

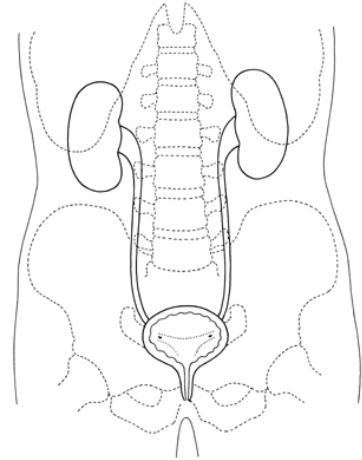
# The Urinary System

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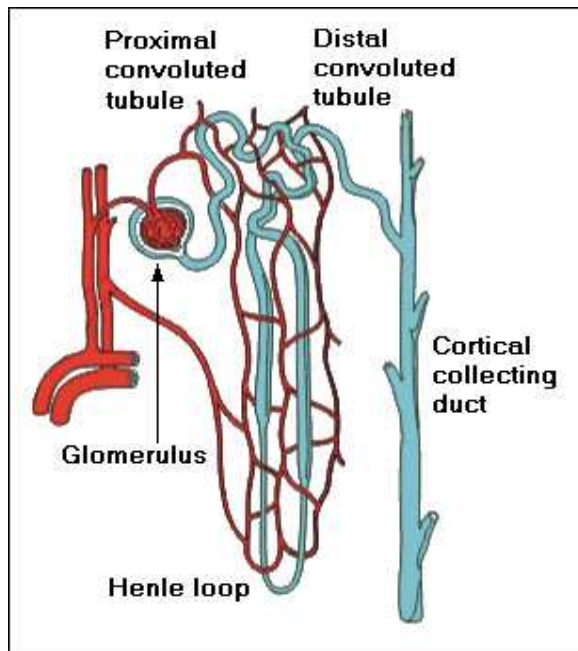
## Reading

The urinary system **consists** of the following organs: two kidneys, two ureters, a urinary bladder and a urethra. The functional unit of the kidney is the Nephron. The functions of the urinary system include regulation of the body fluid volume, pH, osmolarity, and electrolyte composition; excretion of metabolic waste products and excretion of **foreign** substances; activation of vitamin D; and production of the hormones renin and erythropoietin.

An Overview: The average kidney is about 10 cm long, 5.5 cm wide and 3 cm in thickness. The kidneys are located on the posterior wall of the abdominal cavity and either side of the vertebral column. They are **typically** located between the level of the T12 and L3 vertebrae. The kidneys, the two ureters (which connect the kidneys to the urinary bladder) are behind the peritoneum or outside the peritoneal cavity. As a result, these organs are sometimes described as being retroperitoneal. The bladder is located in the pelvic cavity under the peritoneum. Each ureter (approximately 30 cm long) **descends** lateral to the vertebral column and enters the posterior, inferior surface of the bladder. The urethra exits the inferior surface of the bladder and **empties** to the exterior of the body. In females the urethra is short, about 4 cm, while in males it is about 19 cm long.



The Nephron: The **real** work of the urinary system is done by the nephrons within the kidneys. The 2



ureters and the urethra are little more than **conduits** for moving urine; and the bladder is used to hold urine between **periodic** urinations (micturitions). Each kidney contains about 1.25 million nephrons. On average 20% of the cardiac output goes to the kidneys each minute or about 1 liter of blood per minute (renal blood flow). From that liter of blood the nephrons filter and **process** about 125 ml per minute. If all of the filtered amount were **turned into** urine, it would equal about 180 liters per day. However, the nephrons **aggressively** reabsorb most of the filtered water and put it back into the circulation. **Ultimately** only about 1.5 liters (less than 1%) of water is excreted per day. This volume is **more than enough** to remove the waste products processed by the kidneys. In general, the kidneys must excrete a minimum of 500 ml per day to remove the necessary amounts of waste products. Even at 1.5 liters per day, each nephron is only processing about 0.0006 ml per day or 0.000000417 ml per minute. As you can see in the diagram, the nephron is **intimately** associated with the vascular system. Plasma is

filtered at a **specialized** capillary called the glomerulus, while the reabsorbed water is returned to the circulation **via** capillaries that surround the **remaining parts** of the nephron. As the filtered fluid passes along the nephron the cells **lining** the tubules **adjust** osmolarity, volume, pH and electrolyte balance. Once the fluid leaves the collecting duct its composition can no longer be adjusted. From this point on, it is called urine and is **destine** for elimination without any **further** changes.

**Check Point – Vocabulary**

Instructions: Match the words in column A with the contextual meaning in column B.

