

# Infections of urinary and genital tract

# Introduction

- Urinary tract infections (UTIs) - lower and/or the upper parts UT urinary tract
- Urogenital tract infections (UGTIs) - genital tract, urinary tract and sexually transmitted urogenital tract infections (ST-UTIs)
- clinical symptoms and signs - UTIs and GTIs - similar
- misdiagnosed/undignosed GTIs and overdiagnosed UTIs

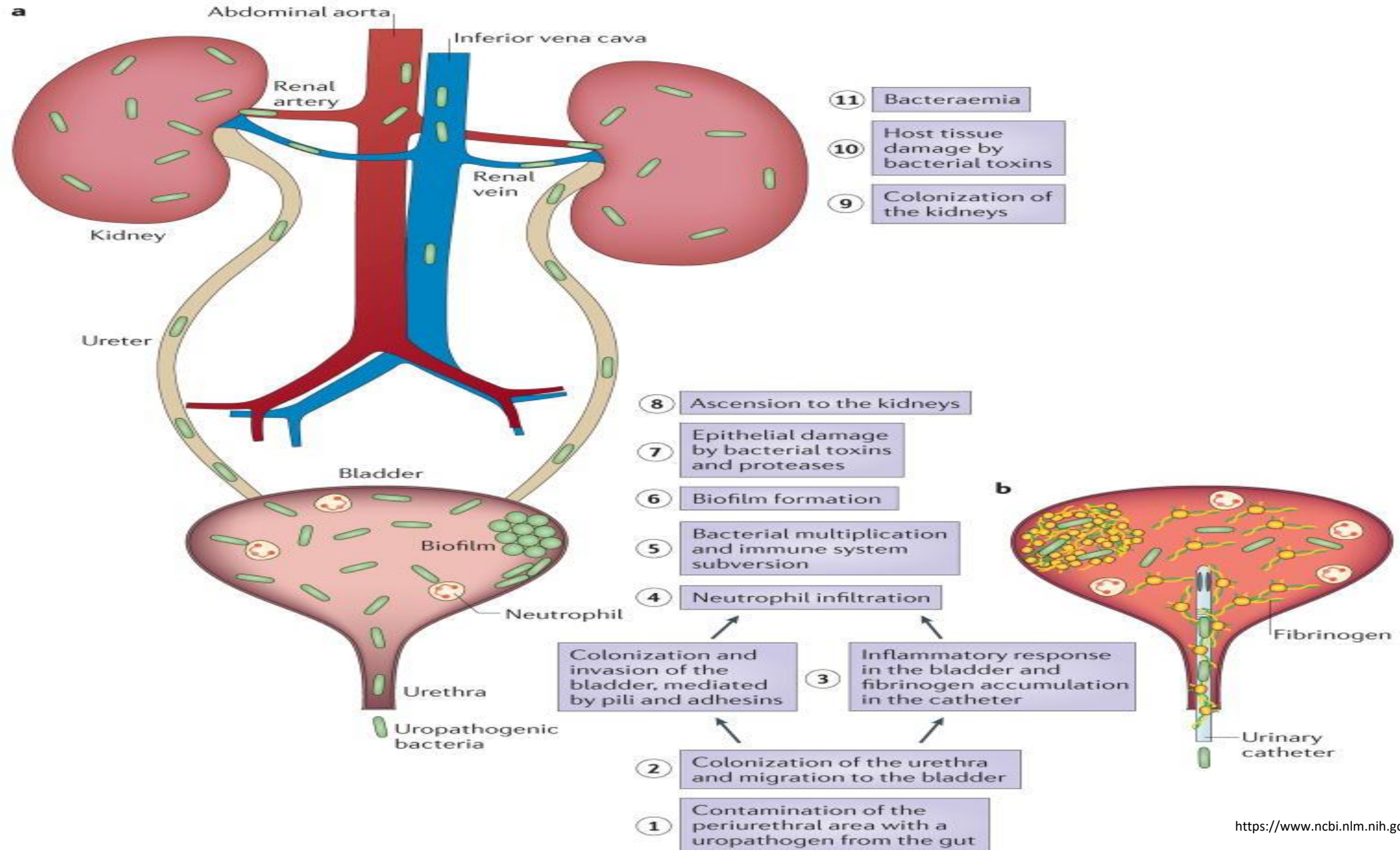
# Urinary tract infections - cause

- *Escherichia coli*
- *Klebsiella pneumoniae*
- *Proteus mirabilis*
- *Enterococcus faecalis*
- *Staphylococcus saprophyticus*

