

Sepsis in the Long-Term Care Setting: Part 1

Project Firstline | PA Department of Health

Wednesday, June 5th, 2024

▶ What is Project Firstline?

- Innovative project designed to **promote foundational knowledge on infection prevention and control (IPC)** for all types of frontline healthcare workers
- Developed in partnership with the Centers for Disease Control and Prevention (CDC) in 2020 to:
 - Build healthcare workforce **expertise in IPC** across all 50 states
 - Keep the healthcare community **safe from infectious disease threats**



PA Project Firstline Team

Arielle Allen
MPH, CIC, CPH



General IP

Emily Magee
MPH, CIC



**IP
Supervisor**

Purva Patel
MBBA, MPH, CPH, CHES, CIC



General IP

Merry Sheeran
BS, RN, CIC, LTC-CIP



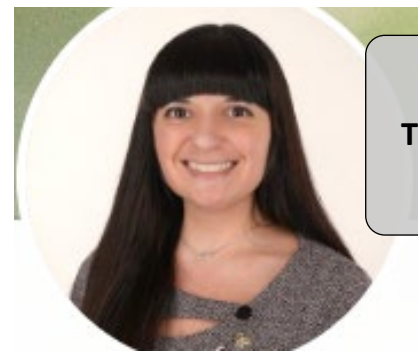
Travel IP

Kelly Acree
MPH, BSN, RN, CIC



Travel IP

Carolyn Pandolfo
BS, RN, CHES, CHC, PMP, CIC



Travel IP

Learning Objectives

Participants will be able to:

1.) Identify at least 3 signs and symptoms of sepsis in long-term care (LTC) residents

2.) Describe 3 or more interventions for sepsis surveillance and treatment

3.) Demonstrate understanding of at least 4 best practices for early detection and prevention of sepsis

4.) Apply 3 or more sepsis prevention and control strategies to their unique LTC environment

LTC Settings: Residents and Staff



Acute Care



Subacute Care



Skilled Nursing



Personal Care



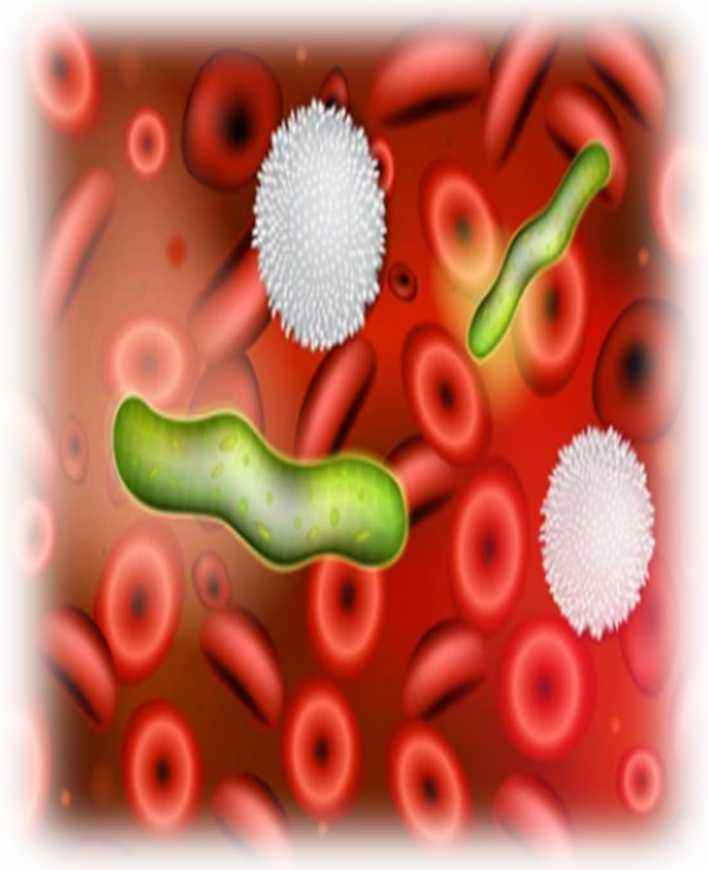
**Assisted and
Independent Living**



Intermediate Care

▶ What is Sepsis?