A	B
1. <b>consists</b>	A. additional
2. <b>foreign</b>	B. by means of / by way of
3. <b>typically</b>	C. changes designed to make something correct or perfect
4. <b>descends</b>	D. commonly / often the case
5. <b>empties</b>	E. describing what will happen to something else over time
6. <b>conduits</b>	F. finally
7. <b>periodic</b>	G. goes in a downward direction
8. <b>process</b>	H. greater than required in order to accomplish a task
9. <b>turned into</b>	I. in close contact / in close spatial relationship
10. <b>aggressively</b>	J. inner layer of some structure
11. <b>ultimately</b>	K. is made up of
12. <b>more than enough</b>	L. not a normal part of something
13. <b>intimately</b>	M. passageway
14. <b>specialized</b>	N. repeated process
15. <b>via</b>	O. steps involved with something procedure or activity
16. <b>remaining parts</b>	P. that which is left over / that which has yet to be involved
17. <b>lining</b>	Q. the contents of something are released or removed
18. <b>adjust</b>	R. to convert something into something else
19. <b>destine</b>	S. to do something actively
20. <b>further</b>	T. very specific

## Clinical Corner

**Catheterization:** The process of placing a catheter into the bladder to drain urine from the bladder. Patients who are unconscious or are immobile are catheterized until they are able to urinate either with or without assistance. Catheterization is common cause of hospital acquired cystitis. For paraplegics and quadrapelgics, cystitis from repeated catheterization is constant problem.

**Clean catch:** Method used to get a urine sample. Urine in the bladder is normally sterile (without bacteria) however, there is bacteria in the distal region of the urethra. To avoid contaminating the urine sample with the bacteria in the distal urethra, urination is started, to flush the bacteria from the urethra, then the specimen cup is placed in the urine stream to catch the remainder of urine in the bladder.

**Continuous ambulatory peritoneal dialysis (CAPD):** A process in which clean dialysis fluid is introduced into the peritoneal cavity with a catheter. The dialysis fluid draws waste products from the blood as the blood passes through the capillaries of the peritoneum. Later the dialysis fluid containing waste products is drained from the peritoneal cavity and replaced with fresh fluid. The process allows the patient to continue with daily activities since they do not have to be linked by tubing to a dialysis machine.

**Cystitis:** Inflammation of the urinary bladder.

**Dip stick urine tests:** Quick test for urine in which a plastic strip with various reagents patches is immersed in a urine sample. The colors changes seen on the reagent patches are compared with a standard chart to determine if there are changes. Dip sticks can detect such things as Glucose, Ketones, Protein, pH, Blood/Hemoglobin, Leucocytes,

Urobilin, Specific gravity, Nitrite, Urobilinogen and Bilirubin.

**Diuretic:** A substance [caffeine, alcohol] or drug [furosemide (Lasix), that increases urine production.

**Dysuria:** Difficult or painful urination. (dys = difficult or bad) (ur = urine)

**Frequency:** A symptom of cystitis in which the patient feels that they must urinate much more frequently than normal.

**Glucosuria:** Presence of glucose in the urine. (gluco = glucose)

**Gonorrhea:** Type of urethritis caused by *Neisseria gonorrhoeae* (a gram-negative diplococcus). (rrhea = flowing)

**Hematuria:** Presence of blood in the urine.

**Hemodialysis:** The process in which the functions of the kidneys are replaced by a machine. Blood from the patient is passed through a machine that filters, cleans and adjusts the blood before being returned to the patient.

**Incontinence:** Inability to retain urine in the bladder.

**Nosocomial:** An infection acquired while in the hospital.

**Proteinuria:** Presence of protein in the urine.

**Pyelogram:** An X-ray of the kidney and the ureters. (pyelo = pelvis)

**Pyelonephritis:** Inflammation of the kidney and renal pelvis.

**Renal calculi (Kidney stones):** Kidney stones are calcium deposits that precipitated from the urine. Most are small enough to flow through the system and exit in the urine. However, some can be large

enough that they obstruct the flow of urine.

**Urethritis:** Inflammation of the urethra.

**Urgency:** A symptom of cystitis in which the patient feels a strong desire to urinate.

**Urinary obstruction:** A situation in which something (calculi, tumor) blocks the flow of urine through some part of the flow pathway.

**Urinary tract infection UTI:** An infection of the urinary tract usually caused by a bacteria, and usually of the urethra or urinary bladder. *E. coli* is the most common bacteria associated with this condition.

**Void:** A verb use to describe the process of emptying the bladder.

## Talking with the Patient

Instructions: work with a partner. One person can read the part of the doctor and the other person can read the part of the patient.