# Urinary tract infections

- **uncomplicated** - lower UTIs (cystitis), upper UTIs (pyelonephritis)
- **complicated** – associated with risk factors
  - urinary obstruction
  - urinary retention - neurological disease,
  - immunosuppression,
  - renal failure, transplantation,
  - pregnancy
  - foreign bodies (calculi, indwelling catheters, drainage devices)

# Urinary tract infections - pathogenesis



# Urinary tract infections - summary

- *Escherichia coli*
- *Proteus* spp.
- *Klebsiella* spp.
- *Pseudomonas* spp.
- *Streptococcus faecalis*
- *Staphylococcus epidermidis/ saprophyticus/ aureus*

1. Abnormal urinary tract
  1. Stones
  2. Strictures
  3. Vesico ureteric reflux
  4. Gynecological causes
  5. Neurological causes
  6. Enlarged prostate
2. Instrumentation
3. Immune suppression due to diabetes or pregnancy

## Signs and Symptoms of UTI

### Acute Pyelonephritis

**Symptoms:** Loin pain, High fever with chills and vomiting

**Signs:** Renal angle and lumbar region tenderness

### Cystitis, Urethritis

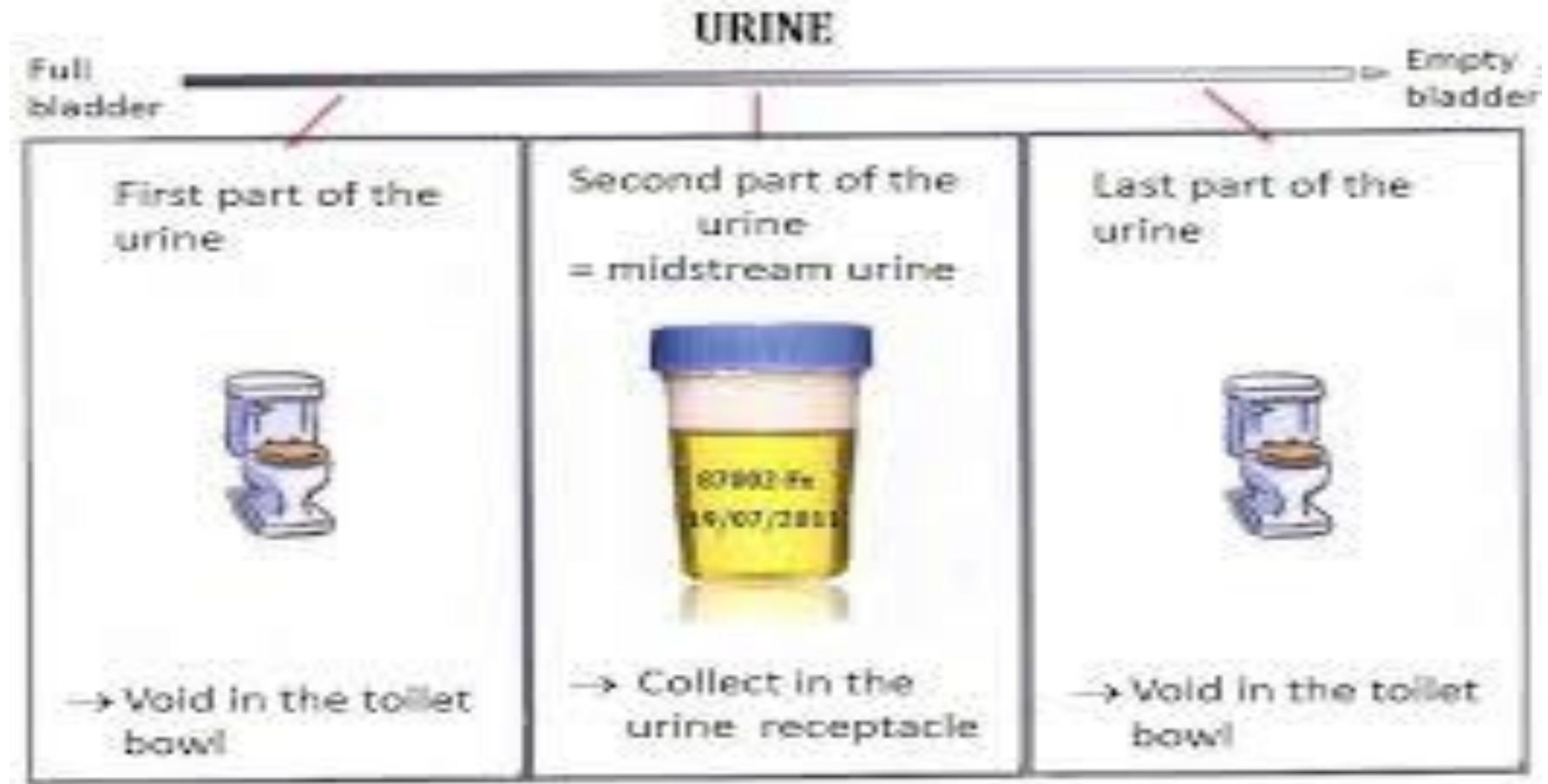
**Symptoms:** Dysuria, increased frequency of micturition, supra pubic pain

