

APPLICATION OF INFECTION PREVENTION AND CONTROL FOR OUTPATIENT DIALYSIS SETTINGS

Statewide Program for Infection Control and Epidemiology
(SPICE)
UNC School of Medicine



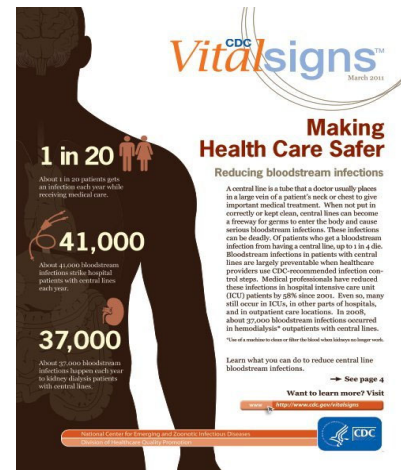
OBJECTIVES

- ▶ Describe patient infection risks from dialysis.
- ▶ Review national infection prevention and control recommendations for outpatient hemodialysis settings.



Epidemiology of Dialysis Infections

- In US approximately 370,000 people rely on hemodialysis
- Around 75,000 receive hemodialysis through a central line
- Central lines increase the risk of infection over a graft or fistula
- CDC estimates there are 37,000 central line infections associated bloodstream infections yearly (2008)



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HEMODIALYSIS INCREASES THE RISK OF INFECTION



- ▶ Dialysis Patients are at an increased Risks of Infection related to the following:
 - ▶ Underlying medical conditions (e.g., diabetes)
 - ▶ Weaken immune system
 - ▶ Frequent healthcare exposure (hospital stays)
 - ▶ Frequent use of catheters or insertion needles for access to the bloodstream

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INFECTIONS IN DIALYSIS PATIENTS

- ▶ Hemodialysis patients have an increased risk for getting hepatitis B and C infections and bloodstream infections (BSI).
 - ▶ Hepatitis B and C can cause chronic lifelong inflammation of the liver
- ▶ Germs can enter bloodstream through a vascular access (catheter, fistula, or graft)
 - ▶ 1 in 4 patients who have BSI caused by *Staph aureus* can also result in additional complications:
 - endocarditis (Infected heart valve)
 - osteomyelitis (infected Bone)
 - Multi-drug resistant organisms (MDRO)
 - Up to 1 in 5 patients with an infection die within 12 weeks.

HOW TO HELP PREVENT THE SPREAD OF INFECTION IN HEMODIALYSIS

Know and follow the basics of infection prevention and control (IPC)

- ▶ Always follow Standard Precautions
- ▶ Perform hand hygiene
 - ▶ Use personal protective equipment (PPE)
 - ▶ Follow safe infection practices
- ▶ During dialysis, infections can be spread by contact transmission
 - ▶ Most commonly by healthcare worker hands!
- ▶ Follow IPC recommendations for outpatient hemodialysis settings



WHEN TO PERFORM HAND HYGIENE

- ▶ Before you touch a patient
- ▶ Before you inject or infuse a medication
- ▶ Before you cannulate a fistula/graft or access a catheter
- ▶ After you touch a patient
- ▶ After you touch blood, body fluids, mucous membranes, wound dressings, or dialysis fluids (e.g., spent dialysate)
- ▶ After you touch medical equipment or other items at the dialysis station
- ▶ After you remove gloves

Remember: perform hand hygiene between each patient or station



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FOLLOW STANDARD PRECAUTIONS FOR HEMODIALYSIS CARE

- ▶ Wear gloves, a gown, and/or face protection anytime there is potential contact with blood or other potentially infectious materials
- ▶ Change gloves during patient care if the hands will move from a contaminated body-site to a clean body-site
- ▶ Remove gloves after contact with a patient and/or the surrounding environment (including medical equipment)
- ▶ Never wear the same pair of gloves for the care of more than one patient. For the healthcare personnel protection and to protect patients



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KNOWLEDGE CHECK

True or false that hemodialysis increases the risk for Hepatitis B and C and bacterial bloodstream infections?

