

A Disease Process Module:

UNDERSTANDING SEPSIS

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Developing Top-Notch CNAs, One Inservice at a Time



A Disease Process Module:

UNDERSTANDING SEPSIS

We hope you enjoy this inservice, prepared by registered nurses especially for nursing assistants like you!

Instructions for the Learner

If you are studying the inservice on your own, please do the following:

- Read through **all** the material. You may find it useful to have a highlighting marker nearby as you read. Highlight any information that is new to you or that you feel is especially important.
- If you have questions about anything you read, please ask _____.
- Take the quiz. Think about each statement and pick the best answer.
- Check with your supervisor for the right answers. You need **8 correct** to pass!
- Print your name, write in the date, and then sign your name.
- Keep the inservice information for yourself and turn in the quiz page to _____ no later than _____. Show your Inservice Club Membership Card to _____ so that it can be initialed.
- Email In the Know at feedback@knowingmore.com with your comments and/or suggestions for improving this inservice.

After finishing this inservice, you will be able to:

Define sepsis and discuss why it is on the rise.



List three early warning signs of sepsis and discuss your role in recognizing and reporting these right away.



List at least three risk factors that increase a person's chance of developing sepsis.



List at least five things you can do to prevent sepsis.



Demonstrate standard infection control practices in your daily work with clients.

THANK YOU!



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A Disease Process Module: Understanding Sepsis

THE IMMUNE SYSTEM OVERREACTS

You just arrived at work. You get a brief report from the outgoing shift. Everything seems normal.

*The nurse tells you that one of your clients, Mrs. Mayes, was diagnosed with a **urinary tract infection** yesterday. She asks you to keep a close eye on her **vitals** and monitor **strict I&O**.*

When you enter Mrs. Mayes' room at 0730 . . . she is sleeping. You move quietly, trying not to disturb her.

*You open the blinds and turn on a light. This is when you notice her color. She looks **pale**, almost **bluish**. You turn on the overhead light and try to arouse her, but she is too **lethargic**.*

You grab the machine and check her vitals right away. You get:

- **Heart rate:** 125 beats/min
- **Blood Pressure:** 87/52 mm Hg
- **Respirations:** 38 breaths/min
- **Temperature:** 38.6° C (101.5° F).

*You call for the nurse. The nurse suspects Mrs. Mayes may be developing **sepsis** and she activates the **emergency response protocol**.*



SO, WHAT EXACTLY IS SEPSIS?

- Sepsis is a complex condition that happens when the body's immune system **overreacts to an infection**.

Normally, when the immune system recognizes a foreign invader, it responds by sending white blood cells to the area to kill the germ. There is some swelling at the area of infection.

With sepsis, this process goes into **overdrive**—causing widespread inflammation (swelling) and blood clots that block blood flow throughout the body.

Without blood and oxygen, the body's vital organs (heart, lungs, brain, kidneys, liver) will eventually shut down.

Sepsis is on the rise. It has become the 10th leading cause of death in the United States. More people die from sepsis than from breast, colon, pancreatic and prostate cancer combined.

Keep reading to learn all you can about sepsis. You'll learn who is most at risk, the early warning signs, how it is treated and even how sepsis can be prevented!

A CLOSER LOOK AT WHAT'S REALLY HAPPENING

For years, terms that described this inflammatory response to infection were confusing. You may have heard it referred to as sepsis, blood poisoning, bacteremia or septicemia. In 1991, the American College of Chest Physicians (ACCP) developed more exact language and outlined the levels of severity. **Here are the official terms related to sepsis in order of seriousness:**

INFECTION

An invasion of the body by a disease causing "germ," such as a bacteria, a virus, a fungus or a parasite.

SYSTEMIC INFLAMMATORY RESPONSE SYNDROME (SIRS)

A "whole body" inflammatory response to an infection, trauma or burn. SIRS is diagnosed when *two or more* of the following symptoms are present:

- **Temperature** above 38° C (100.4° F) or below 36° C (96.8° F)
- **Heart rate** above 90 beats/min
- **Respiratory rate** above 20 breaths/min
- **White blood cell count** above 12,000 or below 4,000.

SEPSIS (*Infection + SIRS*)

Sepsis is diagnosed when there are **two or more symptoms of SIRS** and the person has a known or suspected **infection**.