1. D: Good afternoon Ms. Jones.
2. P: Hi Dr. Musaf.
3. D: What seems to be the problem?
4. P: I think I may have a bladder infection.
5. D: Really – tell me what kind of symptoms you've been having.
6. P: For starters I've got a crampy feeling in my lower abdomen and I also have some bad lower back pain.
7. D: When did the cramps start?
8. P: About a week ago.
9. D: And you're sure they are not related to your period.
10. P: Yes, I finished my last period about two weeks ago.
11. D: Are your periods normal – any problems – excessive bleeding, more cramping than normal or irregular timing?
12. P: No, they are normal.
13. D: What is your normal cycle?
14. P: About 30 days.
15. D: Okay – go on – what other symptoms do you have?
16. P: It seems like I have to pee every few minutes – I always have the sensation that I need to go.
17. D: That is a common symptom.
18. P: There is also a slight burning sensation when I urinate and my urine is cloudy and has a strong smell. I've also had a low grade fever for the past few days.
19. D: Have you had any recent illnesses – a cold or flu?
20. P: No – I've been very healthy.
21. D: Well -- all the things you have described certainly fits cystitis. We can check it out pretty easily. Here is a sample cup – please take it down to the toilet and bring back a sample. We will need a clean catch – so start the stream first and then get the sample. We don't need much – half the cup is more than enough.
22. P: Okay – no problem, I already feel the urge to go again.
23. D: Great.

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24. P: I'm back! Is this enough?
25. D: Yes that's fine. Let me test it with one of these urine quick test strips.
26. P: Really – it's that simple?
27. D: Yes. This little strip can test a variety of things some of which are very indicative of a bladder infection.
28. P: Maybe I should get a can of those.
29. D: You can – they are sold over the counter. Well – let's see what we've got? Nitrates are positive, leukocytes are positive and a trace of red blood cells – everything else is normal.
30. P: Is that good or bad?
31. D: These findings are consistent with a bladder infection. Nitrites are byproducts of bacterial metabolism and leukocytes are the cells your body uses to fight the bacteria.
32. P: What about the blood?
33. D: Blood is sometimes present if the infection is moderate to severe. I want to do one more thing – let's put a little bit in a tube and spin it down.
34. P: What will that do?
35. D: That will concentrate all this cloudy material in the bottom of the tube – we can then stain it and take a look at it under the microscope.

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36. D: I got a TV monitor hooked to the microscope so you can also see what in there.
37. P: Great – I think?
38. D: Okay – well see all those little things swimming about on the monitor?
39. P: Yes.
40. D: Those are bacteria – lots of them.
41. P: Those are in my bladder?
42. D: Yes and they seem very happy.
43. P: #@\$#%#\$
44. D: Don't worry – 90% of bladder infections are caused by E. coli which is a common bacteria and can be easily treated.
45. P: Okay.
46. D: Are you currently taking any medications?
47. P: No.
48. D: Are you seeing any other doctors for any health problems?

49. P: No.
50. D: Okay – well, I’m going to prescribe you seven days of Macrofantin, which is an antibiotic and I’m also going to give you 2 days worth of pyridium, which will relieve some of the more unpleasant symptoms you’re experiencing.
51. P: Just 2 days worth?
52. D: While you will need to take the antibiotic for 7 days, the symptoms should be gone in 2 days. So I don’t think you will need more than 2 days of Pyridium.
53. P: Okay.
54. D: You will need to take the Marcodantin four times a day – and you should take it after meals. I want you to start it right away – so grab a bite to eat and get the first one down ASAP. You can then take one after dinner tonight and then one more with a glass of milk before bed. Tomorrow you can just divide the four doses evenly throughout the day.
55. P: Okay.
56. D: The Pyridium should be taken 3 times a day and it should also be taken with food and at least 2 glasses of water. Now Pyridium will turn your urine red-orange – so don’t be alarmed – this is quite normal. And Pyridium will stain your underwear – so don’t wear any that you don’t want stained orange.
57. P: That’s good to know.
58. D: As I said, the pain should be gone in 2 days – if the pain persists after 2 day I want you to call me.
59. P: Okay.
60. D: I also want you to increase your water intake – and make sure you finish all the antibiotics, even if you’re feeling fine. If you don’t, you run the risk of the infection coming back.
61. P: Okay.
62. D: I’m also going to send your sample to the lab for a positive ID of the bacteria in your urine. It’s not likely, but if it turns out to be something other than E. coli I may want to change the antibiotic you’re taking. If that happens I’ll call you and let you know. If you don’t hear from me, you can assume that everything is fine. But I expect everything to be okay and after 7 days you should be fully recovered.
63. P: Okay.
64. D: Before you go – can you tell me what sort of work you do?
65. P: I work in a microprocessor assembly factory. Why? Is that significant?
66. D: Do you work in one of those clean rooms and wear those white suits?
67. P: Yes – but the work is easy – nothing strenuous and my coworkers are great.
68. D: I’m not worried about the labor part. How often do you get to go to the toilet?
69. P: Oh we can go whenever we want – but we have to go through the hassle of un-suiting, then going and re-suiting.
70. D: So I’m guessing you go as seldom as possible.
71. P: Pretty much.
72. D: How many times do you urinate each day?
73. P: I don’t know – may 3 or 4 times.
74. D: How about at night?
75. P: Normally never – but since this started – may 3 or 4 times a night.
76. D: Isn’t it uncomfortable to work while needing to pee?
77. P: We all have a routine – we rarely drink anything before lunch and almost nothing at lunch. If you don’t drink – you don’t have to pee.
78. D: How much water do you drink each day?
79. P: Not much, 2 cups of coffee, a glass of tea and a soda maybe.
80. D: Well that is a problem – the dehydration and the infrequent urination is the perfect recipe for a bladder infection. If you are going to continue at this job you are going to have to start drinking and urinating more normally or you’re going to be in here with a bladder infection every few months. It may be a hassle, but you and your coworkers need to make some changes. If it would be helpful for me to explain this to the plant manager I will be glad to talk to them.
81. P: Thanks – but I don’t think they mind – it’s more about us just not wanting to go through the hassle. But I guess I’ll have to just get used to it.
82. D: The key is to not dehydrate yourself and to urinate when the urge hits – I mean you can delay for a while, but don’t hold it for an hour or more.
83. P: Okay.
84. D: And try to drink at least a liter and half of water each day.
85. P: Well do.

