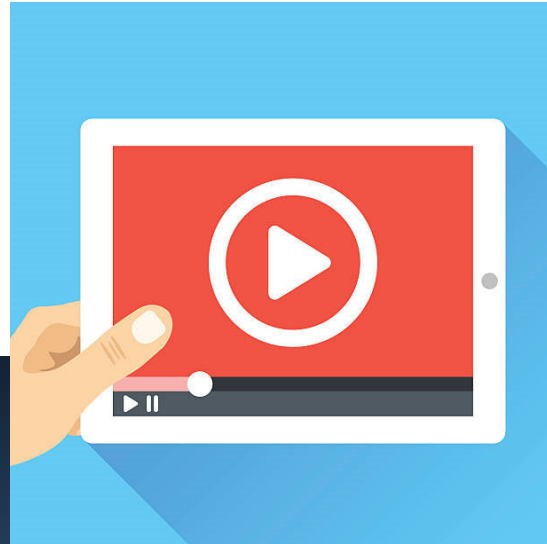


## URINARY TRACT INTRODUCTION

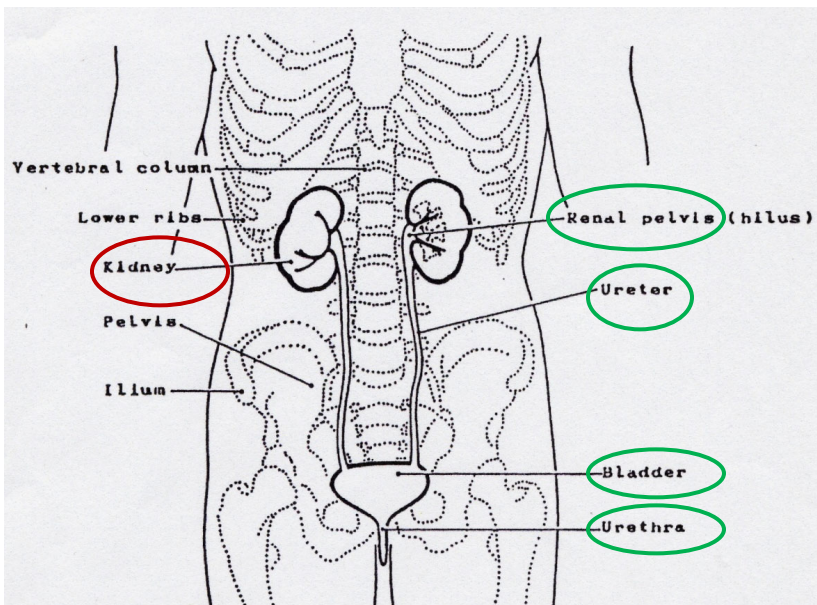
Presented by Lori Somers, RN  
 SHRI Video Training Series | Iowa Cancer Registry  
 Recorded 3/2023



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## The Urinary Tract System



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# Urinary Tract System

## Kidney

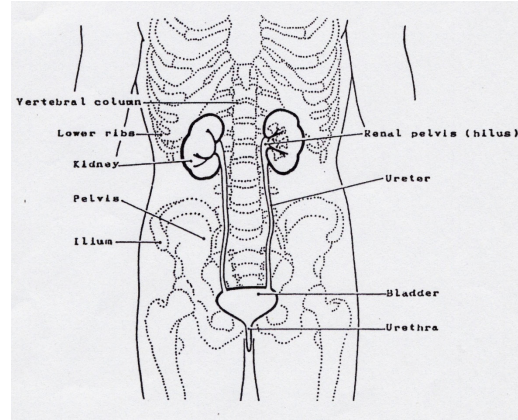
**Kidney parenchyma** (glandular part) C64.9

**Kidney Renal Pelvis** C65.9

**Ureter** C66.9

**Bladder** C67.9 (NOS)

**Urethra** C68.0



3

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## Bladder, Renal Pelvis, Ureter

- Definitions
  - **Upper** urinary tract:
    - kidney, renal pelvis and ureter
  - **Lower** urinary tract:
    - bladder, sphincter, urethra

Urinary tract (STR definition): **structures lined by urothelium**

**Two different** sections in STR manual:

- **Kidney**
- **Renal Pelvis, Ureter, Bladder and Other Urinary**

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## Urinary Tract

### Renal pelvis, ureter, bladder, urethra, prostatic urethra in males

- Structures lined by transitional epithelium
- Tumor cells may shed and implant in structures lower in the tract causing multifocal tumors
- Transitional epithelium: preferred term is now **urothelial/transitional cells**
- Expandable (stretchable) epithelium with layered appearance- Bladder