SEVERE SEPSIS

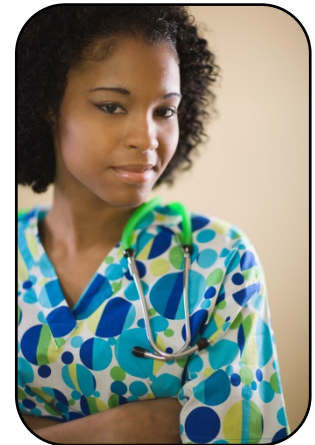
Sepsis becomes severe when there is any organ failure. Symptoms of organ failure depend on the system affected. (*See page 4 for symptoms.*)

SEPTIC SHOCK

Shock occurs when the BP becomes dangerously low (systolic BP less than 90 mmHg or a drop of 40 mmHg from the person's baseline) along with the above symptoms of organ failure.

MULTIPLE ORGAN DYSFUNCTION SYNDROME (MODS)

MODS is failure of more than one organ system. The person cannot survive without life support measures.



REMEMBER MRS. MAYES?

What was going on with Mrs. Mayes that made the nurse to suspect sepsis?

- She had a known infection.
- She had two or more symptoms of SIRS.

What about Mrs. Mayes' blood pressure? Could this be septic shock?

Did Mrs. Mayes have any symptoms of organ failure?

Share your thoughts with your supervisor and co-workers.

WHAT'S NEW?

Grab your favorite highlighter! As you read through this inservice, **highlight five things** you learn that you didn't know before. Share this new information with your supervisor and co-workers!



WHO IS MOST AT RISK?

Anyone who has an infection is at risk for sepsis. However, there are certain factors that actually increase the risk.

AGE

Sepsis is most common in older people (those over the age of 70) and in the very young (under the age of 10).

RACE

Black people are more likely to get sepsis than are white people—and black men face the highest risk.

MEDICAL CONDITIONS

Certain medical conditions can increase the risk of a client developing sepsis, including:

- Bacteremia, a bacterial infection in the blood
- Pneumonia
- Diabetes
- Trauma (bullet wounds, large burns)

WEAKENED IMMUNE SYSTEM

The risk of sepsis increases in people with weakened immune systems, such as those with:

- Cancer or cancer treatment
- HIV or AIDS
- Organ transplants
- Kidney or liver failure

INVASIVE MEDICAL DEVICES

The risk of sepsis is higher in clients who have:

- Urinary catheters
- Breathing tubes
- Artificial joints

HOSPITALIZATION

People who are in the hospital, particularly those in intensive care units, are at higher risk of developing sepsis.

GENETICS

Some people appear to have a genetic tendency toward developing sepsis.



THINK
about it!

A HEALTHY YOUNG WOMAN



Mariana Bridi da Costa, a 20 year old Brazilian model didn't have any of the usual risk factors for sepsis.

One day, she felt sick and went to the

hospital. Doctors initially diagnosed her with kidney stones.

Then, urine tests revealed that she had a *urinary tract infection* caused by a rare, *drug resistant bacteria*.

She was started on antibiotics and sent home after a few days.

Mariana returned to the hospital a few weeks later with **kidney failure** and symptoms of **septic shock**.

Doctors were forced to amputate her feet and hands in an attempt to save her life.

But, on January 24, 2009, she died. The cause of death was sepsis that resulted from a urinary tract infection.

- **Talk to your supervisor and co-workers about Mariana.**
- **Discuss why you think this terrible tragedy happened and how it might have been prevented.**

WHY IS SEPSIS ON THE RISE?

The number of people developing sepsis and septic shock has been increasing since the 1930s. In fact, the rate has nearly doubled just in the last 20 years!

The reasons for this increasing incidence include:

- **AN AGING POPULATION:** Remember, age is an important risk factor for sepsis. Older people are more likely to develop sepsis because of weakened immunity and the presence of chronic disease. So, as the population ages, there are just more elderly people around who are at risk.
- **IMMUNE SUPPRESSING MEDICAL TREATMENTS:** There is an increase in the number of people with weakened immune systems as a result of organ and bone marrow transplants, more chemo and radiation therapy for cancer, steroid therapy and HIV infection. So, as medical treatments for life threatening illnesses advance, more people are alive (but immune compromised) and therefore more at risk of developing sepsis.
- **INVASIVE MEDICAL DEVICES:** Invasive diagnostic and therapeutic procedures (including arterial lines, pulmonary artery catheters, central venous lines, ventricular shunts and Foley catheters allow pathogenic organisms to bypass the body's natural defenses contribute to the increasing incidence of sepsis.
- **ANTIBIOTIC RESISTANT ORGANISMS:** As more and more bacteria become resistant to antibiotics, infections like MRSA last longer and become more severe, increasing the risk of the infection spreading and developing into sepsis.