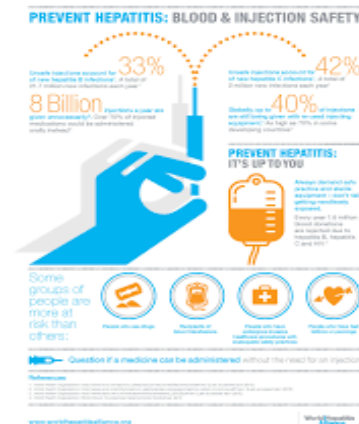
True

False



FOLLOW SAFE INJECTION PRACTICES FOR HEMODIALYSIS

- ▶ Needles and syringes are single use devices. Never use for more than one patient.
- ▶ Never administer medications from a single-dose vial or IV bag to multiple patients.
- ▶ Always perform hand hygiene and cleanse the access port before injecting into it.
- ▶ Saline bags are always single patient use!



IPC SPECIFIC RECOMMENDATIONS FOR HEMODIALYSIS

- ▶ Wear gloves and other PPE for all patient care
- ▶ Promote vascular access safety
- ▶ Separate clean areas from contaminated areas
- ▶ Use medication vials safely
- ▶ Clean and disinfect the dialysis station between patients
- ▶ Perform safe handling of dialyzers



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WHEN TO WEAR GLOVES DURING HEMODIALYSIS PATIENT CARE

- ▶ Wear disposable gloves when providing direct patient care or touching equipment at the dialysis station
- ▶ Wear gloves when cleaning surfaces in the environment or medical equipment
- ▶ Remove gloves and perform hand hygiene between each patient or station, and if moving from a contaminated to clean area of the same patient or within the same dialysis station.
- ▶ Why use PPE? For the healthcare personnel's own protection!



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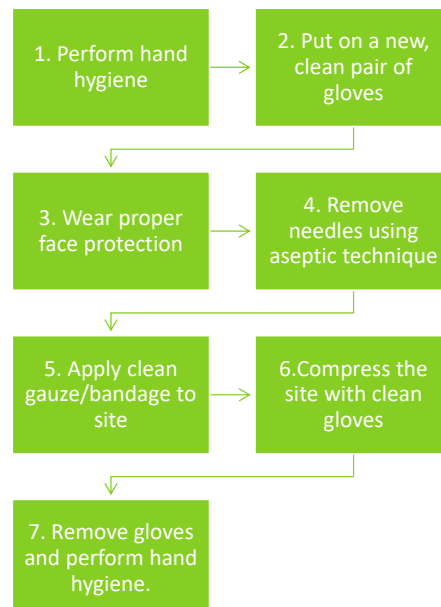
OTHER PPE FOR HEMODIALYSIS CARE

For healthcare personnel (HCP) protection...

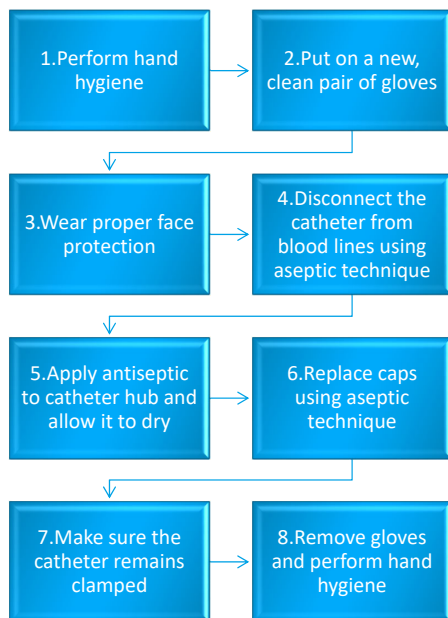
- In addition to gloves, HCP should wear a gown and face protection as needed:
 - During initiation and termination of dialysis.
 - When cleaning dialyzers.
 - Whenever handling lab samples.
- PPE should always be changed if it becomes dirty.