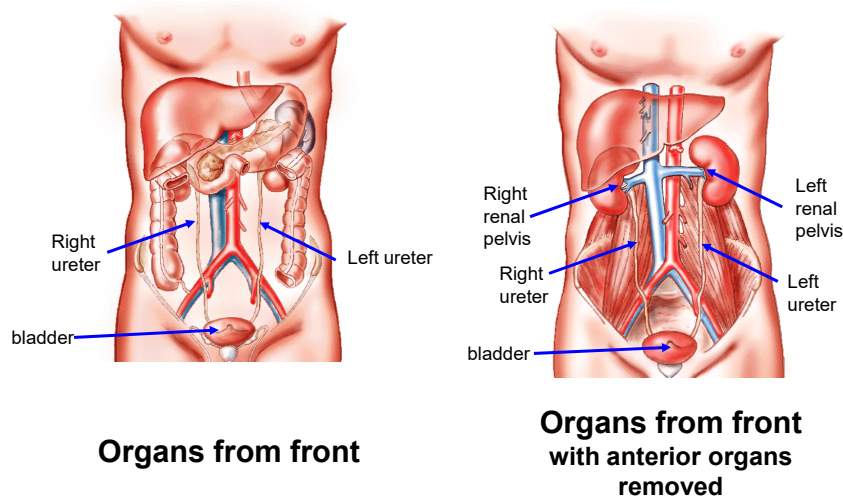
### Kidney parenchyma (body)- glandular

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## Anatomy

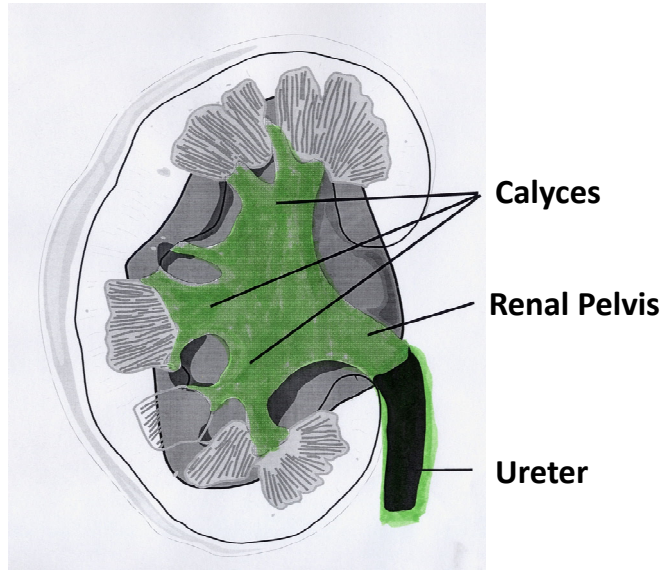
### Bladder, Renal Pelvis, Ureters



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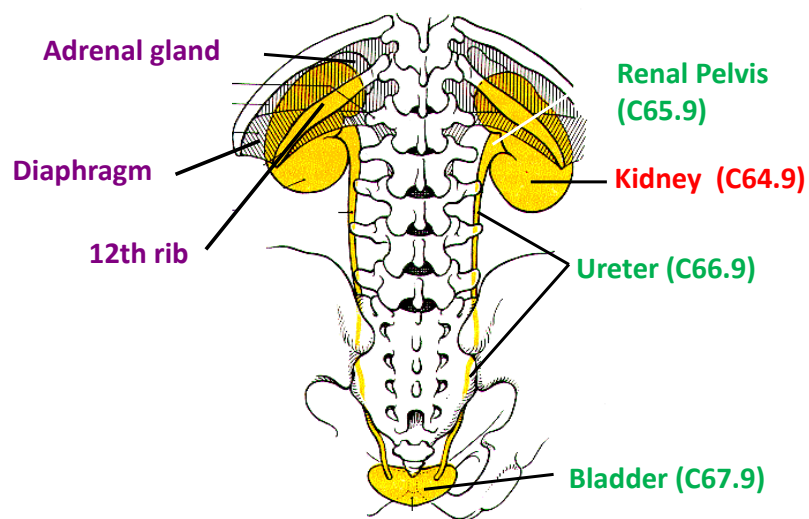
## Renal Pelvis and Ureter