In spite of all the advances in diagnosis and therapy, the number of deaths associated with sepsis remains high.

- As many as **half** of all people with severe sepsis and septic shock will die. Up to **85 percent** of people with multiple organ dysfunction syndrome (MODS) will die.
- The key to surviving sepsis is early detection and early treatment. If sepsis can be diagnosed and treated *before* it progresses to severe sepsis or septic shock, the chance of survival is good.



CONNECT it now!

Apply what you know

Look at the risk factors for sepsis on page 3 and the reasons for the increasing number of cases of sepsis on this page.

Now, think about a sick client you care for right now.

What risk factors for sepsis does this client have?

What can you do to keep this client safe from sepsis?

WHAT ARE THE SYMPTOMS OF SEPSIS?

THE EARLY WARNING SIGNS OF SEPSIS INCLUDE:

- Any known or suspected **infection**

And, two or more of the following:

- **Temperature** above 38° C (100.4° F) or below 36° C (96.8° F).
- **Heart rate** above 90 beats/min.
- **Respiratory rate** above 20 breaths/min.
- **White blood cell count** above 12,000 or below 4,000.

SIGNS OF SEVERE SEPSIS

Sepsis becomes severe when there is any organ failure. Symptoms of organ failure include:

- Mottled, blotchy or marbled appearance to the skin.
- Dusky or bluish color to the skin.
- Oliguria (Very little or no urine output).
- Lethargy, reduced mental alertness.
- Difficulty or rapid breathing.
- Decreasing blood pressure.

SIGNS OF SEPTIC SHOCK

Severe sepsis progresses to septic shock in about 40 percent of all cases. Signs of septic shock include:

- **Dangerously low BP:** Systolic (top number) less than 90 or a drop of 40 mmHg from the person's baseline.
- **Widening pulse pressure.** A drop in the diastolic pressure (the bottom number of the BP)—with little or no change in the systolic pressure (the top number of the BP).

SIGNS OF MULTIPLE ORGAN DYSFUNCTION SYNDROME (MODS)

- If sepsis is not treated effectively, multiple organs will begin to lose function and fail. Unfortunately, most people who progress to this stage will die. Those who survive have an increased risk of complications and death for up to five years after recovery.



TALK about it!

Open the Discussion

Are you and your team doing enough to prevent infections in your clients?

It takes teamwork and excellent communication to make sure everyone is doing his or her part to keep clients safe from infection.

Open the discussion. Talk to your supervisor about the infection control policies and procedures for your workplace. You might want to ask:

- **What is the rate of sepsis from healthcare acquired infections for our organization?**
- **One is too many. What can we do to improve our sepsis rate?**

Volunteer to lead your peers to a higher status of infection control excellence!

You can do this by offering to train all new hires on the proper techniques in handwashing, oral care, skin care, peri-care, cath care, and preventing pressure ulcers.

When everyone is working together to prevent infection—your clients will be healthier and the rate of sepsis will drop!

MOST COMMON SOURCES OF INFECTION

Since sepsis always starts with an infection, it's important to understand where infections can come from.

BACTERIAL INFECTIONS

Bacterial infections are the most common cause of sepsis. **Some examples of bacterial infections that could lead to sepsis include:**

- Pneumonia
- Urinary tract infection
- Cellulitis (infection of the skin)
- Appendicitis
- Meningitis
- Osteomyelitis (bone infection)
- Surgical wound infections
- Infected pressure sores

Surprisingly, the infection can begin anywhere that bacteria or other infectious agent can enter the body. If the right risk factors are present . . . sepsis can result from something that seems harmless—like a **scraped elbow** or an **ingrown toenail**.

Remember, clients with invasive medical devices have an increased risk for infection. Infections at the site of these invasive devices can easily lead to sepsis:

- Urinary catheters
- Breathing tubes
- Feeding tubes
- IV's
- Dialysis ports (AV fistula or peritoneal port)
- Artificial joints

FUNGAL INFECTIONS

Fungal infections that lead to sepsis are on the rise. It is estimated that 5 percent of all cases of sepsis, severe sepsis and septic shock are caused by *Candida* (yeast infections).



THE LATEST IN SEPSIS RESEARCH

The latest news in sepsis research may both excite you and make you feel a little queasy!

Researchers have discovered that a common roundworm may be able help with the treatment of sepsis.

It turns out this roundworm secretes a protein that helps with the swelling seen in sepsis and also activates a mechanism that calls on the cells to clean up the damage caused by the infection.

