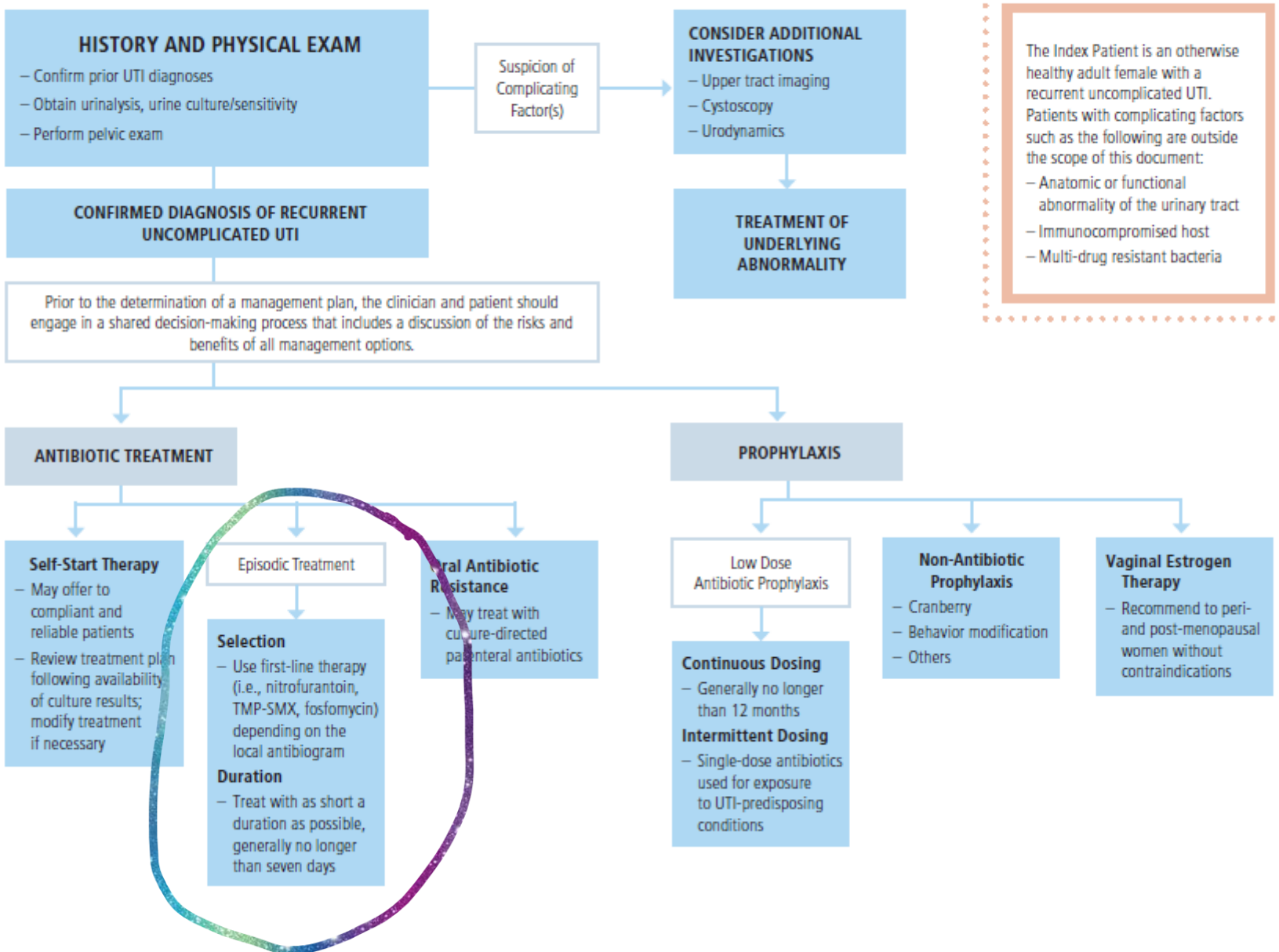

Antibiotic Selection

Clinicians should use first-line therapy (i.e., nitrofurantoin, TMP-SMX, fosfomycin) dependent on the local antibiogram for the treatment of symptomatic UTIs in women. (Strong; Grade B)