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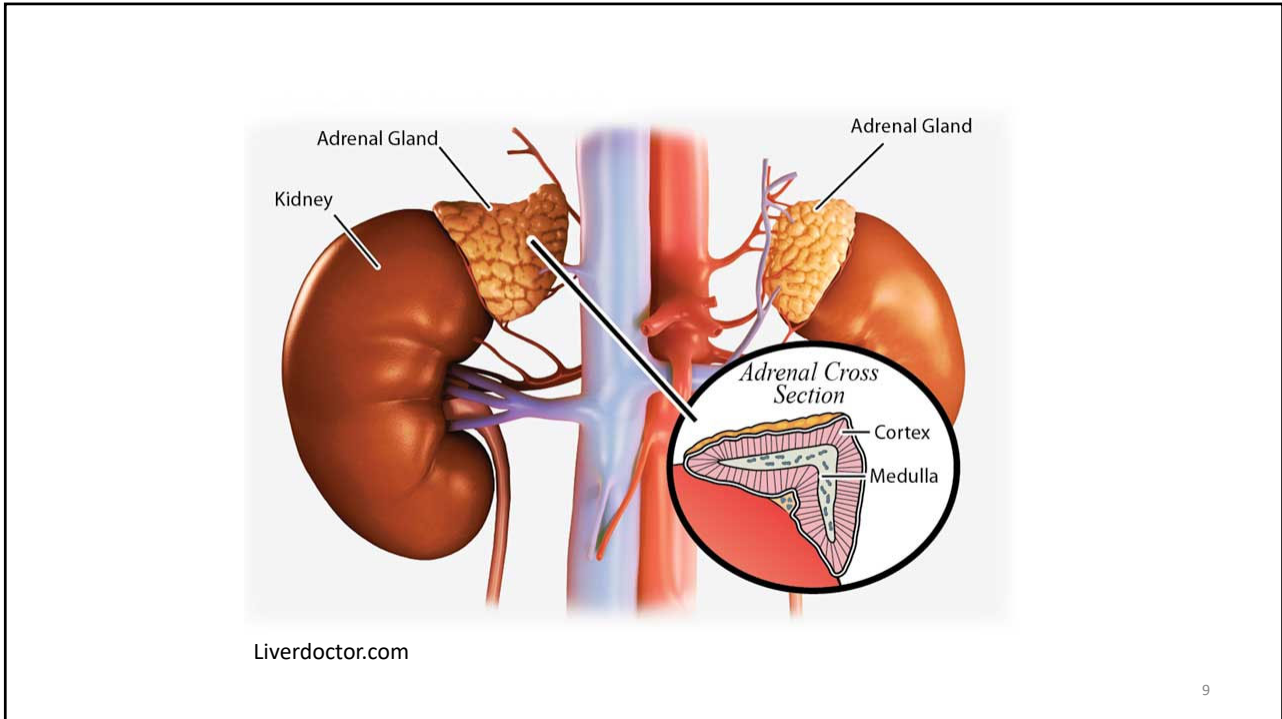
## Renal Pelvis, Ureters, Bladder



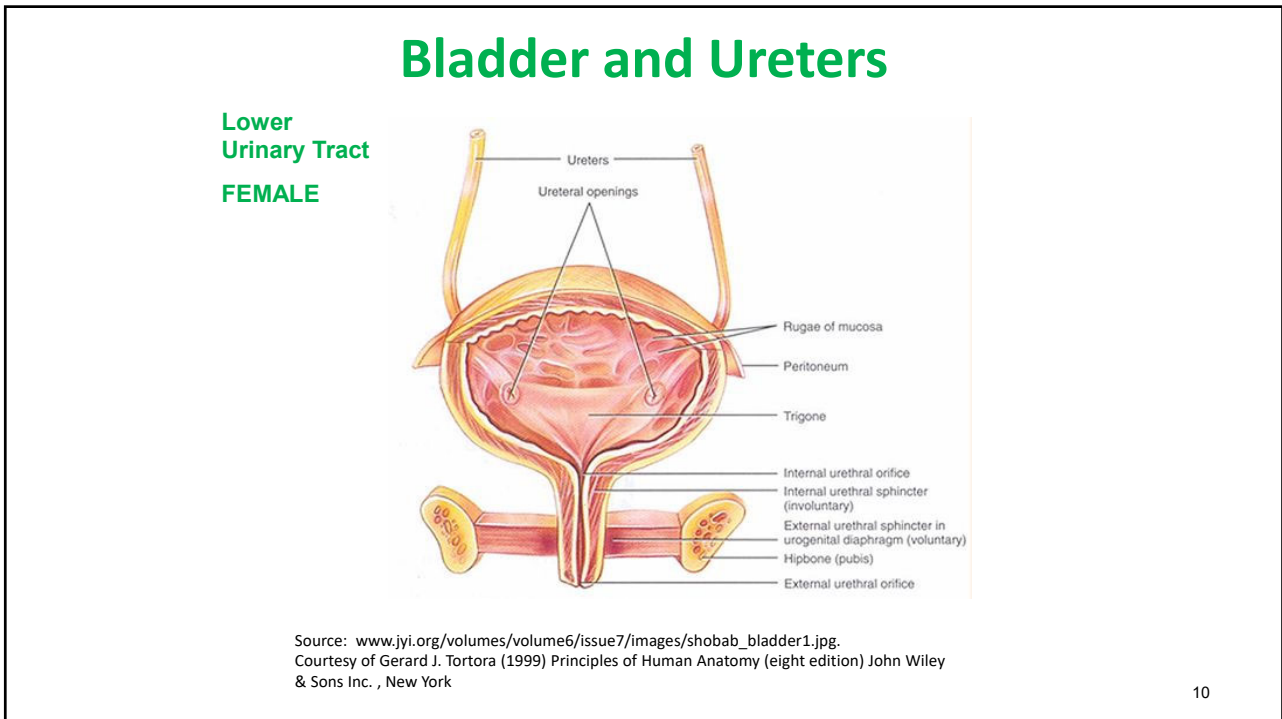
Source: Color Atlas and Textbook of Human Anatomy