- Life-threatening **response** to an underlying infection
- Often originates in the lungs, urinary tract, gastrointestinal tract, or on the skin
 - Usually bacterial but can be viral, fungal, parasitic, etc.
- Can quickly cause tissue damage, organ failure, and death
- Sepsis is **NOT**:
 - Contagious
 - “Blood poisoning”



➤ Risk Factors for Sepsis

- Age (very young or very old)
- Chronic health conditions
- Compromised immune system
- Pregnancy
- Prior history of sepsis
- Recent severe illness or hospitalization



Key Statistics

Incidence

- Approximately 87% of new sepsis cases **occur in the community** as opposed to in the hospital

Prevalence

- In a typical year, **1.7 million** American adults endure sepsis

Morbidity

- The average cost per hospital admission due to sepsis averages **twice the cost** of other conditions

Mortality

- At least 350,000 patients with sepsis **die during hospitalization** or are discharged to **hospice**

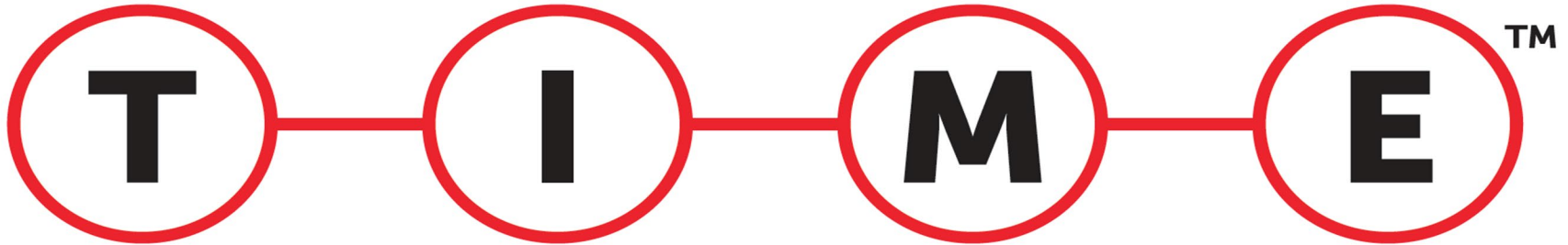
Signs and Symptoms

- Tachycardia or weakened pulse
- Hypotension
- Altered mental status
- Fever or hypothermia
- Diaphoresis
- Hemorrhagic rash
- Dyspnea or tachypnea



Signs and Symptoms

When it comes to sepsis, remember ***IT'S ABOUT TIME™***. Watch for:



TEMPERATURE

higher or lower than normal

INFECTION

may have signs and symptoms of an infection

MENTAL DECLINE

confused, sleepy, difficult to rouse

EXTREMELY ILL

severe pain, discomfort, shortness of breath

If you experience a combination of these symptoms: seek urgent medical care, call 911, or go to the hospital with an advocate. Ask: "Could it be sepsis?"

Sepsis 911: LTC Interventions

Assess the Resident

- Assess the resident's vital signs, symptoms, and perfusion status
- Determine their responsiveness and level of consciousness

Immediately Activate 911

- Remain with the resident and call emergency medical services
- State clearly to EMS: ***"I am concerned about sepsis"***

Prepare for Transport

- Maintain the resident's safety, comfort, and privacy
- Monitor the resident and ensure airway patency

Transfer to Acute Care Hospital

- Provide an inter-facility transfer report using **SBAR**:
- ***Situation, Background, Assessment, Recommendation***
- Use an inter-facility [transfer tool](#) if helpful

Stages of Sepsis

Stage 1: Sepsis

- Overreactive immune response to an infection
- Already life-threatening at this stage

Stage 2: Severe Sepsis

- Inflammation throughout the body lowers blood pressure
- Organ and tissue damage begin to occur (may result in amputation)

Stage 3: Septic Shock

- Blood pressure falls despite IV fluids and vasoactive agents
- Organ failure and death can occur at this stage

▶ Screening and Early Detection

- Sepsis is officially diagnosed through **physical assessment** and **confirmatory testing**:
 - **Inflammatory** (white blood cell count, c-reactive protein, etc.)
 - **Hemodynamic** (hypotension, venous oxygen, etc.)
 - **Organ dysfunction** (urine output, creatinine, coagulation, bilirubin, etc.)
 - **Tissue perfusion** (lactate, capillary refill, etc.)
- Early detection is **critical** to initiating rapid treatment:
 - The risk of death **increases by an average of 7.6% per hour** prior to treatment
 - Treatment must be **quick and efficient** as soon as sepsis is identified