- No difference between agents in terms of treatment success
- Instead, choice is based on *in vitro* resistance prevalence, ecological adverse effects, and collateral damage (per IDSA 2011 guidelines for UTI tx)
- Don’t use TMP-SMX if local resistance rates exceed 20%
- Use second-line agents in case of resistance or allergy (β-lactams, fluoroquinolones)
- Remember, fluoroquinolones are associated with QTc prolongation, tendon rupture, and aortic rupture

Antibiotic Duration

Clinicians should treat rUTI patients experiencing acute cystitis episodes with as short a duration of antibiotics as reasonable, generally no longer than seven days. (Moderate; Grade B)

- Only fosfomycin is single dose (nitrofurantoin is 5d and TMP-SMX is 3d)
- Balance symptom resolution with reduction in risk of recurrence

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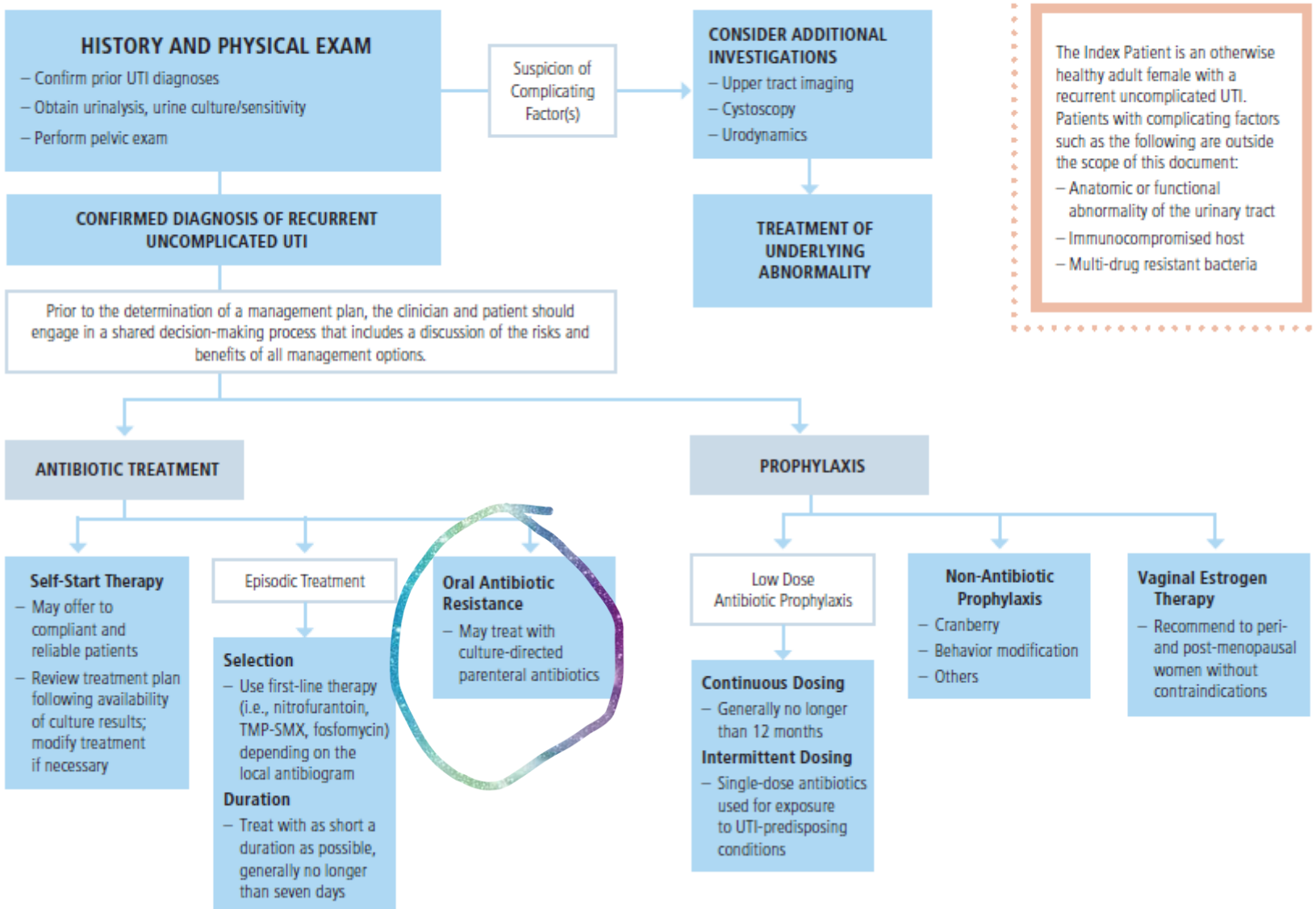