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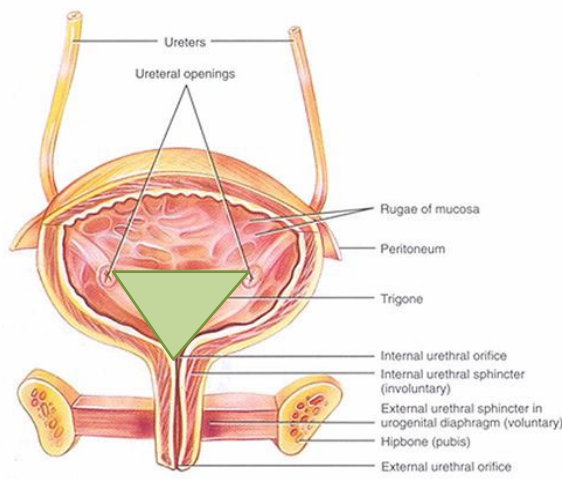
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## Bladder and Ureters

Lower  
Urinary Tract  
FEMALE



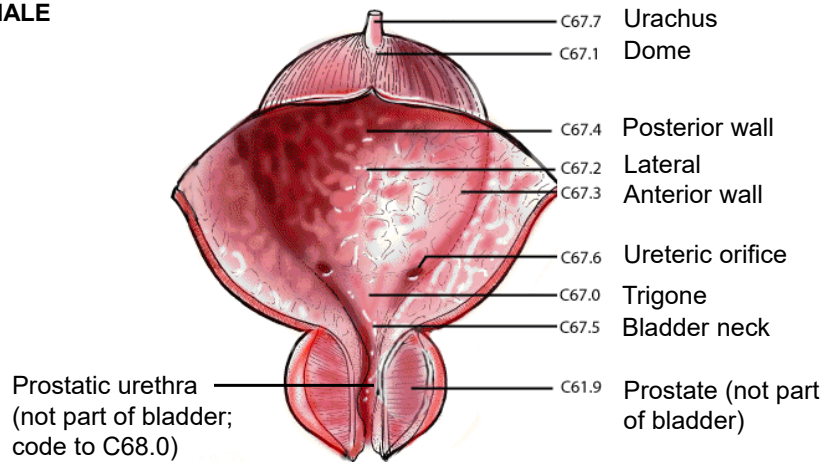
Source: [www.jyi.org/volumes/volume6/issue7/images/shobab\\_bladder1.jpg](http://www.jyi.org/volumes/volume6/issue7/images/shobab_bladder1.jpg).  
Courtesy of Gerard J. Tortora (1999) Principles of Human Anatomy (eight edition) John Wiley & Sons Inc. , New York

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## Bladder Anatomy with ICD-O-3 Codes

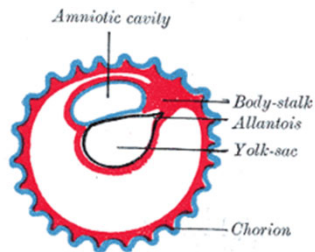
MALE



Source: UICC *TNM-interactive*, Wiley-Liss, 1998

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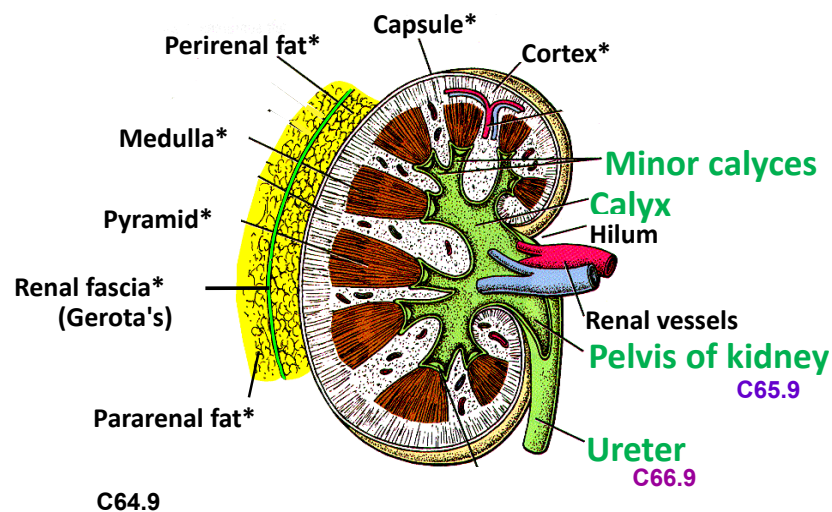
### Bladder Trivia

The **urachus** is an embryological canal connecting the [urinary bladder](#) of the fetus with the [allantois](#), a structure that contributes to the formation of the umbilical cord. The lumen (inside) of the urachus is normally obliterated during embryonic development, transforming the urachus into a solid cord, a **functionless remnant**. The urachus lies in the [space of Retzius](#), between the transversalis fascia anteriorly and the [peritoneum](#) posteriorly.