Roundworm infections are often discovered in areas with poor sanitation. Roundworms can take up residence in a body for decades without being detected.

Oddly, having a roundworm infection actually *decreases* the severity of allergies and autoimmune diseases!

Researchers are looking at using the protein secreted by roundworms to treat sepsis and other conditions caused by inflammation.



DIAGNOSIS AND TREATMENT

Sepsis is usually diagnosed when there is a known or suspected infection and the client has two or more symptoms of SIRS.

However, in the elderly and people who are sick from other illnesses like cancer or other chronic disease, diagnosing sepsis can be difficult. In these cases, doctors will order a series of tests to narrow down the exact problem.

If the doctor suspects sepsis, the following tests will likely be run:

- **Blood test:** The blood can show if there is evidence of an infection (increased white blood cells), clotting problems or low blood oxygen.
- **Urine test:** This will show if there are any signs of a urinary tract infection.
- **Wound secretions:** If there is an open wound, testing a sample of the wound's secretions can help show what type of antibiotic might work best.
- **Spinal tap (lumbar puncture):** The fluid in the spine may be checked for infections, such as meningitis.
- **X-ray:** An x-ray of the lungs may be needed to confirm a suspected lung infection, like pneumonia.
- **CT Scan:** Infections in the appendix, pancreas or bowels are easier to see on CT scans.
- **MRI (Magnetic resonance imaging):** An MRI may be ordered if the doctor suspects an infection in other internal structures.

TREATMENT

Sepsis is a medical emergency! A client with signs of sepsis must be treated in a hospital. The exact treatment will depend on the source of infection and the severity of the symptoms. However, most people with signs of sepsis will need:

- **Respiratory support:** This may be as simple as placing the client on oxygen or as complex as placing the client on a ventilator.
- **Fluids:** IV fluids will be used to increase the blood pressure.
- **Antibiotics:** Antibiotics will be used to treat the underlying infection—once it is identified.



THE NEXT step!

Apply what you've learned!

In your own words (and without looking back at the material, try answering the following questions:

1. What is an infection?

2. What are three possible symptoms of SIRS?

3. What two conditions must be met for a diagnosis of sepsis?

4. Sepsis becomes "severe" when there is any _____ failure.

5. The main symptom of septic shock is:

HOW CAN YOU PREVENT SEPSIS?

Preventing sepsis starts with preventing infection! As a nursing assistant, you are a key player in the fight to prevent infections that can lead to sepsis. Standard infection control guidelines include:

- **WASH YOUR HANDS:** The single most important thing you can do to protect your clients from infection is to WASH YOUR HANDS! See more about hand washing on page 9.
- **ORAL CARE:** The mouth is full of bacteria. Keeping the mouth clean and free from sores or injuries is an important infection control measure. Encourage your independent clients to brush their teeth with a soft toothbrush after every meal. Provide oral care with a soft toothbrush or foam swab to clients who cannot do it themselves.
- **SKIN CARE:** Perform all skin care gently and slowly. Your client's skin may be thin and fragile. Give warm baths, not hot. Use mild, unscented soaps and lotions. Keeping skin soft, healthy and moisturized can decrease the chance of a break in the skin. Remember—any break in the skin leaves an opening for an infection to develop.
- **PERI-CARE AND CATHETER CARE:** The number one healthcare associated infection is the urinary tract infection. Most healthcare associated UTI's are the result of catheterization or incontinence and can be avoided by providing regular peri-care and cath-care using proper technique.
- Every client needs perineal care everyday. And, incontinent clients need it after every urination or bowel movement. If you are unsure of how to provide proper peri-care or cath care, ask your supervisor for a demonstration or request the In The Know inservice topic called "Perineal and Catheter Care."
- **PREVENT PRESSURE SORES:** Reposition immobile clients at regular intervals and use support pads mattresses or bed cradles as ordered to avoid pressure ulcers.
- **PREVENT PNEUMONIA:** Reposition immobile clients regularly. Encourage mobility or coughing and deep breathing exercises as ordered to prevent pneumonia.



Thinking outside the box!

Working with clients in the home often requires coming up with creative solutions to uncommon problems.