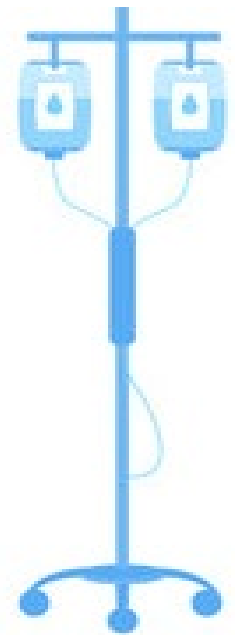
Treatment

- **IV Fluids**

- Crystalloid fluids (i.e., normal saline)
- Colloid fluids (i.e., albumin and dextran)

- **IV Medications**

- Broad-spectrum antibiotics
- Corticosteroids
- Vasopressors



Treatment

- Nasogastric (NG) tube feeding
- Intubation
- Oxygen therapy
- Renal dialysis
- Intracranial pressure (ICP) monitoring
- Urinary and arterial catheterization



Post-Sepsis Syndrome (PSS)

Muscle and joint pain

Swelling and skin rashes

Organ failure

Insomnia

Dyspnea

Repeat infections

Poor appetite

Hair loss

Nightmares and hallucinations

Mood swings and panic attacks

Decreased concentration and cognitive functioning

Depression and low self-esteem

Memory loss

Post-Traumatic Stress Disorder (PTSD)

IPC is a Team Sport!



Hand Hygiene

Perform Hand Hygiene

Before:

- Aseptic procedures
- Resident contact
- Donning PPE

After:

- Doffing PPE
- Resident contact
- Touching resident surroundings
- Body fluid exposure risk



Don and Doff for Resident Care



Wear a **gown** that is appropriate to the task to protect skin and prevent soiling of clothing from blood or body fluids



Don **gloves** when it can be reasonably anticipated that there could be contact with blood or body fluids



Use a **mask** and protective **eyewear or face shield** to protect the mucous membranes of the eyes, nose, and mouth from splashes and sprays

Source Control

Understand Source Control

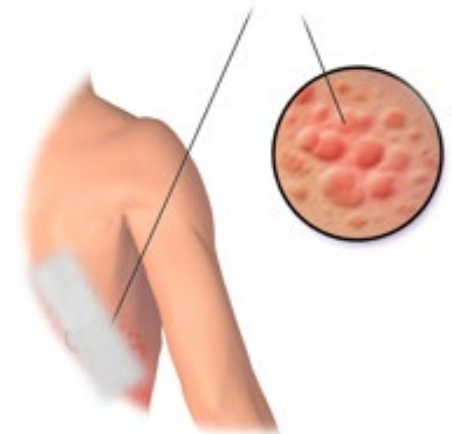
Keeping germs from spreading by stopping them at their source:



Bandaging a wound



Covering the nose and mouth with a properly fitted mask or respirator



Covering a rash

Wound Care

Assess, Clean, and Dress for Success

- Gather and dedicate supplies **before** a dressing change to prevent contamination
- **Always** perform hand hygiene before preparing a clean or sterile field and before starting wound care
- Don **fresh gloves and PPE**—*consider use of a surgical mask during procedure*
- Position barriers **under** the wound
- Clean wounds using **aseptic, non-touch** technique



Wound Care

Assess, Clean, and Dress for Success



- **Clean and disinfect** reusable equipment as well as the wound supply cart
- **Repeat** doffing and hand hygiene procedures

- **Remove** and immediately **discard** old dressings as well as soiled gloves in appropriate receptacle
- Perform hand hygiene **again** and don **new gloves** to access supplies



▶ Cleaning and Disinfection

Spot the Difference

- Environmental cleaning *removes* things like dust, dirt, grime, spills, smears, and messes from surfaces (may catch some germs)



- Environmental disinfection *kills* the germs on a surface (done after cleaning)

Immunization

Promote Vaccines Over Natural Immunity



- Encourage residents to stay [up-to-date](#)
 - *Exceptions may be made for those with allergies, reactions, and compromised immune status*
- Ensure proper storage and handling of vaccines
 - Temperature control
 - Single-dose vs. multi-dose vial use
 - Sharps safety and needlestick prevention



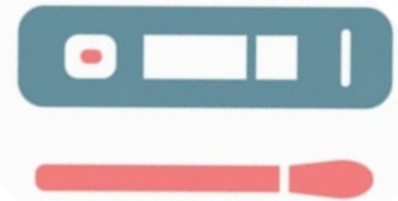
Test for Underlying Infections

- Types of tests:
 - Blood
 - Urinalysis
 - Culture
 - Blood, urine, skin, sputum, throat, cerebrospinal fluid, etc.
 - Radiographic and advanced imaging tests
 - Confirmatory/diagnostic tests