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## Upper Urinary Tract



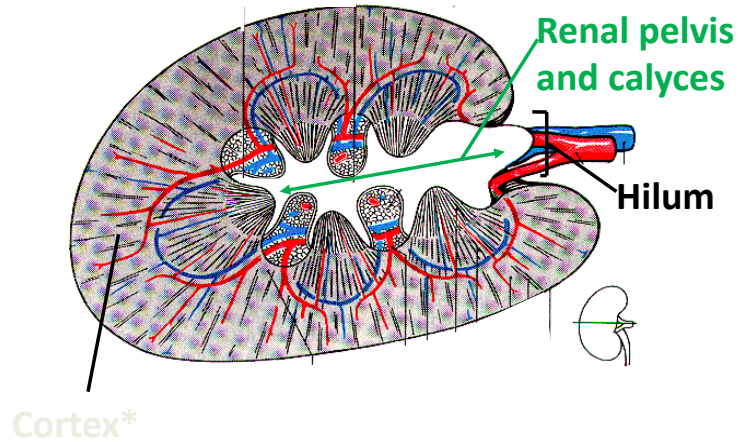
C64.9

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## Cross Section at Hilum

The medial (inner) side of each kidney presents a concave notch called the **hilum**, (or hilus) means "depression" and is the place where the vessels enter the organ.

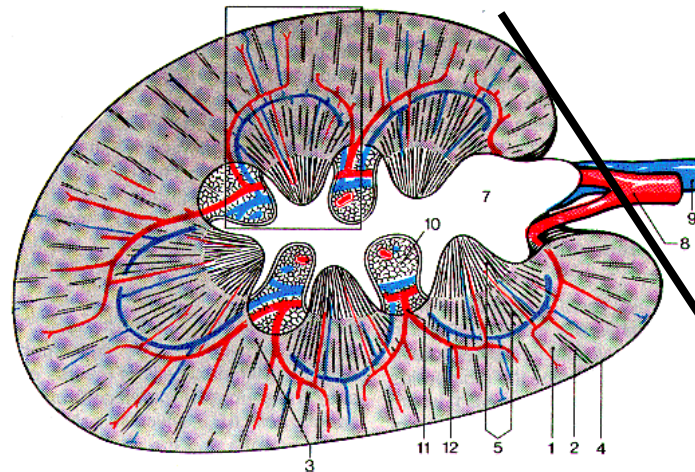


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**Renal Sinus:** space outside the kidney and renal pelvis, but within a line drawn from the medial edge of the upper pole to the medial edge of the lower pole.

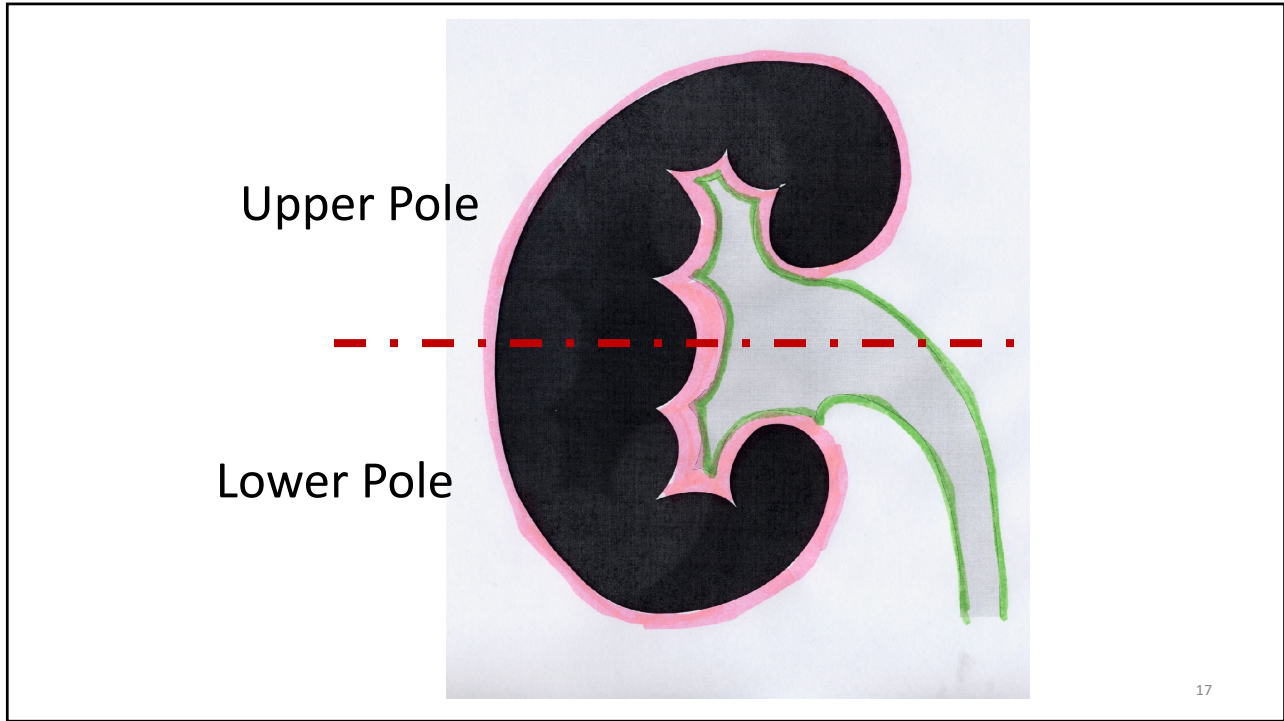
While the pelvis falls within this region, the term refers to the fatty tissue only, not to the collecting system structures.