**Signs:** Supra pubic tenderness

# Urinary tract infections

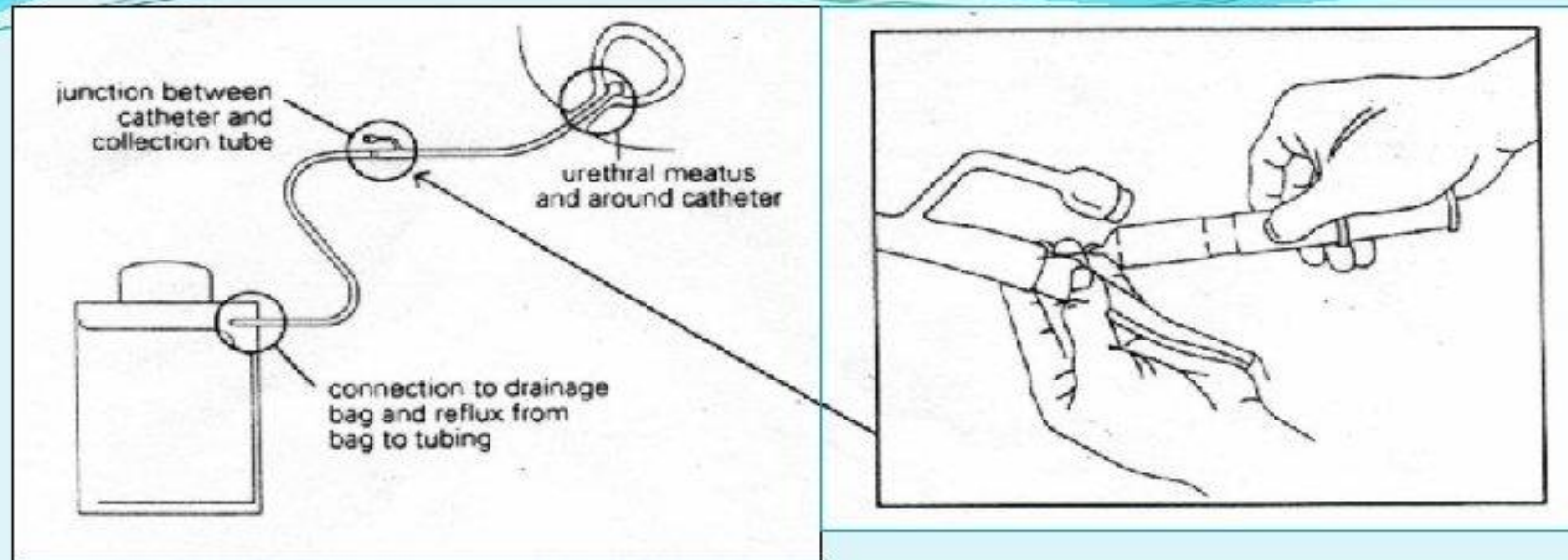
- Urinalysis or urine test
- **Urine culture**
- Ultrasound
- Cystoscopy
- CT scan

# Mid-stream urine sample





# Catheter Specimen of Urine (CSU)



## The urinary catheter

Urine specimens for laboratory investigations can be collected from catheterized patients as shown (left). The second port is for putting fluids into the bladder (right).