Be Ready to Test in LTC Settings

- Hospital/health system laboratory partnerships
- Community-based laboratory vendors
- In-house point-of-care (POC) testing
- Clinical Laboratory Improvement Amendment (**CLIA**) **Certificate of Waiver** required for *“simple laboratory examinations and procedures that have an insignificant risk of an erroneous result”*
- The PA [Bureau of Laboratories](#) and [LTC RISE Program](#) can assist with POC testing and CLIA inquiries



Therapeutics

Correctly Diagnose and Treat Infections

- Oral, topical, and IV antimicrobial medications:
 - Antibiotics
 - Antivirals
 - Antifungals
 - Antiparasitics
- Oral and IV fluids



Therapeutics

Recognize Antimicrobial Resistance (AMR)

Occurs when microorganisms become resistant to antimicrobials designed to treat the infection

- Primarily antibacterials and antifungals
- Multi-Drug-Resistant Organisms (MDROs):



- *Clostridoides difficile* (*C. diff*)
- Carbapenem-resistant Enterobacterales
- Carbapenem-resistant *Pseudomonas*
- Carbapenemase-producing organisms
- Methicillin-resistant *Staphylococcus aureus* (MRSA)
- Vancomycin-resistant *Staphylococcus aureus*
- Vancomycin-resistant Enterococci (VRE)
- *Candida auris* and *Candida kruseii*

▶ Infection Risk Management

Identify and Prevent the Risks

LTC settings and care interventions can create many opportunities for infections to spread through reservoirs:

Body



Skin



GI system or "gut"



Respiratory system



Blood

Environment



Water and wet surfaces



Dry surfaces



Dirt and dust



Devices

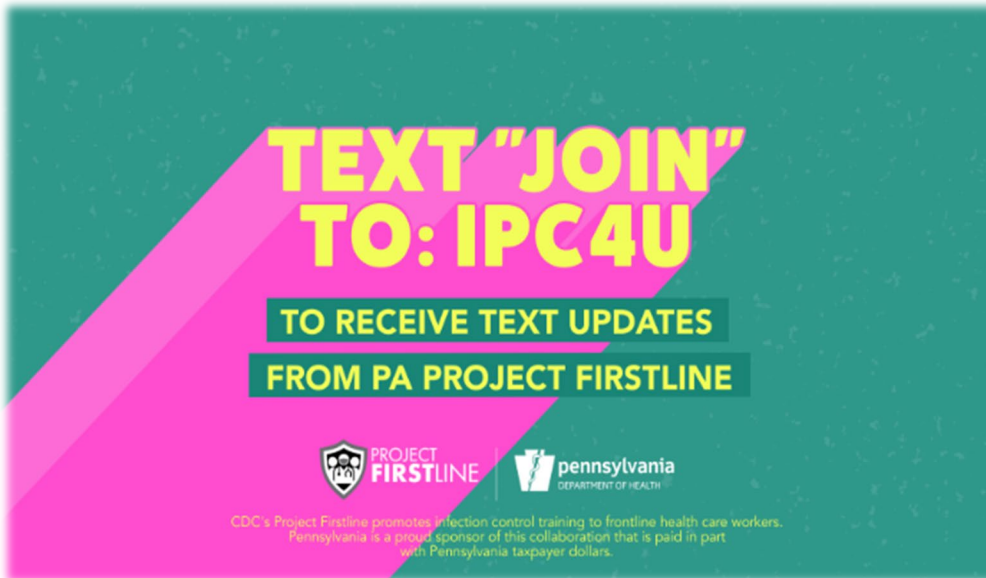
Open Forum

Thank You for Attending Part 1!

Questions, Comments, Feedback, and Discussion

Resources

- For more information, please visit the PA Project Firstline [homepage](#)
- Contact us at RA-DHFIRSTLINE@PA.GOV
- Request **free** onsite IPC education [here](#)



Resources

- **PA Department of Health (DOH):**
 - [Health Care-Associated Infection Prevention/Antimicrobial Stewardship \(HAIP/AS\) Program](#)
 - [Bureau of Laboratories](#)
- **PA DOH LTC RISE Program (by Region):**
 - [Southeast](#)
 - [Southcentral](#)
 - [Northwest](#)
 - [Northeast, Northcentral, and Southwest](#)
- **PA Department of Human Services (DHS):**
 - [Disabilities and Aging](#)



References

CDC Project Firstline (2023, November 20). *Reservoirs*. CDC.gov. Retrieved March 15, 2024, from <https://www.cdc.gov/infectioncontrol/ppt/health-care-Training-ReservoirsTK-S3-Slides-508.pptx>.