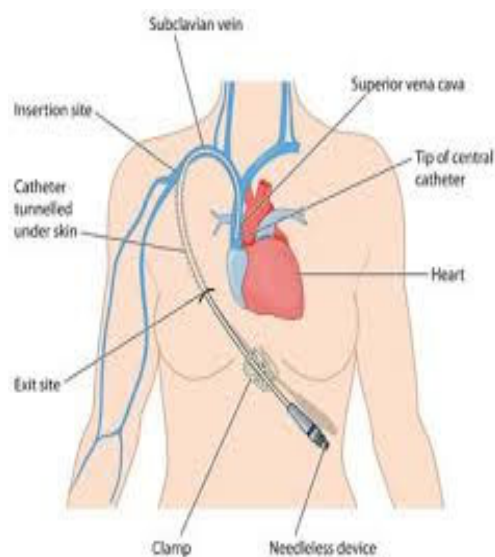
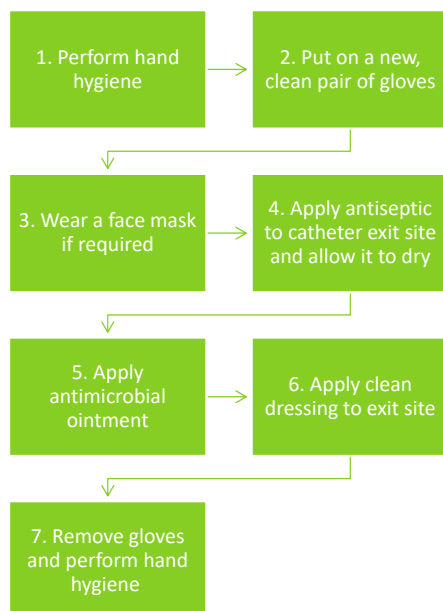
BASIC STEPS IN FISTULA/GRAFT CARE DECANNULATION PROCEDURE



BASIC STEPS IN CATHETER CARE CATHETER DISCONNECTION PROCEDURE



CATHETER EXIT SITE CARE



SEPARATE CLEAN AREAS FROM CONTAMINATED AREAS

- ▶ Clean areas should be used for the preparation, handling and storage of medications and unused supplies and equipment. The facility should have clean medication and clean supply areas
- ▶ Contaminated areas are where used supplies and equipment are handled
- ▶ Do not handle or store medications or clean supplies in the same area as where used equipment or blood samples are handled

Remember: Treatment stations are contaminated areas! Keep clean!



KNOWLEDGE CHECK

Which of the following statements is false?

1. HCPs should wear gloves, gown and face protection during initiation and termination of dialysis.
2. HCPs should wear gloves, gown and face protection when cleaning dialyzers.
3. HCPs should wear gloves, gown and face protection whenever handling lab samples.
4. It is best to store medications and supplies in the same area as where used equipment or blood samples are handled.



DEDICATE SUPPLIES TO A SINGLE PATIENT

- ▶ Any item taken to a patient's dialysis station could become contaminated
- ▶ Items taken into the dialysis station should either be: – disposed of, or – cleaned and disinfected before being taken to a common clean area or used on another patient
- ▶ Unused medications or supplies taken to the patient's station should not be returned to a common clean area (e.g., medication vials, syringes, alcohol swabs)

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SAFE USE OF MEDICATION VIALS

- ▶ Prepare all individual patient doses in a clean area away from dialysis stations
- ▶ Prepare doses as close as possible to the time of use
- ▶ Do not carry medications from station to station
- ▶ Nor should they carry medication vials, syringes, alcohol swabs, or supplies in their pockets.
- ▶ Do not prepare or store medications at patient stations
- ▶ Do not use the same medication cart to deliver medications to multiple patients
- ▶ Use single-dose vials whenever possible and dispose of them immediately after use



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CLEANING AND DISINFECTING THE DIALYSIS STATION



- ▶ Routine cleaning and disinfection of the dialysis station will reduce the risk of spreading an infection
- ▶ Cleaning is done using cleaning detergent, water and friction, and is intended to remove blood, body fluids, and other contaminants from objects and surfaces
- ▶ Disinfection is a process that kills many or all remaining infection-causing germs on clean objects and surfaces
- ▶ Use an EPA-registered hospital disinfectant and follow label instructions for proper dilution
- ▶ Wear gloves during the cleaning/disinfection process



