

## Campaign to Prevent Antimicrobial Resistance Dialysis Patients

Centers for Disease Control and Prevention (CDC)

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The number of patients with end-stage renal disease treated by maintenance hemodialysis has increased during the past 30 years. Infection has emerged as one of the most prominent and most serious complications encountered in dialysis patients, and remains a significant cause of morbidity and mortality. Annual mortality rate among hemodialysis patients is 23% and infections are the second most common cause, accounting for 15% of deaths. Hemodialysis patients are immunosuppressed and require frequent hospitalization and surgery, which increases their risk for resistant infections. Vascular access infections (in hemodialysis patients) and peritonitis (in peritoneal dialysis patients) are the most common infections.

The Centers for Disease Control and Prevention (CDC) has established a campaign that aims to prevent antimicrobial resistance in healthcare settings. The campaign centers on four main strategies: preventing infection, diagnosing and treating infection, using antimicrobials wisely, and preventing transmission. The CDC has released 12 steps for this aim. The recommendations include limiting the use of catheters to avoid infections and vaccinating more patients against the flu. The guidelines suggest treating the infection, rather than the colonization. For example, physicians should treat pneumonia, not the tracheal aspirate, or treat urinary tract infections rather than the indwelling catheter.

## 12 Steps by published by CDC to prevent Antimicrobial Resistance: Dialysis

### Prevent Infection

#### Step 1. Vaccinate Staff and Patients

Influenza and pneumococcal vaccine given to both staff and patients will help to prevent infections requiring antimicrobial therapy. Get influenza vaccine

- Give influenza and pneumococcal vaccine to patients in addition to routine vaccines (e.g. hepatitis B)

#### Step 2. Get the Catheters out

##### *Hemodialysis*

Indwelling catheters are the single most important factor contributing to bacteremia in hemodialysis patients. The relative risk for bacteremia in patients with dialysis catheters is sevenfold the risk for patients with primary arteriovenous fistulas. Primary risk factor for access infection is access type (catheters>grafts>fistulas).

- Use catheters only when essential
- Maximize use of fistulas/grafts
- Remove catheters when they are no longer essential

##### *Peritoneal Dialysis*

- Remove/replace infected catheters

### Step 3. Optimize Access Care

Careful infection control prevents peritoneal dialysis-related infections.

Peritoneal Catheter Insertion and Management Catheter insertion should be performed under operating room, sterile conditions.

- Adherence to the principles of catheter insertion, management, and care remain the cornerstone of successful peritoneal dialysis access.
  - Use proper insertion and catheter-care protocols
  - Remove access device when infected
  - Use the correct catheter
  - Follow established KDOQI and CDC Guidelines for access care
- Use proper insertion and catheter-care protocols

#### Diagnose and Treat Infection Effectively

### Step 4. Target the Pathogen

Microbiologic cultures and antimicrobial susceptibility testing allows for targeted antimicrobial therapy. Identifying the pathogen using microbiologic cultures and antimicrobial susceptibility testing allows for targeted antimicrobial therapy. Obtain appropriate cultures

- Target empiric therapy to likely pathogens
- Target definitive therapy to known pathogens
- Optimize timing, regimen, dose, route, and duration

**Step 5. Access the Experts** Input from infectious diseases experts improves the outcome of serious infections.

- Consult the appropriate experts for complicated infections

**Step 6. Use local data** The prevalence of resistance varies by locale. Know your local antibiogram

- Get previous microbiology results when patients transfer to your facility
- Step 7. Know when to say "no" to vanco**

Reduction of vancomycin use is one of the most important strategies to limit the emergence, selection, and spread of vancomycin resistant bacteria.

- Follow CDC guidelines for vancomycin use. Consider 1st generation cephalosporins instead of vancomycin

**Guidelines for Appropriate Vancomycin Use (HICPAC/CDC)** Selected situations

in which the use of vancomycin should be discouraged:

- Treatment in response to a single blood culture positive for coagulase-negative staphylococcus, if other blood cultures taken during the same time frame are negative.
- Continued empiric use for presumed infections in patients whose cultures are negative for beta-lactam resistant gram-positive microorganisms.
- Eradication of MRSA colonization.
- Systemic or local prophylaxis for infection or colonization of indwelling central or peripheral intravascular catheters.
- Primary treatment of antibiotic-associated colitis.
- Routine prophylaxis for patients on continuous ambulatory peritoneal dialysis or hemodialysis.

Treatment (chosen for dosing convenience) of infections caused by beta-lactam-sensitive gram-positive microorganisms in patients who have renal failure.

#### **Step 8. Treat infection, not contamination or colonization**

A major cause of antimicrobial overuse is treatment of contamination or colonization.

- Use proper antisepsis for drawing blood cultures
- Get one peripheral vein blood culture, if possible
- Avoid culturing vascular catheter tips
- Treat bacteremia, not the catheter tip
- Culture the blood, not the skin or catheter hub

**Step 9. Stop Antimicrobial Treatment** Stopping empiric therapy when cultures are negative can significantly reduce antimicrobial use.

- When infection is treated
- When infection is not diagnosed

**Prevent transmission**

#### **Step 10: Follow Infection Control Precautions**

- In the hemodialysis setting, contact transmission plays a major role in transmission of bloodborne and other pathogens.
- Infection Control Precautions for hemodialysis patients include:
- Strict attention to hand hygiene

- using gloves for patient care and when handling patients medical equipment and devices.
- Dedicating nondisposable items for use on a single patient.
- Cleaning and disinfection of items taken into a dialysis station that will be used for more than one patient.

For patients at increased risk for transmission of pathogenic bacteria, including antimicrobial-resistant strains, additional precautions also might be necessary in some circumstances. For example, staff treating the patient should a) wear separate gown over their usual clothing and b) dialyze the patient at a station with as few adjacent stations as possible.

- Use standard infection control precautions for dialysis centers
- Consult local infection control experts

**Step 11: Practice Hand Hygiene** Hand hygiene is the single most important infection control measure for preventing the spread of antimicrobial resistant organisms.

- Wash your hands or use an alcohol-based handrub
- Set an example

**Step 12: Partner With Your Patients**

Dialysis patients share in the responsibility for preventing access-related infections

- Educate on access care and infection control measures

- Re-educate regularly
- Patients should be educated about the importance of their role in infection control upon admission to a dialysis center/hospital and at least annually thereafter.
- Educational materials should include personal hygiene, hand hygiene, proper care of access lines, and recognition of signs of infection.

### References

- 1 Influenza recommendations...CDC, *MMWR* 2003; 52 (RR08):1-36
- 2 Gokal et al., *Peritoneal Dialysis International* 1998;18:11-33.
- 3 CDC, *MMWR* 2001;50 (5): 31
- 4 [www.cdc.gov/drugresistance/healthcare/dialysis/card.htm](http://www.cdc.gov/drugresistance/healthcare/dialysis/card.htm)