Antibiotic Resistance

In patients with rUTIs experiencing acute cystitis episodes associated with urine cultures resistant to oral antibiotics, clinicians may treat with culture-directed parenteral antibiotics for as short a course as reasonable, generally no longer than seven days. (Expert Opinion)

- If ESBL sensitive only to carbapenem, order fosfomycin susceptibility testing
- Many ESBL-producing bacteria are susceptible to fosfomycin and/or nitrofurantoin
- Consider ID consult

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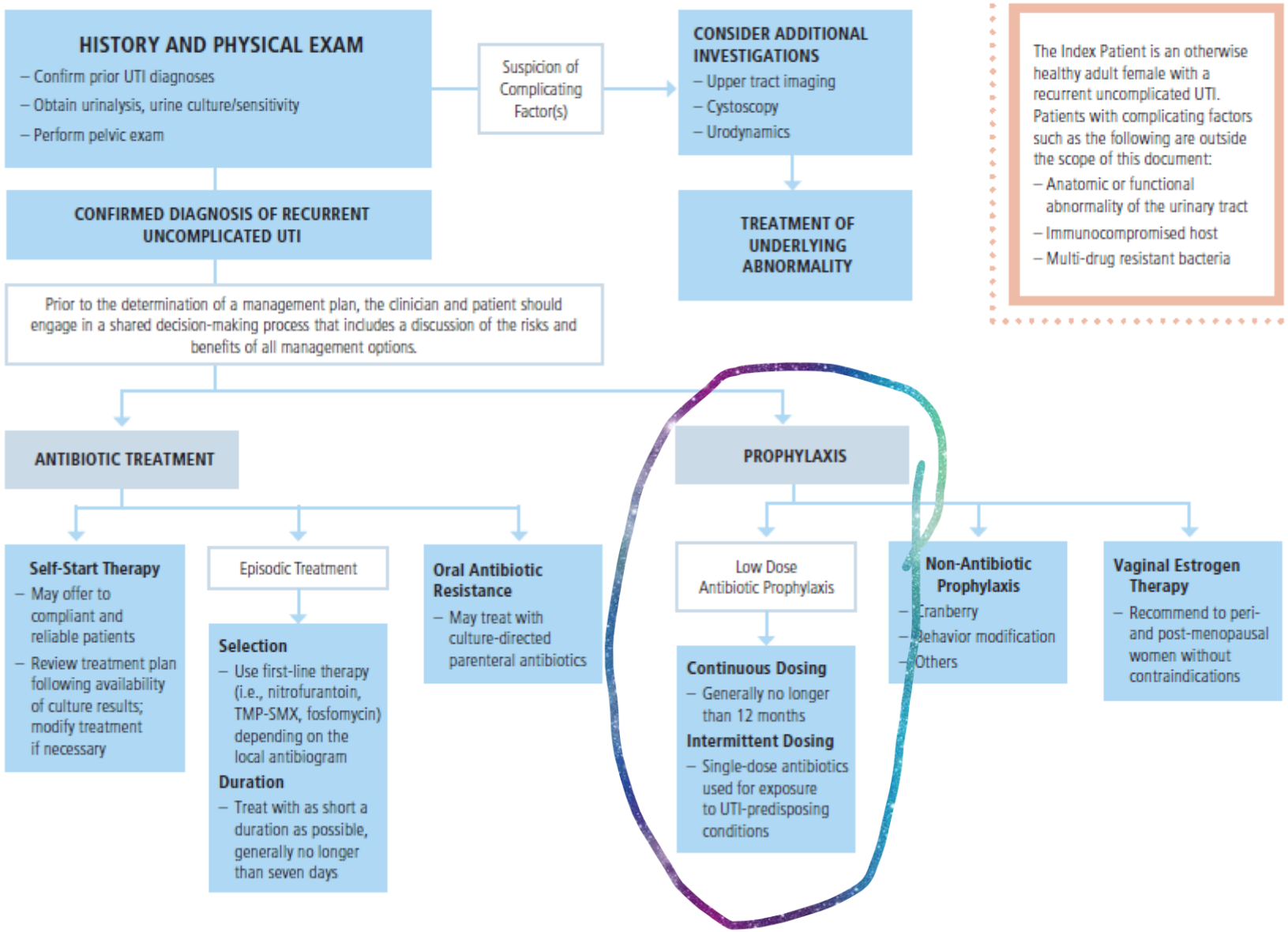