86. D: Here – this brochure that will give you more information about cystitis and things you can do to avoid future cases.  
 87. P: Great thanks.  
 88. D: Unless, there is a problem, I don't think there will be a need for a follow-up visit.

89. P: Okay.  
 90. D: Great – call me if you have any problems.  
 91. P: Okay – thanks Dr. Musaf. Have a good day.  
 92. D: You too – bye.

### Taking with the Patient

**Instructions:** Reread the interview and then, working with a partner, try to recreate the interview using some of the question variations below – then switch roles and recreate the interview again using other question variations. Focus on using the past simple and present perfect tenses during the interview.

### Questions to Remember (note the verb tenses used in the different types of questions)

- ⇒ What kinds of symptoms have you been having?
- ⇒ When did the cramps start? (past simple)
- ⇒ How long have you had the cramps? (present perfect)
- ⇒ Are your periods normal?
- ⇒ What is your normal cycle?
- ⇒ What other symptoms do you have?
- ⇒ Are you currently taking any medications?
- ⇒ Are you seeing another doctor for any health problems?
- ⇒ How much water do you drink each day?
- ⇒ How many times do you urinate during the day?
- ⇒ How many times do you urinate at night?

**Instructions:** Review the interview and find line numbers that correspond to the interview elements listed below. In some cases different aspects of the same interview element may be addressed in different parts of the interview – one such case has been done as an example. The questions in the table below are not in the sequence of the interview.

Interview element	Line numbers
Patient greeting.	
Request for information on patients chief complaint	
Request for information on patients current and recent health	
Request for information about medications being taken by patient	
Request for information about working environment	
Request for information regarding monthly cycle	
Explaining lab tests results	
Providing an initial diagnosis	
Explaining what additional tests will be used to confirm the diagnosis	
Request for behavioral change regarding urination and hydration	80, 84
Offering a prognosis	
Recommendations for patient hydration	
Providing patient written information about regarding their condition	
Explaining how lab results will be communicated	

Request for information regarding urination habits and frequency	
Concluding the visit	

### Check Point – Comprehension

Instructions: Work with a partner and take turns asking the following questions. When answering, practice giving full answers, not short cryptic answers – don't limit your use of language.

1. What is the patient's chief complaint?
2. Based on the interview, what is the minimum and maximum age you would predict for this patient? What is the rationale for your conclusion?
3. Is this patient seeing any other doctors for health issues?
4. How long has the patient been experiencing the chief complaint?
5. What symptoms does the patient include as part of the description of their CC?
6. What is the initial diagnosis?
7. Describe the medications included in the treatment plan. What is the purpose of each?
8. What urine parameters were particularly important in making the diagnosis? Why?
9. Why is the doctor interested in the patient's monthly cycle?
10. Why is the doctor concerned about the patient's work environment?

### Practice Dialog

Instructions: Work with a partner to complete the two scenarios. After completing the first scenario, switch roles and complete the second scenario.

#### Scenario A:

Doctor -- Initiate a phone conversation with the patient. (1) explain that the lab results indicate a different bacteria (2) tell the patient that you are going to change her medication to Bactrim (3) explain that the new medication should be taken PO, q12h x 10 days, 1 hr ac or 2 hr pc with 2 glasses of water (4) reiterate the prognosis (5) tell the patient to call if the prognosis does not evolve as expected, (6) reiterate the need for changes in water intake and urination frequency, (7) conclude the conversation.

Patient – Ask relevant and realistic questions in response to the information the doctor provides.