DISINFECTING THE DIALYSIS STATION

- ▶ All equipment and surfaces are considered contaminated after a dialysis session all must be disinfected
- ▶ After the patient leaves the station, disinfect the dialysis station (including chairs, trays, countertops, and machines) after each patient treatment
- ▶ Wipe all surfaces – Surfaces should be wet with disinfectant and allowed to air dry
- ▶ Give special attention to cleaning control panels on the dialysis machines and other commonly touched surfaces
- ▶ Empty and disinfect all surfaces of prime waste containers

CDC Audit Tool for Routine Hemodialysis Station Disinfection

<https://www.cdc.gov/dialysis/PDFs/dialysis-Station-Disinfect-Tool-508.pdf>



KNOWLEDGE CHECK

Which of the following statements is true?

1. Any item taken to a patient's dialysis station could become contaminated.
2. Use single-dose vials whenever possible and dispose of them immediately after use.
3. Do not carry medication vials, syringes, alcohol swabs, or supplies in pockets
4. Use an EPA-registered hospital disinfectant and follow label instructions for proper dilution
5. All of the above.

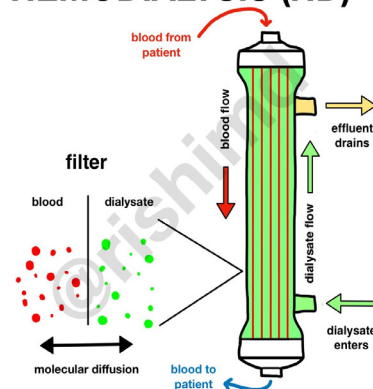
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DIALYZERS

Reuse of dialyzers

- The dialyzer may either be discarded after each treatment or be reused
- Reuse requires an extensive procedure of high-level disinfection
- Reused dialyzers are not shared between patients.
- There was an initial controversy about whether reusing dialyzers worsened patient outcomes. The consensus today is that reuse of dialyzers, done carefully and properly, produces similar outcomes to single use of dialyzers.

HEMODIALYSIS (HD)



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SAFE HANDLING OF DIALYZERS AND BLOOD TUBING

- ▶ Before removing or transporting used dialyzers and blood tubing, cap dialyzer ports and clamp tubing
- ▶ Place all used dialyzers and tubing in leak-proof containers for transport from station to reprocessing or disposal area
- ▶ If dialyzers are reused, follow published methods (e.g., AAMI standards) for reprocessing

AAMI is the Association for the Advancement of Medical Instrumentation



VACCINE-PREVENTABLE INFECTIONS

Vaccination of dialysis staff and patients

- ▶ Preventing the spread Influenza
 - ▶ Influenza spread by droplets when people cough, breath or talk
 - ▶ Causes acute respiratory infection
- ▶ Preventing the spread of hepatitis B
 - ▶ Hepatitis B spread easily contact with blood.
 - ▶ Can cause acute or chronic infection or liver cancer
- ▶ Recommended vaccines for healthcare personnel
 - ▶ Flu vaccine yearly and complete the hepatitis B vaccine series.
- ▶ Recommended vaccines for patients
 - ▶ Inactivated influenza yearly and pneumococcal vaccine
 - ▶ Conduct routine testing for hepatitis B and hepatitis C



PREVENTING THE SPREAD OF HEPATITIS B IN THE DIALYSIS FACILITY

- ▶ Dialyze hepatitis B (HBsAg+) patients in a separate room using separate machines, equipment, instruments, and supplies – Be sure to use a separate gown when treating these patients
- ▶ Staff members caring for patients with hepatitis B (HBsAg+) should not care for HBV-susceptible patients at the same time (e.g., during the same shift or during patient change over)
- ▶ HBsAg+ means hepatitis B surface antigen (a lab test for hepatitis B virus) was positive
- ▶ HBV-susceptible means anyone who has never been infected and lacks immunity to hepatitis B virus