Antibiotic Prophylaxis

Following discussion of the risks, benefits, and alternatives, clinicians may prescribe antibiotic prophylaxis to decrease the risk of future UTIs in women of all ages previously diagnosed with UTIs. (Conditional; Grade B)

- Several trials have shown daily antibiotics to be more effective at reducing recurrence compared to placebo
- Increased risk of pulmonary and hepatic side effects, adverse events overall, vaginitis, oral candidiasis, skin rash, nausea
- Quinolones are not recommended for prophylaxis due to serious side effects
- No data to support one antibiotic over another or cycling of antibiotics

NOTE: Women with 1 or 2 cx-proven UTIs per year for years might also benefit from more proactive management

Antibiotic Prophylaxis - Dosing

- TMP 100 mg daily, TMP-SMX 40/200 mg daily or 3x/week, nitrofurantoin 50 or 100 mg daily, cephalexin 125 or 250 mg daily, fosfomycin 3g every 10 days
- Duration variable, UTIs tend to recur when stopped
- Peri-coital (before or after) is effective in women who have a temporal association of UTIs with intercourse
  - Decreases risk of AEs

Adverse Effects

Nitrofurantoin

- Pulmonary – 0.001%
- Hepatic - 0.0003%
  - (or maybe as high as 0.7%)
- Avoid in patients with chronic lung disease, creatinine clearance below 30 mL/min
- High suspicion if patient develops dry cough and dyspnea (acute sx appear at mean 9 days, chronic mean 1-6 mos)
- Risk-assessment, shared decision-making, and clinical monitoring

TMP-SMX

- GI disturbances
- Skin eruptions
- Neurologic (aseptic meningitis, tremor, delirium, gait disturbances)
- Decreased oxygen carrying capacity (methemoglobinemia, blood dyscrasia)
- Toxic epidermal necrolysis
- Reproductive toxicity
- Interactions with other drugs (P450)
- Hypoglycemia, hyperkalemia, nephrotoxicity

Antibiotic Resistance

- Resistance is 2.5 times more likely within 2 months of UTI treatment with an antibiotic
- 1.33 times more likely within 12 months
- Effect greatest in 1st month but persists up to 12
- Related to individual's bacterial pool due to transfer between commensals and potential pathogens