#### Scenario B:

Doctor – Initiate a phone conversation with the patient. (1) explain that the lab results confirmed cystitis but also indicated a gonorrhea infection as well (2) explain that she needs to contact all the sexual partners she has had in the last 60 days and tell them that they need to be tested for gonorrhea (3) reassure the patient that this is not a serious complication and the overall prognosis is still fine (4) tell the patient that she needs to come in to get an injection of Rocephin (5) explain that this medication must be injected and will work with only a single dose (6) explain that the disease must be reported, but that the information is confidential (7) schedule an appointment, (8) conclude the conversation.

Patient – Ask relevant and realistic questions in response to the information the doctor provides.

**Check Point – Asking questions**

Instructions: work with a partner to write questions that would generate the listed responses from a patient. Then put the Q and A in what you think is the most logical sequence. Compare your sequence with other groups.

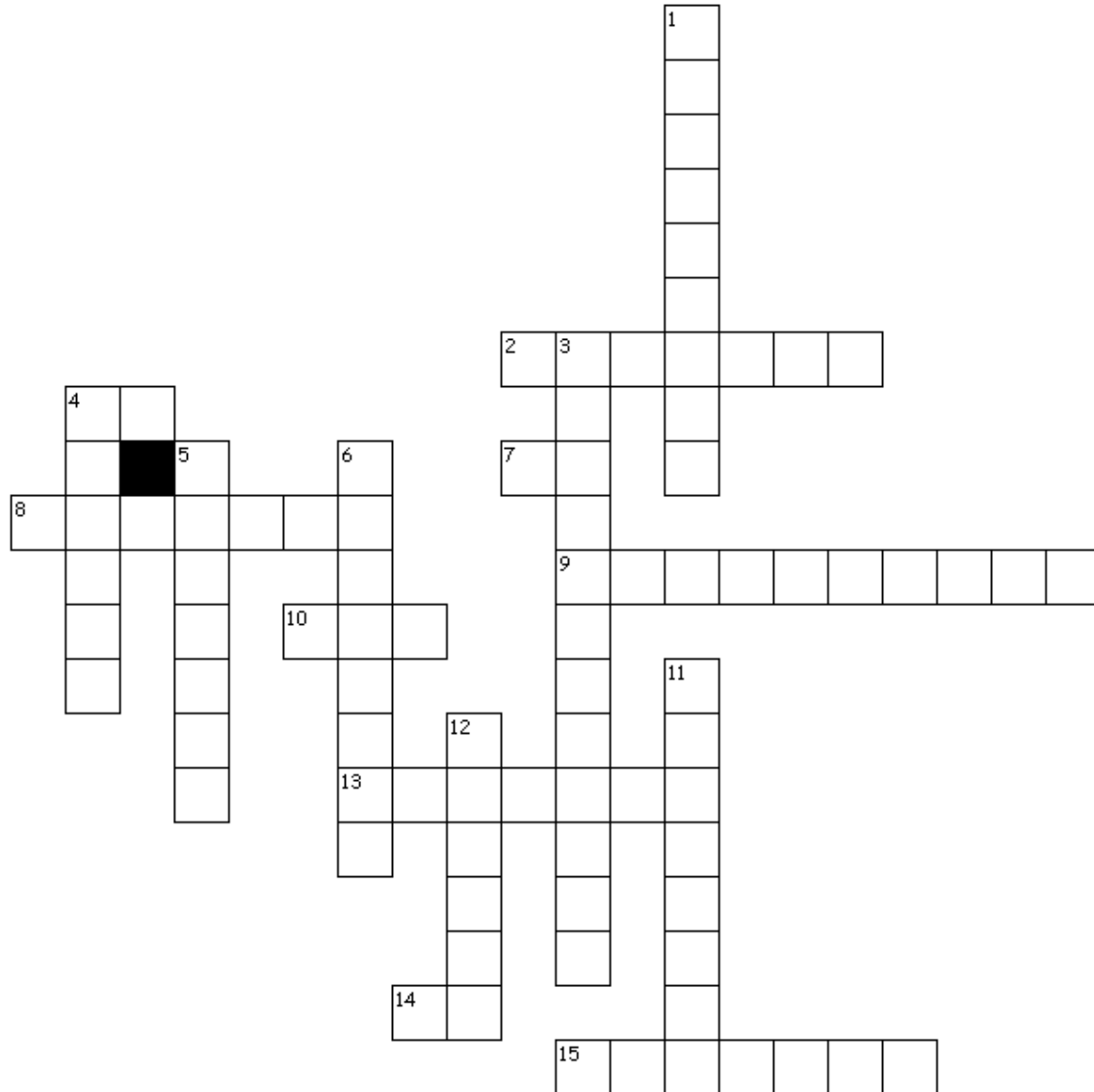
Questions	Responses	Sequence
	I usually go three or four times a day.	
	I've them for about 1 week.	
	My cycle is about 30 days,	
	I work in a microchip factory.	
	Yes, it is very cloudy and has a foul smell.	
	My health has been fine I haven't had any recent illnesses.	
	No, I've never had this problem before.	
	I don't drink much water, some coffee and tea.	
	No, I'm not taking any medicines.	
	No, my periods have been very normal.	