- **THE PROBLEM:** You are caring for an 87 year old man who lives alone. You notice that his home is simple and clutter-free, but it is also quite dirty. The floors, counters, and bathrooms look like they haven't been cleaned in years.
- You've offered to clean and have even just started cleaning without asking. But, your client becomes embarrassed and tells you he will hire a maid . . . but a maid never comes!
- **WHAT YOU KNOW:** You know the unclean conditions put your client at risk for infection. His age, open wounds on his legs, and his history of diabetes and liver disease put him at risk for sepsis.
- **GET CREATIVE:** Think of **3 creative solutions** you might suggest to your client right now to help him understand the importance of getting the environment clean—without embarrassing him.
- **TALK ABOUT IT:** Share your ideas with your co-workers and supervisor and find out how they would solve the problem.

HOW CAN YOU PREVENT SEPSIS?—CONTINUED

Preventing sepsis also includes early recognition and prompt reporting of any signs of infection or changes in vital signs.

SIGNS OF INFECTION INCLUDE:

- Fever or chills.
- Redness, swelling or pain.
- Pus or watery drainage from a wound or pressure sore.
- Skin around a wound or invasive medical device that is warm to touch.
- A red line streaking away from a wound.
- Foul odor from a wound, perineal area, or mouth.
- Confusion or excessive tiredness.
- Swollen bumps in armpit, neck or groin.
- Trouble breathing.
- Abnormal urine (cloudy or blood tinged) or pain during urination.

MONITOR VITAL SIGN CHANGES, ESPECIALLY:

- Temperature above 38° C (100.4° F) or below 36° C (96.8° F).
- Heart rate above 90 beats/min.
- Respiratory rate above 20 breaths/min.

IMPORTANT HAND WASHING GUIDELINES

The most important thing you can do to prevent infections in your clients is to wash your hands before and after **any** contact.

- Use soap and water to wash your hands. **Scrub for at least 20 seconds.** Or, follow your workplace guidelines which may require you to scrub up to 60 seconds.
- The key to washing your hands is *not* the kind of soap or the temperature of the water. It's the energy you put into scrubbing your hands. **Friction** gets rid of bacteria—not soap.

Only use waterless hand rubs when hands are not visibly soiled. To use: Place a small amount in the palm of one hand. Rub hands together, being sure to cover all surfaces **rub until your hands are completely dry.**



5 KEY points

Key Points to Remember

1. Sepsis is a complex condition that happens when the body's immune system **over-reacts to an infection.**
2. Sepsis is diagnosed when there are **two or more symptoms of SIRS** and the person has a known or suspected **infection.**
3. Anyone who has an infection is at risk for sepsis. However, certain factors, such as age, race, medical conditions, weakened immune system and genetics can actually increase the risk.
4. The number of people developing sepsis and septic shock has been increasing since the 1930s. In fact the rate has nearly doubled just in the last 20 years.
5. As a nursing assistant, you are a key player in the fight to prevent the infections that can lead to sepsis.



Developing Top-Notch CNAs, One Inservice at a Time

A Disease Process Module: Understanding Sepsis

Are you "In the Know" about sepsis?

Circle the best choice. Then check your answers with your supervisor!

EMPLOYEE NAME
(Please print):

DATE: _____

- ***I understand the information presented in this inservice.***
- ***I have completed this inservice and answered at least eight of the test questions correctly.***

EMPLOYEE SIGNATURE:

SUPERVISOR SIGNATURE:

Inservice Credit:

<input type="checkbox"/> Self Study	1 hour
<input type="checkbox"/> Group Study	1 hour

File completed test in employee's personnel file.

1. Sepsis occurs when the body overreacts to

- A. A medication C. Cancer
B. An infection D. Dehydration

2. Which of the following is NOT a risk factor for sepsis?

- A. Age (older than 70) C. Weakened immune system
B. Urinary catheter D. Sedentary lifestyle

3. Which client is **most** at risk of developing sepsis?

- A. An Asian man who has just turned 60.
B. A 86 year old Caucasian woman who is incontinent.
C. A 76 year old African American male who has diabetes.
D. A 58 year old woman who remains healthy while getting chemo treatments.

4. The most important thing you can do to prevent sepsis is to

- A. Know who is at risk. C. Prevent infections.
B. Recognize early warning signs. D. All of the above.

5. True or False

Sepsis progresses to severe sepsis when there is a failure of any organ system.

6. True or False

It's common for a client with a UTI to have a temperature of 102°C and a respiratory rate of 28.

7. True or False

If you notice any signs of sepsis you should report to your supervisor right away.

8. True or False

Sepsis is a medical emergency.

9. True or False

The rate of sepsis diagnoses has nearly doubled in the last 20 years.

10. Fill in the Blanks

Sepsis is diagnosed when there are two or more symptoms of _____ and the person has a known or suspected _____.