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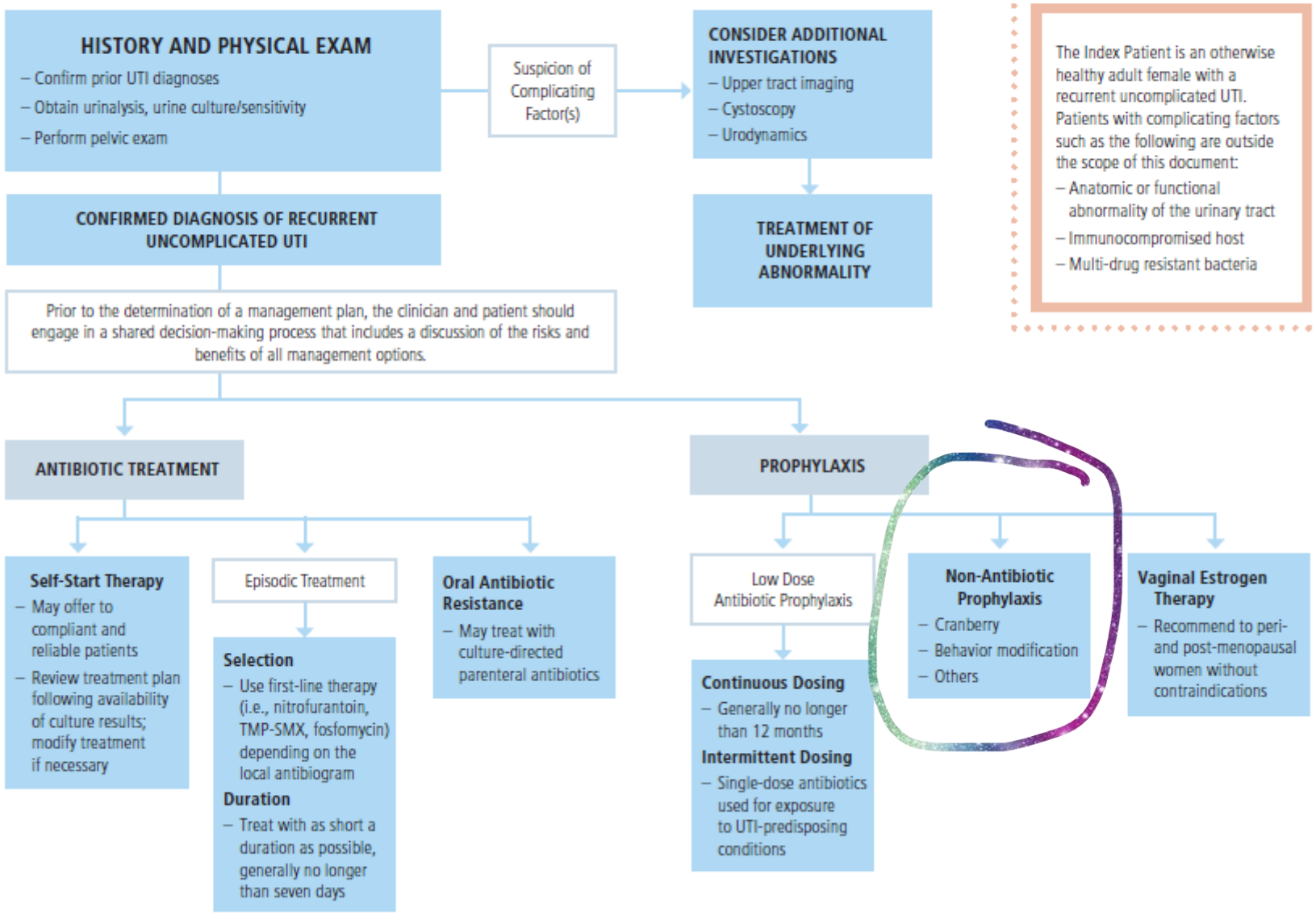

Non-antibiotic Prophylaxis

Clinicians may offer cranberry prophylaxis for women with rUTIs. (Conditional; Grade C)

- Proanthocyanidins prevent adhesion of bacteria to urothelium
- Dosing is a real challenge with juice and tablets/capsules
- Little risk to cranberry supplements
  - Watch for sugars in juice, especially in diabetics

- Lactobacillus, D-mannose, methenamine, herbs/supplements, intravesical hyaluronic acid/chondroitin, biofeedback, and immunoactive therapy – lack of data
- Increased water intake to 3 500 mL bottles daily – promising data, especially in those who drink too little