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## Primary Site codes

- Table 1 in Solid Tumor Rules | Urinary Schema

Site Term and code	Synonyms
Bladder, anterior wall C673	-
Bladder, dome C671	Roof Vault Vertex
Bladder, lateral wall C672	Lateral to ureteral orifice Left wall Right wall Sidewall
Bladder neck C675	Internal urethral orifice Vesical neck
Bladder NOS C679	Lateral posterior wall ( <b>no hyphen</b> )
Bladder, overlapping lesion C678	Fundus Lateral-posterior wall ( <b>hyphen</b> )
Bladder, posterior wall C674	-

Site Term and code	Synonyms
Bladder, trigone C670	Base of bladder Below interureteric crest Below interureteric field Below interureteric ridge Floor of bladder
Bladder, urachus C677	Mid umbilical ligament Urachal remnant
Bladder, ureteric orifice C676	Just above ureteric orifice
Overlapping lesion of urinary organs C688	-
Paraurethral gland C681	-
Renal pelvis C659	Pelvis of kidney Pelviureteric junction Renal calyces Renal calyx
Ureter C669	-
Urethra C680	Cowper gland Prostatic utricle Urethral gland
Urinary system NOS C689	-

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## Urinary Tract Histologies

Renal Pelvis, Ureter, Bladder and other Urinary

- **Urothelial carcinoma (transitional cell carcinoma, "TCC")**
  - 90% of all urinary tract cancers
  - Papillary urothelial carcinoma (papillary transitional cell carcinoma, "Pap TCC")
- **Squamous cell carcinoma**
  - 10% of renal pelvis tumors, 5% of bladder tumors
- **Adenocarcinoma**
  - Very rare in renal pelvis, ureters
  - < 1% of urinary tract tumors
  - Most likely a primary in kidney parenchyma with extension into renal pelvis or ureter

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## Definitions

### Papillary vs. Non-papillary urothelial (Flat Carcinoma)

Gross descriptions of tumor architecture or structure; not specific histologies

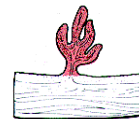
- Both apply to transitional cell/urothelial carcinoma

#### Papillary tumor

Warty growth projecting from the wall

On a stalk

- **Non-invasive** papillary urothelial ca (in situ)
- **Invasive** papillary urothelial ca



Non-invasive



Invasive

#### Non-papillary urothelial: (Flat tumor)

Originates within mucosa

Does not project from the wall

- **Non-invasive** CIS
- **Invasive** urothelial ca



In situ



Invasive

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## Grade Table 19

### Grade 19

#### Grade ID 19-Clinical Grade Instructions

Schema ID#	Schema ID Name	AJCC ID	AJCC Chapter
00610	Kidney Renal Pelvis	61.1	Renal Pelvis and Ureter: Urothelial Carcinomas
00610	Kidney Renal Pelvis	61.2	Renal Pelvis and Ureter: Squamous Cell Carcinoma and Adenocarcinoma
00620	Bladder	62.1	Urinary Bladder: Urothelial Carcinomas
00620	Bladder	62.2	Urinary Bladder: Squamous Cell Carcinoma and Adenocarcinoma
00631	Urethra	63.1	Urothelial Male Penile Urethra and Female Urethra
00631	Urethra	63.2	Squamous Male Penile Urethra and Female Urethra
00633	Urethra-Prostatic	63.3	Prostatic Urethra: Urothelial Carcinomas
00633	Urethra-Prostatic	63.4	Prostatic Urethra: Squamous Cell Carcinoma and Adenocarcinoma

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## Grade

	Code	Grade Description
Use these codes for adenoca and squamous cell carcinoma: 1, 2, 3, 9	1	G1: Well Diff
	2	G2: Mod Diff
	3	G3: Poorly Diff, undiff, anaplastic
Use these codes for urothelial cancers, L, H, 9	L	LG: Low-grade
	H	HG: High-grade
	9	Grade cannot be assessed (GX); unknown

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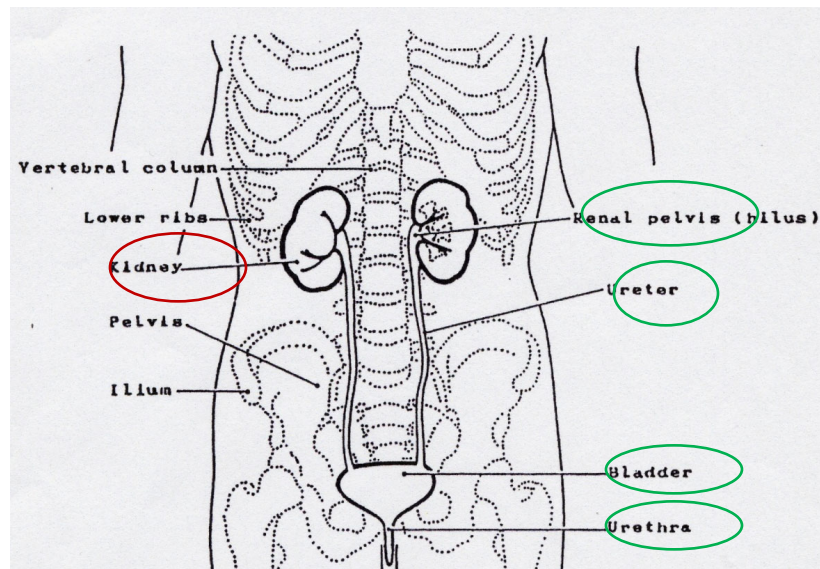
22