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PREVENTING THE SPREAD OF BACTERIAL INFECTIONS IN THE DIALYSIS FACILITY

- ▶ Hemodialysis patients at increased risk for spreading germs to other patients include those with:
 - ▶ An infected skin wound with drainage that is not contained by dressings
 - ▶ Fecal incontinence or uncontrolled diarrhea
- ▶ For these patients use the following precautions:
 - ▶ Wear a gown and gloves when caring for the patient and remove the gown and gloves when finished caring for that patient
 - ▶ Do not wear the same gown when caring for other patients
 - ▶ Dialyze patient at a station with as few adjacent stations as possible (e.g., at the end or corner of the room)
- ▶ Patients with respiratory illness and a fever are at risk of spreading viral infections
 - ▶ These patients should be dialyzed at least 6 feet away from other patient stations or any shared supplies

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EDUCATING YOUR PATIENTS AND THEIR CAREGIVERS

- ▶ Advise patients to inform you if they notice any of the following possible signs of infection:
 - Fever
- ▶ The access site is:
 - swollen (bulging),
 - red,
 - warm to touch,
 - has pus, or
 - severe pain at the access site
- ▶ Remember: infections of the vascular access site can be life threatening



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TRAINING AND EDUCATION OF PATIENTS AND THEIR CAREGIVERS



When a new patient starts dialysis and on an annual basis, review the following:

- ▶ Personal hygiene and hand hygiene technique
- ▶ Patient responsibility for proper care of the access site and recognition of signs of infection
- ▶ Recommended vaccinations (including hepatitis B, influenza, and pneumococcal)
- ▶ Reasons for selecting a fistula or graft over a catheter to lower the risk of infection

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KNOWLEDGE CHECK

True or False?

Patients who undergo dialysis should not receive the yearly influenza vaccine because of increase risk of reaction?

True

False



KEY INFECTION PREVENTION PRACTICES

- ▶ Perform hand hygiene frequently and change gloves
- ▶ Maintain separate clean areas for supplies and medications and separate contaminated areas for used items
- ▶ Practice proper handling and delivery of patient supplies and medications
- ▶ Perform effective cleaning and disinfection of dialysis equipment and environmental surfaces
- ▶ Carefully handle medications and the patient's vascular access to avoid contamination
- ▶ Remember: Use aseptic technique every time!



SUMMARY

- ▶ Infections that patients can get while receiving dialysis are serious and preventable!
- ▶ Healthcare workers like you following infection control precautions and other safe care practices are the key to prevention!
- ▶ Infection prevention is everyone's responsibility!



CDC RESOURCES

Checklist: Dialysis Station Routine Disinfection

Part A: Before Beginning Routine Disinfection of the Dialysis Station

- Review and address each item using and adjust from the dialysis station.
- Wash hands and perform hand hygiene.
- Check that there is no water or blood on surfaces.
- Ensure that the prepping bottle has been changed.
- Ensure that the patient has left the dialysis station.
- Check all single-use needles. Make any reusable needles for reuse when they will be used and determine before being used if you recommend a device change.
- Remove gloves and perform hand hygiene.

Part B: Routine Disinfection of the Dialysis Station - Labeled patient face left

- Wash hands.
- Apply disinfectant to all surfaces in the dialysis station using a wiping motion (back to front).
- Ensure surfaces are fully wet with disinfectant. Allow surface to air-dry.
- Wipe off surfaces of the workstation using paper towels to remove the disinfectant solution.

Checklist: Hemodialysis catheter disconnection

- Wear mask (if required)
- Perform hand hygiene
- Put on new, clean gloves
- Clamp the catheter
- Disconnect catheter from blood lines aseptically
- Scrub catheter hub with antiseptic
- Allow hub antiseptic to dry
- Attach new caps aseptically
- Remove gloves
- Perform hand hygiene

Checklist: Hemodialysis injectable medication preparation

- Ensure medication preparation area is clean
- Inspect medication vial and discard if sterility is questionable
- Perform hand hygiene
- Prepare medication aseptically
- Disinfect rubber septum of vial with alcohol
- Withdraw medication using a new needle and new syringe
- Discard single-dose vials and store multi-dose vials appropriately

These aseptic conditions in a designated low background level of air (dialysis preparation room) and these clean flow, laminar flow systems are not intended to be used for any other purpose. The cleanroom should be ready to receive the patient treatment only and daily in a separate room.