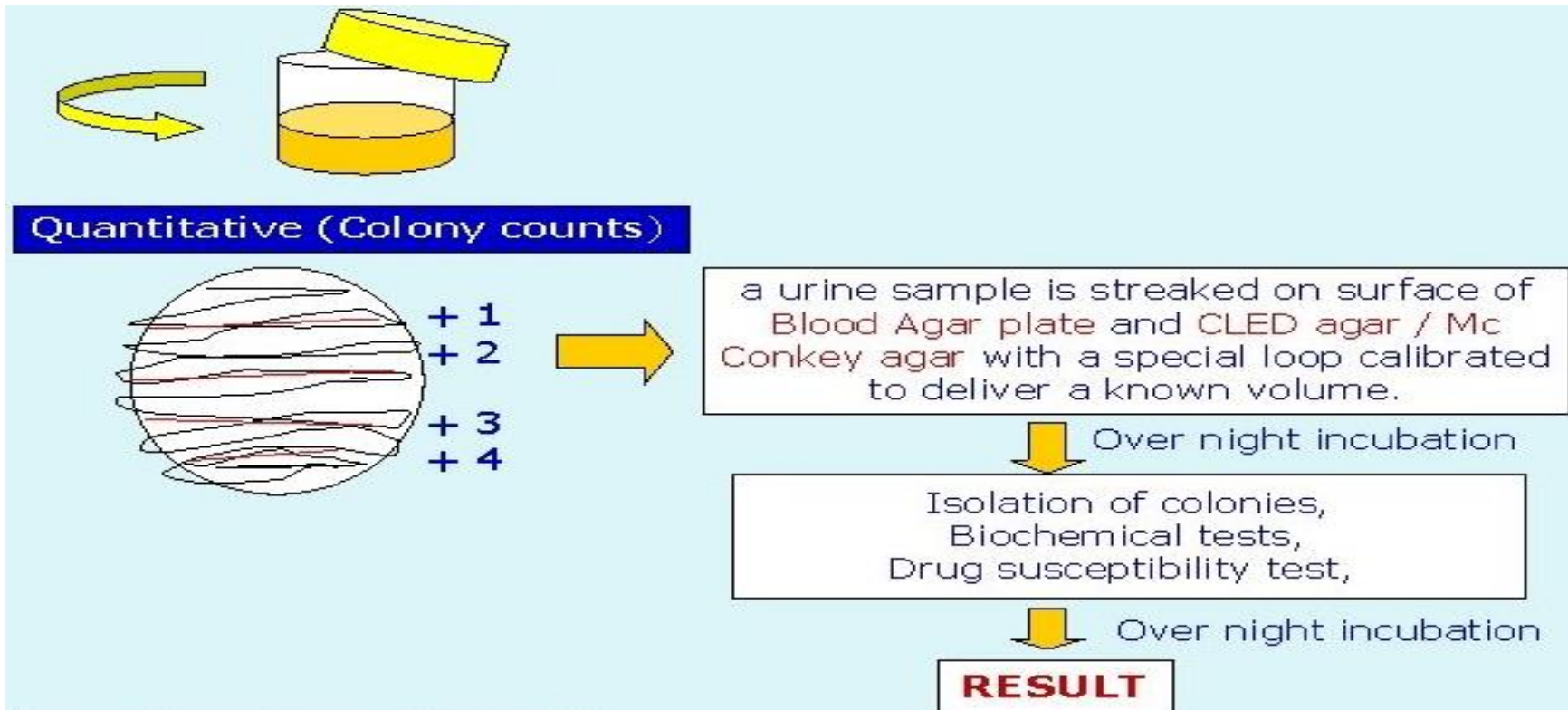
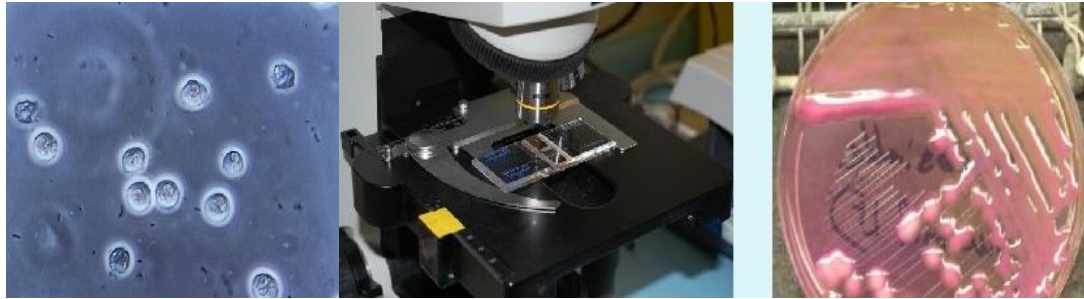
Urine from the drainage bag should not be tested because it may have been standing for several hours.