**Check Point – Present Perfect**

Instructions: Rewrite the sentences in column A in the present perfect form.

A	B
1. I had the cramps for one week.	1.
2. I worked at the microchip factory since 2005.	2.
3. I was not sick with a cold or flu in over a year.	3.
4. My periods are normal.	4.
5. I lived in my present flat for 6 years.	5.
6. I never had cystitis before.	6.
7. I had asthma since I was 7 years old.	7.
8. I no idea how much urine I pass each day.	8.
9. I never see my urine so cloudy.	9.
10. I never liked drinking water.	10.

## Cross Word Puzzle



Across	Down
2. by-product of bacterial metabolism found in the urine in cases of cystitis	1. blood in the urine
4. abbreviation for take medication by mouth or orally	3. inability to control urination
7. abbreviation for before meals	4. common name for a woman's monthly cycle
8. a strong feeling of the need to urinate	5. functional unit of the kidney
9. an infection that is acquired while in the hospital	6. a drug used to relieve the pain and cramping of bladder infections
10. abbreviation for 4 times a day	11. inflammation of the urinary bladder
13. connects the kidneys to the urinary bladder	12. the urinary bladder is located in the _?_ cavity
14. abbreviation for after meals	
15. painful or difficult urination	

**Check Point** –Vocabulary Builder

Instructions: For each group of 4 words, find the word that is unrelated to the other 3 words.

Odd One Out			
Wheel chair	Crutch	Cane	Cast
Ureter	Prostate	Urethra	Kidney
Liver	Spleen	Pancreas	Kidney
Dysuria	Proteinuria	Hematuria	Glucosuria
Excise	Open	Remove	Take out
Initiate	Begin	Start	Continue
Acquired	Obtained	Received	Produced
Goal	Objective	Result	Aim
Assess	Discover	Determine	Evaluate
Distended	Bloated	Occupied	Swollen
Puffy	Edematous	Swollen	Pitted
Wax	Increase	Get bigger	Wane
Precede	Proceed	Before	Come first

**Check Point** – Past Continuous and Past Simple

Instructions: Use the word pairs to complete the sentences. One word in each pair should be in the past continuous and the other word in the pair should be in the past simple.

Mini-lesson: A common use for past continuous relative to the past simple is when we want to describe a process that was taking place in the past that was interrupted by some event.

Example: I *was surfing* the internet when my brother *called* from Alaska. (In this example “surfing” is the process that was taking place in the past, which was interrupted when my brother “called.”)

[look / walk]	[visit / sound]	[start / get]	[start / make]	[complain / come]
[operate / start]	[shake / arrive]	[become / study]	[ski / notice]	[stop / talk]
1. I _____ when I first _____ the blood in my urine.				
2. I _____ my friend in the hospital when the fire alarm _____ and the patients had to be evacuated.				
3. Just as I _____ to urinate I _____ this terrible pain in my urethra.				
4. We _____ friends when I _____ at the university.				
5. The doctor _____ to pass a kidney stone just as he _____ the incision to remove the patient’s appendix.				
6. Whenever I _____ by to talk to the Dean, he _____ always _____ on the phone.				
7. Just as I _____ about the mess, housekeeping _____ in to clean up the office.				
8. The doctor _____ still _____ when the patient _____ to come out from under anesthesia.				
9. While the doctor _____ for a hypodermic needle, the patient quietly _____ out of the office.				
10. The patient _____ with chills when the doctor _____.				