CDC Project Firstline (2023, November 20). *Source Control*. CDC.gov. Retrieved March 15, 2024, from <https://www.cdc.gov/infectioncontrol/ppt/health-care-Training-ReservoirsTK-S3-Slides-508.pptx>.

CDC Project Firstline (2023, November 20). *Environmental Cleaning and Disinfection*. CDC.gov. Retrieved March 15, 2024, from <https://www.cdc.gov/infectioncontrol/ppt/health-care-Training-ReservoirsTK-S3-Slides-508.pptx>.

Centers for Disease Control and Prevention (2023, August). *Hospital Sepsis Program Core Elements: 2023*. CDC.gov. Retrieved March 15, 2024, from <https://www.cdc.gov/sepsis/pdfs/sepsis-core-elements-H.pdf>.

Centers for Disease Control and Prevention (2015). *The Core Elements of Antibiotic Stewardship for Nursing Homes*. Atlanta, GA: US Department of Health and Human Services, CDC. Retrieved March 15, 2024, from <http://www.cdc.gov/longtermcare/index.html>.

Centers for Disease Control and Prevention (2019, July 11). *Vaccine Storage & Handling*. CDC.gov. Retrieved March 15, 2024, from <https://www.cdc.gov/vaccines/hcp/admin/storage-handling.html>.

Centers for Disease Control and Prevention (2016, January 26). *Infection Control Basics and Standard Precautions*. CDC. Retrieved March 15, 2024, from <https://www.cdc.gov/infectioncontrol/basics/standard-precautions.html>.

Centers for Disease Control and Prevention (2022, October 5). *How Antimicrobial Resistance Happens*. CDC.gov. Retrieved March 15, 2024, from <https://www.cdc.gov/drugresistance/about/how-resistance-happens.html>.

References

- Centers for Disease Control and Prevention (2023, August 24). *What is Sepsis?* CDC. Retrieved March 15, 2024, from <https://www.cdc.gov/sepsis/what-is-sepsis.html>.
- Centers for Disease Control and Prevention (2024, February 28). Recommended Adult Immunization Schedule. CDC.gov. Retrieved March 15, 2024, from <https://www.cdc.gov/vaccines/schedules/downloads/adult/adult-combined-schedule.pdf>.
- Centers for Medicare and Medicaid Services (2019, March 1). *Clinical Laboratory Improvement Amendments (CLIA) How to obtain a CLIA Certificate of Waiver*. CMS.gov. Retrieved March 15, 2024, from <https://www.cms.gov/regulations-and-guidance/legislation/clia/downloads/howobtaincertificateofwaiver.pdf>.
- Cleveland Clinic (2022, June 14). *Septic Shock*. My.ClevelandClinic.org. Retrieved March 15, 2024, from <https://my.clevelandclinic.org/health/diseases/12361-sepsis>.
- Cleveland Clinic (2023, January 19). *Sepsis*. My.ClevelandClinic.org. Retrieved March 15, 2024, from <https://my.clevelandclinic.org/health/diseases/12361-sepsis>.
- Florida Atlantic University (2011). SBAR Communication Form and Progress Note. IN.gov. Retrieved March 15, 2024, from https://www.in.gov/health/files/INTERACT_SBAR_Form.pdf.
- Jones, H., DNP, NP-C (2022, September 13). *Protecting Long-Term Care Residents from Sepsis*. CDC Safe health care Blog. Retrieved March 15, 2024, from <https://blogs.cdc.gov/safehealthcare/protecting-ltc-residents-from-sepsis/>.
- Pennsylvania Department of Health (2018, April). *Wound Care Observation Checklist*. PA.gov. Retrieved March 15, 2024, from <https://www.health.pa.gov/topics/Documents/Programs/HAIP-AS/Woundcareobservationchecklist.FINAL.pdf>.

References

Pennsylvania Department of Health (2022, June 7). *Make Your Intention Prevention Clean Hands Stop the Spread*. PA.gov. Retrieved March 15, 2024, from <https://www.health.pa.gov/topics/Documents/Programs/HAIP-AS/Hand%20Hygiene%20Make%20Your%20Intention%20Prevention.pdf>.