Remove caps from all vials (single or multi-dose), syringes, and equipment (e.g., quality particles) from the cleanroom. If a multi-dose vial is used, it should be discarded if a multi-dose vial is used. The multi-dose vial should be discarded if it is not used within the time period specified in the vial label. The multi-dose vial should be discarded if it is not used within the time period specified in the vial label.

Hemodialysis Central Venous Catheter Scrub-the-Hub Protocol

This protocol outlines a suggested approach to preparing catheter hubs prior to accessing the catheter for hemodialysis. It is based on evidence where available and incorporates theoretical evidence where published evidence is unavailable.

Definitions:
 Catheter refers to a central venous catheter (CVC) or a central line.
 Hubs refers to the end of the CVC that connects to the blood lines on the dialyzer.
 CVC refers to a device that comes on and encloses the hub.
 Line refers to the catheter portion that extends from the patient's body to the hub.
 Blood flow refers to the arterial and venous ends of the extracorporeal circuit that carries the patient's blood to the dialyzer.

Catheter Connection and Disconnection Steps:

Connection Steps:

- Wash hands and perform hand hygiene.
- Clamp the catheter. Always clamp the catheter before removing the cap. Never use an unclamped catheter (see notes).
- Disinfect the hub with caps removed using an appropriate antiseptic (see notes).
 - Use a separate antiseptic pad for each hub. Leave the cap on the antiseptic pad. Do not reuse the pad for the next step.
- Remove the cap and disinfect the hub with a new antiseptic pad for each hub. Wipe the water (back and out) of the hub thoroughly with the cap, making sure to remove any residue (e.g., blood).
- Using the same antiseptic pad, apply antiseptic with friction to the catheter, moving from the hub at least several centimeters down the line. Hold the line taut while applying the antiseptic to dry.
- If using a separate antiseptic pad for each hub, always wash each hub again to remove any antiseptic and disconnected for the shortest time possible.

Disconnection Steps:

- Wash hands and perform hand hygiene.
- Remove hand hygiene and line new clean gloves.
- Clamp the catheter. Always clamp the catheter before disconnecting. There is one unclamped catheter (see notes).
- Disconnect the catheter hub before applying the new cap using an appropriate antiseptic (see notes).
 - Disconnect the connection space by disconnecting it from the dialyzer and antiseptic pad for the subsequent disconnection of the hub.
- Disconnect the blood line from the catheter and disconnect the hub with a new antiseptic pad. Scrub the water (back and out) of the hub thoroughly with new gloves, making sure to remove any residue (e.g., blood).
 - Use a separate antiseptic pad for each hub. Leave the cap on the antiseptic pad. Do not reuse the pad for the next step.
- Always handle the catheter hubs aseptically. Once disconnected, do not allow the catheter hubs to touch anything other than the antiseptic pad and the antiseptic pad.
- Attach the new dialyzer to the catheter aseptically. Use caution if you need to secure caps to the catheter (see notes).
- Remove the catheter if still clamped.
- Remove gloves and perform hand hygiene.



LINKS TO CDC RESOURCES

- ▶ CDC Audit Tools and Checklists
<https://www.cdc.gov/dialysis/prevention-tools/audit-tools.html>
- ▶ CDC Core Interventions <https://www.cdc.gov/dialysis/prevention-tools/core-interventions.html>
- ▶ CDC Recommendations for Preventing Transmission of Infections Among Chronic Hemodialysis Patients (2001) <https://www.cdc.gov/infectioncontrol/guidelines/dialysis>
- ▶ CDC Hemodialysis Central Venous Catheter Scrub-the-Hub Protocol <https://www.cdc.gov/dialysis/prevention-tools/scrub-protocols.html>
- ▶ CDC Infection Prevention Tools
<https://www.cdc.gov/dialysis/prevention-tools/index.html>