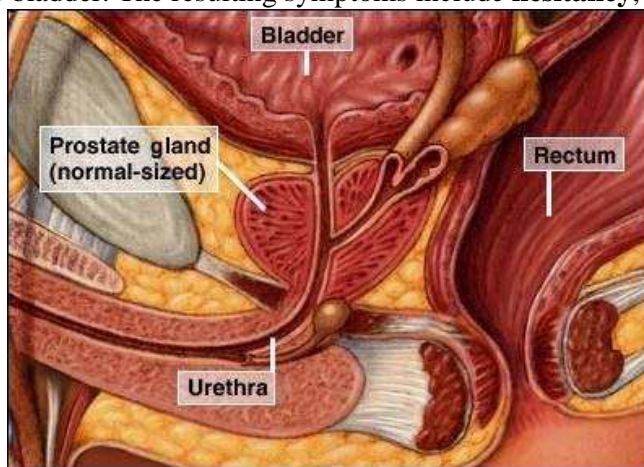
## Reading

### Focus on: Benign prostatic hyperplasia

Prostatic hyperplasia should not be **confused** with prostatitis. The most common cause of prostatitis is a bacterial infection which can be treated with antibiotics. Benign prostatic hyperplasia is a hormone **induced** increase in the number of cells in the prostate gland. Because the prostate completely surrounds the urethra, any increase in the size of the prostate has the potential to **compress** the urethra and **restrict** or completely block the flow of urine from the bladder. The resulting symptoms include **hesitancy**, **intermittency**, **incomplete voiding**, **weak urinary stream**, and **straining**. Additionally patients experience **frequency**, which when it occurs at night is called nocturia, and **urgency**. If left untreated the condition can lead to bladder infections, urethral infections, bladder stones and urinary **retention** with resulting bladder **distension**.

Benign prostatic hyperplasia affects middle-aged and elderly men. About one-half of men over fifty have some degree of hyperplasia and the percentage increases with age. By age 90, the percentage of men with this condition may be as high as 90%. The condition is related to the production of testosterone, although the exact hormonal interactions that lead to the condition are still being **elucidated**. What is clear is that circulating testosterone is converted to dihydrotestosterone (DHT) by the stromal cells of the prostate gland. DHT then binds with nuclear androgen receptors which lead to transcription of mitogenic growth factors that act on the stromal and near by epithelial cells. The increased mitosis leads the hyperplasia **associated** with this condition.

Benign prostatic hyperplasia can be **managed** with drugs (alpha blockers) that relax the smooth muscle in the prostate gland and the smooth muscle associated with the internal urethral sphincter. The relaxation allows urine to pass more freely through the enlarged prostate gland. If pharmacological interventions are **inadequate** there are a variety of surgical / laser techniques that can be used to reduced the size of the prostate gland.



Prostate Gland and Urethra

### Check Point – Word pairs

Instructions: Draw lines between the words in column A and B to make a meaningful word pair related to the article above.

A	B
androgen	cause
bacterial	cells
bladder	distention
common	factors
growth	gland
incomplete	hyperplasia
pharmacological	infection
prostate	intervention
prostatic	muscle
smooth	receptor
stromal	retention
surgical	technique
urinary	voiding



**Check Point – Vocabulary**

Instructions: Match the term in column A with its contextual meaning in column B. Terms are taken from the article on Benign Prostatic Hyperplasia.

A	B
1. Associated	A. to think something is one thing when it is something else
2. Compress	B. to cause something to happen
3. Confused	C. to squeeze something / to reduce the size of something
4. Distension	D. to limit / to impede
5. Elucidated	E. delay in starting urination
6. Frequency	F. repeated stopping and starting of the urine stream
7. Hesitancy	G. inability to completely empty the bladder
8. Inadequate	H. reduced urine flow rate during micturition
9. Incomplete voiding	I. having to use more force than normal to do something
10. Induced	J. having to urinate often
11. Intermittency	K. a strong desire to urinate
12. Managed	L. involuntary withholding of urine
13. Restrict	M. to be enlarged beyond normal limits
14. Retention	N. to be fully explained
15. Straining	O. to be linked to something / to be related to something
16. Urgency	P. to control
17. Weak urinary stream	Q. ineffective / lacking / insufficient

**Check Point** – Talking about the urinary system.

Instructions: Work with a partner. Read the sentences in column A and find the word in column B that best completes the sentence.

A	B
1. The patient reported having a _____ during urination.	A. analog
2. Diabetics have to _____ their urine for protein, ketones and glucose each day.	B. burning sensation
3. Cystitis can cause abdominal _____.	C. cloudy
4. Some drugs used during anesthesia can cause urinary _____.	D. cramps
5. Prostatitis is usually _____ with antibiotics.	E. dehydration
6. Benign prostatic hyperplasia is a common problem in _____ men.	F. dysfunction
7. Acute urinary retention produces an extremely _____ bladder on palpation.	G. elderly
8. With chronic retention the bladder _____ and the distention caused by retention is usually painless.	H. examined
9. The prostate gland is often _____ by palpation through the anterior wall of the rectum.	I. extend
10. The urogenital diaphragm forms the external urethral _____.	J. immunosuppression
11. While females do not have a prostate gland they do have an _____ called the Skene's gland, and like the prostate it can sometimes become inflamed due to a bacterial infection.	K. indicator
12. Prostatic specific antigen (PSA) is an _____ of a prostatic malignancy.	L. odor
13. Women tend to have more urinary tract infections (UTIs) than men because of the _____ between the urethral opening and the anus and because of shorter urethral length.	M. proximity
14. Patients who receive kidney transplants require life-long _____ to prevent rejection of the transplanted kidney.	N. retention
15. Statistics indicate that a kidney transplant can _____ a patient's life by 10 or 15 years relative to dialysis.	O. sphincter
16. Normal urine is usually described as being _____ in color.	P. straw-yellow
17. Bacterial infections can produce _____, murky or turbid urine.	Q. stretches
18. Dark brown urine can indicate liver _____.	R. tender
19. Certain vegetables, such as asparagus, can cause the urine to have a strong _____.	S. test
20. _____ can cause the urine to be darker yellow than normal.	T. treated

## Talking with the Patient

Instructions: Work with a partner. One person should play the role of the doctor while the other plays the role of the patient. The doctor should practice asking clear, concise questions to get information about the outlined items. Once finished, switch roles and repeat. The patient needs to provide realistic information – the patient can pretend to have one of the following: cystitis, prostatic hyperplasia, or polycystic kidney disease.