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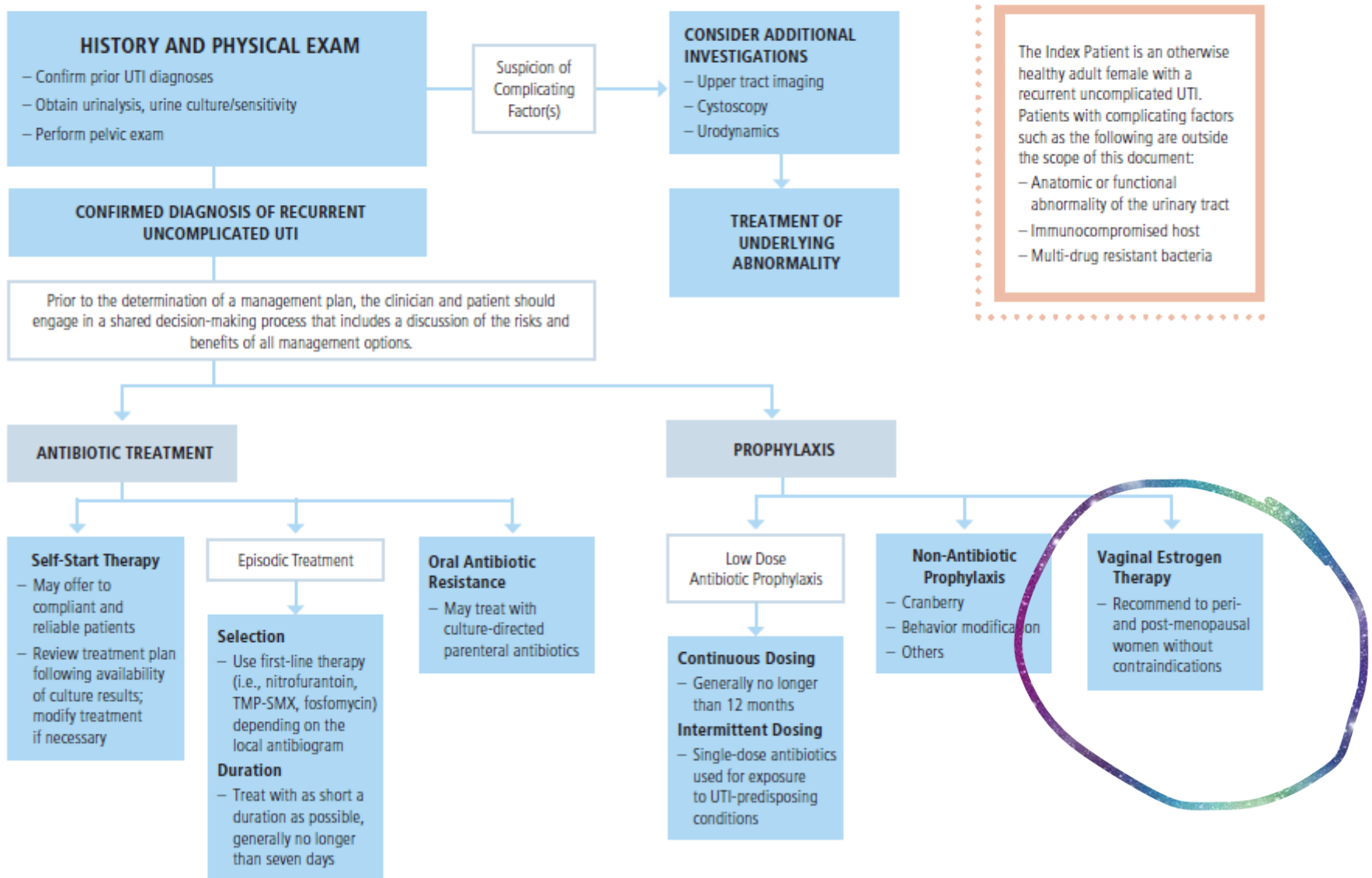

Vaginal Estrogen

In peri- and post-menopausal women with rUTIs, clinicians should recommend vaginal estrogen therapy to reduce the risk of future UTIs if there is no contraindication to estrogen therapy. (Moderate; Grade B)

- Oral and other formulations do not reduce UTI, only vaginal
- Even patients on systemic estrogen should consider vaginal if they are having rUTIs
- Use whatever form of vaginal estrogen the patient prefers
  - Estradiol hemihydrate tablet 10 mcg vaginally daily for 2 weeks then 2-3x/week
  - 17β-estradiol ring – 2mg ring released 7.5 mcg per day for 3 months
  - Cream - 17β-estradiol 2g daily for 2 wks then 1 g 2-3x/week or conjugate equine estrogen 0.5 g daily for 2 weeks then 0.5 g 2x/week
- Systemic risks are low due to low systemic absorption of vaginal estrogen
  - Has not been shown to increase cancer recurrence in women with hx of breast cancer – d/w oncologist but should be considered

Future Directions

- Educating colleagues to ensure UTI is accurately diagnosed, NOT relying on dipstick results
- Better understanding of host response (cytokines, etc)
- PCR identification of microbes
- Better understanding of and rebalancing of the bladder, bowel, and vaginal microbiomes
- Antibiotic stewardship to avoid MDR bacteria expansion, including non-antibiomicrobial agents
- Food science
- Vaccines
- Mannosides
- NSAIDs to modulate host responses
- Addressing modifiable risk factors for prevention

Other Options

Summary

Always culture

Hold antibiotics if possible

Identify and treat risk factors

Vaginal estrogen especially

Know the definition of uncomplicated

Consider cranberry, water, other agents

Limited data doesn’t mean they don’t work

Use prophylaxis when indicated

Watch for AEs

Don’t treat ASB

Unless pregnant or having GU surgery

Questions?