# KIDNEY

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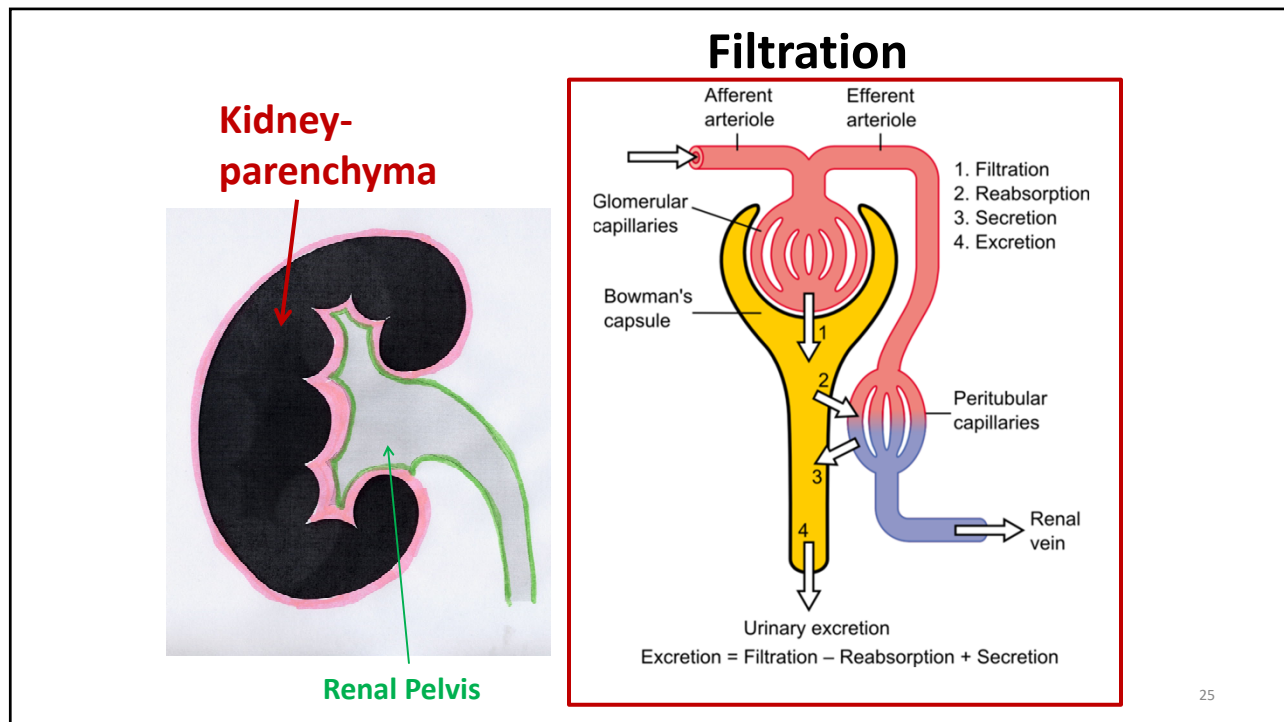
23

## KIDNEY- parenchyma



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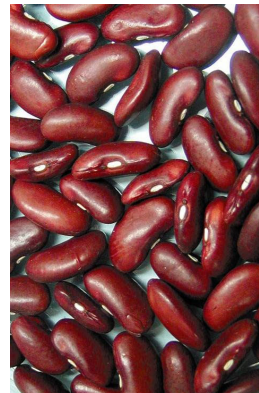
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## Kidney Parenchyma

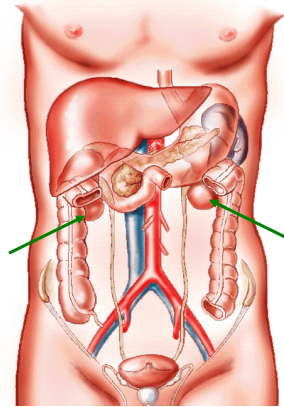
- Bilateral organs
- Bean shaped
- 4" long, 2" wide, 1.5" thick
- Weight: up to 10 ounces
- 3% of all adult cancers
- 85% are **Renal cell carcinoma (adenocarcinoma) or subtype/variants of RCC**
  - ccRCC 8310 most common s/v



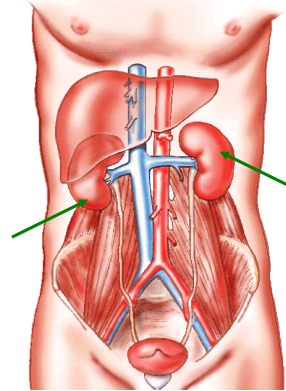
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## Kidneys—Anterior View