- 1) Introductions
  - a) Give your name and get the patient's name, address, age, etc.
  - b) Ask an "open-ended" question about the patient's CC.
- 2) History of CC.
  - a) Dysuria
    - i) Onset
    - ii) Severity
  - b) Frequency
    - i) Quantify frequency
      - (1) nocturia
    - ii) Quantify volume
      - (1) Polyuria
      - (2) Oliguria
      - (3) Anuria
  - c) Urgency
  - d) Hesitancy
  - e) Poor stream
  - f) Incontinence
  - g) Hematuria
  - h) Urethral discharge
  - i) Abdominal pain
  - j) Fever
  - k) Edema
    - i) Location
      - (1) Quantify
- 3) Sexual history
  - a) Number of partners
  - b) Frequency of intercourse
  - c) Intercourse alternatives
- 4) Past medical history
  - a) Neurological diseases that could affect urinary system
  - b) Hypertension
  - c) Diabetes
  - d) Obstetric history
  - e) Surgical procedures that could affect the urinary system
- 5) Drug history (drug and dosage)
  - a) OTC drugs
  - b) Prescription drugs
  - c) Drug allergies
- 6) Family history
  - a) Family history of kidney disease
- 7) Lifestyle history
  - a) Smoking
    - i) Quantify
  - b) Drinking
    - i) Quantify
  - c) Diet
    - i) Specify
  - d) Occupation
    - i) Any connection to CC

**Check Point – Anatomy Review**

Instructions: Work with a partner to label the diagram. Put the number in the blank next to the corresponding name.

Urinary Anatomy	
<p>___ afferent arteriole</p> <p>___ collecting tubule</p> <p>___ distal tubule</p> <p>___ efferent arteriole</p> <p>___ glomerular capsule (Bowman’s capsule)</p> <p>___ glomerulus</p> <p>___ loop of nephron (loop of Henle)</p> <p>___ proximal tubule</p> <p>___ vasa recta capillaries</p>	<p>The diagram shows a nephron and its connection to a collecting duct. The afferent arteriole (3) enters the glomerular capsule (2) containing the glomerulus (1). The efferent arteriole (4) exits. The proximal tubule (5) leads to the U-shaped loop of Henle (6) with its vasa recta capillaries (8). The distal tubule (7) leads to a collecting duct (9).</p>

**Self-test**

1. The average person produces between \_\_\_ liters of urine each day.
  - a. 2 – 3
  - b. 1.5 – 2
  - c. 3 – 4
  - d. 180
2. Benign prostatic hyperplasia normally occurs in men under 50.
  - a. True
  - b. False
3. Dysuria means blood in the urine.
  - a. True
  - b. False
4. The color of normal urine is:
  - a. Golden yellow
  - b. Pale yellow
  - c. Clear
  - d. Reddish
5. The hormone produced by the kidney is:
  - a. Testosterone
  - b. Renin
  - c. Erythropoietin
  - d. Vitamin D
6. The kidneys and the ureters are said to be:
  - a. Retro-peritoneal
  - b. Sub-peritoneal
  - c. Retro-pleural
  - d. Retro-pericardial
7. The most immediate solution to acute urinary retention is urinary catheterization.
  - a. True
  - b. False
8. Kidney stones are usually:
  - a. Calcium compounds
  - b. Iron compounds
  - c. Sodium compounds
9. The kidneys normally receive between 20% and 25% of the cardiac output.
  - a. True
  - b. False
10. A diuretic is a substance that increases urine production.
  - a. True
  - b. False

## Suggested Mini-Lectures

The mini-lectures listed below can be used as topics for instructors to add additional information to this unit or the topics can be assigned to students for classroom presentations.

- ⇒ Further discussion of the anatomy of the kidney
- ⇒ Further discussion of the anatomy of the nephron
- ⇒ Discussion of the physiology of the nephron
  - Glomerular filtration
  - Tubular reabsorption
  - Tubular secretion
- ⇒ Discussion of the renin-angiotensin-aldosterone system
- ⇒ Discussion of plasma clearance
- ⇒ Discussion of mechanism for excretion of concentrated urine