# Suprapubic aspiration

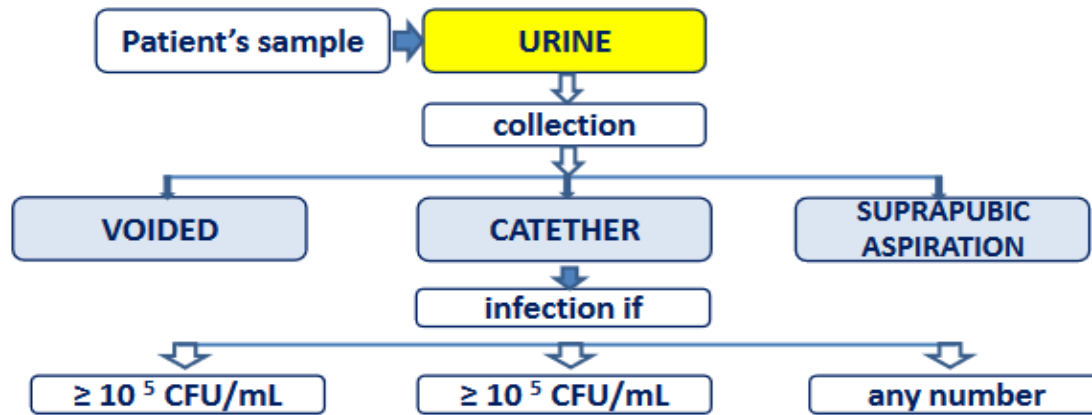
Indications :

- Febrile child age 2-24 months with unknown source of fever
- Need for sterile urine collection when urethral catheterization is not possible such as:
  - Labial adhesions
  - Labial edema
  - Phimosi
- Children with a history of intraurethral surgery
- urethral stricture, urethral injury, malignancy, prostate hyperplasia

# Urine – microbiological evaluation



# Urinary tract infections



## PROHIBITIONS

1. URINE SAMPLE MUST NOT BE TAKEN FROM A URINE BAG IN PATIENTS WITH CATETHER
2. URINE SAMPLE MUST NOT BE STORED OR TRANSPORTED AT RT

**Asymptomatic bacteriuria is not routinely screened for or treated in women who are not pregnant, men, young people or children**

**Asymptomatic bacteriuria is routinely screened for and treated only if is considered a risk factor in clearly defined situations :**  
**pregnant women and patients with: diabetes, neutropenia, polycystic kidneys disease, kidney transplant, and individuals with functional or structural anomalies of urinary tract**

[https://www.umed.wroc.pl/sites/default/files/mikrobiologia/files/UTI\\_student.pdf](https://www.umed.wroc.pl/sites/default/files/mikrobiologia/files/UTI_student.pdf)

- **Less than 100 bacteria/mL:** Indicates the absence of infection or the individual may be taking an antibiotic
- **100 to 100,000 bacteria/mL:** This indicates contamination of the urine sample or infection (the urine culture may need to be repeated)
- **100,000 bacteria/mL:** Indicates an infection

- Trimethoprim-sulfamethoxazole (160/800 mg twice daily for 3-7 days)
- nitrofurantoin (100 mg twice daily for 5-7 days)
- men with uncomplicated UTI - continued for 7-14 days
- acute pyelonephritis - intravenous antibiotics - aztreonam, cefuroxime, ciprofloxacin, gentamicin
- high fluid intake (2L daily) - during therapy + weeks following treatments

# Genital tract infections

**Female genital tract infections** - soft-tissue, perineal; bacterial vaginosis; vulvar and Bartholin gland abscesses; endometritis; pyometra; salpingitis; tubo-ovarian abscesses; adnexal abscess; pelvic inflammatory disease, intrauterine contraceptive device-associated infection; septic abortion; postsurgical obstetric and gynecologic

**Male genital tract infections** - consequence - ascending canalicular infection of the male excurrent ducts - result in urethritis, prostatitis/vesiculitis, epididymitis or epididymo-orchitis

## **Genital tract normal flora:**

Lactobacillus sp.