Kidneys from front



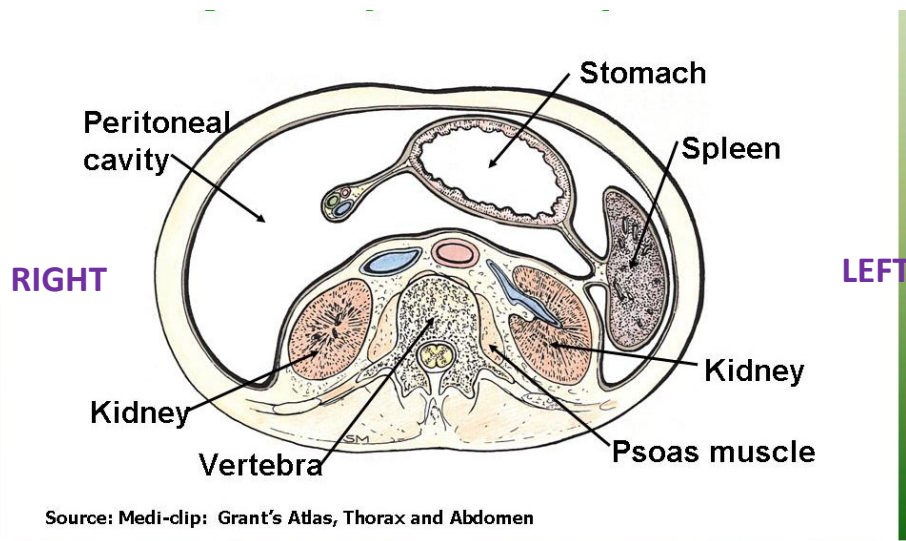
Kidneys from front  
with anterior organs  
removed

Source: Medi-clip: Grant's Atlas, Thorax and Abdomen

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## Cross-section of Abdomen Showing Kidneys in Retro-peritoneum



Source: Medi-clip: Grant's Atlas, Thorax and Abdomen

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## Anatomy Definitions

### Parenchyma

- Solid part of kidney where process of waste excretion takes place

### Cortex

- outer layer of parenchyma consisting of connective tissue

### Medulla

- Area of kidney where filtration and concentration of wastes takes place

### Capsule

- Dense fibrous covering of kidney

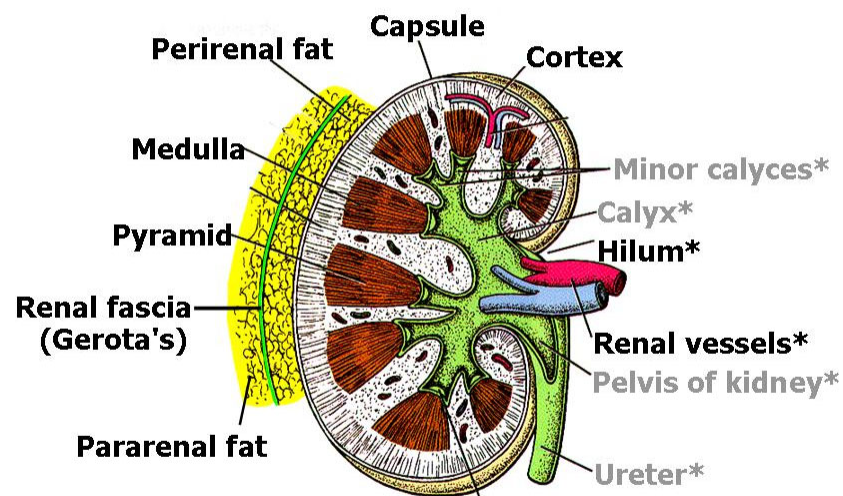
### Gerota's fascia

- Layer of connective tissue between kidneys and psoas muscles

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## C64.9 Kidney Anatomy



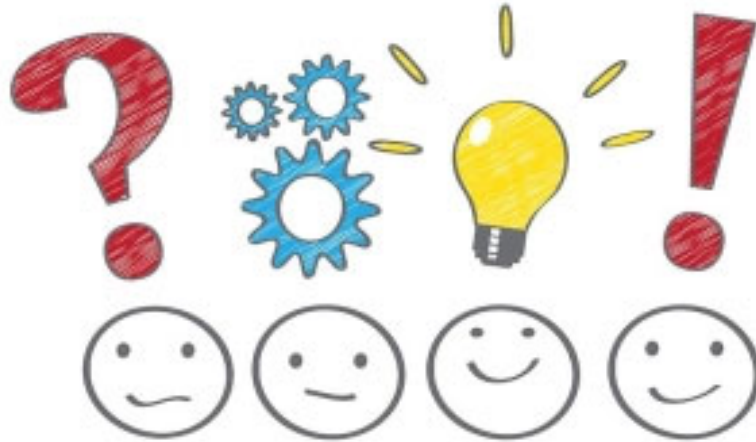
\* not part of kidney parenchyma

Source: Snell, Clinical Anatomy for Medical Students

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Questions?  
lori-somers@uiowa.edu



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