Pennsylvania Department of Health (2024). Division of health care-Associated Infection Prevention. Health.pa.gov. Retrieved March 15, 2024, from <https://www.health.pa.gov/topics/programs/HAIP-AS/Pages/HAIP-AS.aspx>.

Pennsylvania Department of Health (2024). LTC RISE: Long-term Care Resiliency Infrastructure Supports & Empowerment. Health.pa.gov. Retrieved March 15, 2024, from <https://www.health.pa.gov/topics/disease/coronavirus/Pages/LTC-RISE.aspx>.

Pennsylvania Department of Health (2024). Laboratories. Health.pa.gov. Retrieved March 15, 2024, from <https://www.health.pa.gov/topics/Labs/pages/laboratories.aspx>.

Pennsylvania Department of Health (2024). Aging. Health.pa.gov. Retrieved March 15, 2024, from <https://www.dhs.pa.gov/Services/Disabilities-Aging/Pages/default.aspx>.

Sepsis Alliance (2020, July). *It's About Time*. Sepsis.org. Retrieved March 15, 2024, from <https://cdn.sepsis.org/wp-content/uploads/2020/07/Its-About-TIME-.2020.png>.

Sepsis Alliance (2020). *Symptoms*. Sepsis.org. Retrieved March 15, 2024, from <https://www.sepsis.org/sepsis-basics/symptoms/>.

Sepsis Alliance (2021, January 21). *Post-Sepsis Syndrome*. Sepsis.org. Retrieved March 15, 2024, from <https://www.sepsis.org/sepsis-basics/post-sepsis-syndrome/>.

Sepsis Alliance (2021, March 25). *Treatment*. Sepsis.org. Retrieved March 15, 2024, from <https://www.sepsis.org/sepsis-basics/treatment/>.

References

Sepsis Alliance (2021, August 31). *Prevention: Vaccines*. Sepsis.org. Retrieved March 15, 2024, from <https://www.sepsis.org/sepsis-basics/prevention-vaccines/>.

Sepsis Alliance (2022, January 13). *What is Sepsis?* Sepsis.org. Retrieved March 15, 2024, from <https://www.sepsis.org/sepsis-basics/what-is-sepsis/>.

Sepsis Alliance (2023, April 24). *Testing for Sepsis*. Sepsis.org. Retrieved March 15, 2024, from <https://www.sepsis.org/sepsis-basics/testing-for-sepsis/>.

Sepsis Alliance (2023, November 13). *Sepsis and Aging Fact Sheet*. Sepsis.org. Retrieved March 15, 2024, from <https://www.sepsis.org/sepsisand/aging/#:~:text=In%20older%20adults%2C%20sepsis%20is,of%20sepsis%20or%20another%20infection.>

Sepsis Alliance (2024). *Sepsis and Equity Fact Sheet*. Sepsis.org. Retrieved March 15, 2024, from C:\Users\c-cpandolf\Downloads\Sepsis-And-Equity-Fact-Sheet-2021-1-25_sk.pdf.

Sepsis Alliance (2024, February 2). *Life After Sepsis Fact Sheet*. Sepsis.org. Retrieved March 15, 2024, from C:\Users\c-cpandolf\Downloads\Life-After-Sepsis-Fact-Sheet-2024-02-06_sk.pdf.

St. John Ambulance (2024, January). *Sepsis in Adults and Older Children*. St. John Ambulance.org.uk. Retrieved March 15, 2024, from <https://www.sja.org.uk/get-advice/first-aid-advice/sepsis/sepsis-in-adults-and-older-children/>.

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https://s.wsj.net/public/resources/images/BN-LA288_1102BL_H_20151030132233.jpg

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<https://www.shutterstock.com/image-photo/female-nurse-doing-blood-pressure-measurement-497636569>

<https://www.shutterstock.com/image-photo/portrait-senior-people-having-breakfast-table-692517430>

Slide 48: https://www.health.pa.gov/topics/programs/HAIP-AS/PublishingImages/PA%20Project%20Firstline_for%20web.png

<https://www.cdc.gov/infectioncontrol/projectfirstline/images/Poster-85by11HiRes.jpg>

Slide 49: <https://www.health.pa.gov/Pages/default.aspx>

<https://www.dhs.pa.gov/PublishingImages/DHS-logo-title.png>