Coagulase negative Staphylococcus species

Diphtheroids

Anaerobic cocci , gram negative rods

Enterococcus species

# Genital tract infections

- 1) sexually transmitted diseases (STDs)- chlamydia, gonorrhoea, chancroid, and human immunodeficiency virus (HIV)
- 2) endogenous infections- overgrowth of organisms - bacterial vaginosis, vulvovaginal candidiasis
- 3) iatrogenic infections- improperly performed medical procedures (unsafe abortion, poor delivery practices)

# Genital tract infections

Agent	Acute Disease	Pregnancy-Associated Conditions	Chronic Conditions
<i>Neisseria gonorrhoeae</i>	Urethritis Cervicitis Salpingitis Postpartum endometritis	Prematurity Septic abortion Ophthalmia	Infertility Ectopic pregnancy
<i>Chlamydia trachomatis</i>	Urethritis Cervicitis Salpingitis	Ophthalmia Pneumonia Postpartum endometritis	Infertility Ectopic pregnancy
<i>Treponema pallidum</i>	Primary and secondary syphilis	Spontaneous abortion Stillbirth Congenital syphilis	Neurosyphilis Cardiovascular syphilis Gumma
<i>Haemophilus ducreyi</i>	Genital ulcer	None known	Impotence
Human immunodeficiency virus (HIV)	Mononucleosis syndrome	Prematurity Stillbirth Perinatal HIV	AIDS
Human papillomavirus (HPV)	Genital warts	Laryngeal papillomatosis	Genital cancer
Herpes simplex virus 2 (HSV-2)	Genital ulcer	Neonatal HSV Prematurity	Genital cancer
Hepatitis B virus (HBV)	Acute hepatitis	Perinatal HBV	Chronic hepatitis Cirrhosis Hepatoma Vasculitis

# Genital tract infections – complications and sequelae

- Pelvic inflammatory disease (PID) - life-threatening - *N. gonorrhoeae* and *C. trachomatis*
- PID comprises - inflammatory disorders -upper female genital tract- endometritis, salpingitis, tubo-ovarian abscess, pelvic peritonitis
- PID - tubal infertility (inflammation and scarring of the fallopian tubes), ectopic pregnancy, chronic abdominal pain
- Tubal occlusion - prevents the egg from passing through the fallopian tubes
- Ectopic (tubal) pregnancy - fertilized egg implants outside the uterus
- Genital cancers – HPV - cervical neoplasia
- Chronic pain - genital herpes and PID



# Genital chlamydiosis - STD

## *Chlamydia trachomatis*

- Obligate intracellular bacterium

**Most common bacterial STD**

## **Symptoms**

- Male: urethritis, discharge
- Female: Usually asymptomatic; can progress to PID

# *Neisseria gonorrhoeae*

- Infects columnar epithelial cells of the GU tract
- Incubation period 2-7 days
- Can spread in blood, producing rash on extremities and arthritis in joints

# Syphilis

- Incubation period of 1-90 days
- Chancre development at site of inoculation, full-body rash, potential to affect the CNS
- Can not be cultured; DFA or serology testing (RPR) used

# *Haemophilus ducreyi* – chancroid

- Seen in underdeveloped countries
- Incubation period 4-7 days after exposure
- Erythematous papule develops into a pustule which ruptures to form an ulcer. Ulcer usually found on external genitalia
- Lab diagnosis
- Direct smear (school of fish) and culture of ulcer
- Oxidase positive; catalase negative

# Genital herpes

- HSV-1: fever blisters/ cold sores
- HSV-2: genital herpes
- Virus is shed in the absence of symptoms
- Transmitted by sexual contact with secretions from infected sites
- Incubation period 1-26 days after exposure
- Lab diagnosis
  - Viral isolation-cheap
  - Molecular testing- improved sensitivity & TAT

# Human papilloma virus

vaccination at the age of 11–12 years to reduce the risk of cervical and other forms of cancer.

- Common STD in individuals under 24
- Skin- skin transmission
- Asymptomatic
- Self-limiting
- Associated with genital warts and cervical cell dysplasias and cancers

# HIV

- Systemic illness
- Transmission via sexual contact, exposure to blood or body fluids
- Virus attacks the CD4 helper T-cells
- Increased potential for opportunistic pathogens
- Symptoms include:
  - fever, malaise, lymphadenopathy, skin rash
- Lab Diagnosis
  - HIV-1 antibody test- **screen**
  - Western blot/immunofluorescence- **confirmatory**

# *Trichomonas vaginalis*

- Flagellated, urogenital parasite
- Symptoms
  - Itching
  - Burning
  - Yellow-green frothy discharge
  - Foul-smelling odor
- Lab Diagnosis
  - Wet Prep
    - Observance of moving parasites in vaginal discharge



# Genital infections - Specimen Collection

- Urethral discharge
- Cervical/ vaginal
- Throat
- Anus
- Cotton, dacron swabs
- Isolation of gonococci
- Place in modified Stuart's or Amie's (with charcoal) - prevents drying
- Viral culture
  
- **Gram stain**
- **Wet mount**
  
- Examine for bacteria (intra & extra-cellular), PMN's
  
- culture

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