

## What You Can Do To Get Adequate Dialysis

- Run the full treatment time prescribed by your doctor.
- Check the blood flow rate on the machine to make sure it matches what your doctor ordered. A decrease in the amount of blood going through the dialyzer has the same effect on the total volume processed as signing off treatment early.
- Check the dialysate flow rate on the machine. A decrease in dialysate flow decreases toxin removal.
- Use a fistula to dialyze if possible, the next best access is a graft. Catheters, although the only option for some people on dialysis, typically do not provide a blood flow equal to fistulas and grafts.
- If your facility reuses your dialyzer, check the “fill volume”. A decreased “fill volume” will result in a decrease in treatment adequacy.
- Some machine alarms stop the dialysate flow around your blood, leading to a decrease in adequacy. If your machine alarms frequently, ask the staff to intervene.



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Promoting and facilitating high quality care standards for dialysis and kidney transplant patients in Iowa, Kansas, Missouri and Nebraska.

### PATIENT EDUCATION SERIES



## ARE YOU GETTING ENOUGH DIALYSIS?

### Background & Purpose

When kidneys work normally, they filter blood non-stop. “Adequate Dialysis” only replaces a portion of the filtering done by healthy kidneys! When you started dialysis, part of your kidneys may have still been working. Your kidneys were able to remove some toxins and fluid. Unfortunately, this decreases over time and can impact whether or not you are getting enough dialysis treatment. Getting enough dialysis is also called “adequate dialysis”. This brochure will review what adequacy means to you, ways you can improve your adequacy, and the impact of inadequate dialysis on your quality of life.

### INSIDE!

- ★ **Determining Adequacy**
- ★ **The Impact of Signing Off Early**
- ★ **Steps You Can Take To Get Enough Dialysis**

# HOW ADEQUACY IS CALCULATED

## Urea Reduction Ratio (URR)

URR is a formula for determining how much toxins were removed during your dialysis treatment. A tube of blood is taken at the beginning of your treatment (Pre), and another at the end (Post). The level of toxins (urea nitrogen) is calculated for each tube and compared in the formula.

The formula is:

$$\frac{\text{Pre-Post}}{\text{Pre}} \times 100 = \text{URR}$$

For example, if the Pre tube was 35 and the Post tube was 12, the URR would be 65.7%, or as shown below:

$$\frac{35-12}{35} \times 100 = 65.7\%$$

Your URR tells your doctor and the dialysis staff how well your current prescription is doing to reduce the amount of toxins and wastes in your blood. When your kidneys fail to work properly, this waste product – urea – builds up in your bloodstream. If the urea remains high in your blood, it can cause nausea, vomiting, light-headedness, low red blood cell count, weight loss, poor appetite, itching, night cramps, and some difficulty sleeping. Some of these symptoms may be related to other lab values as well as your URR. Check with your dialysis staff and dietitian about your lab values for more information.

## Kt/V

Another way of measuring dialysis adequacy is Kt/V. K stands for the dialyzer clearance, (the amount of toxins it removes) and the lowercase t stands for time. Kt is the volume of fluid completely cleared of urea during a single treatment. For example, if the dialyzer's clearance (the "K") is 300mL/min and your treatment is 3 hours long, (180 minutes), the Kt will be 300 mL/min × 180 min. This equals 54,000 mL, or 54 liters.

In the bottom part of the fraction, V is the volume of water your body contains. The body is about 60 percent water by weight. If you weigh 70 kilograms (154 lbs.), The V will be 42 liters. So the ratio (K × t) to V, or Kt/V, compares the amount of fluid that passes through the dialyzer with the amount of fluid in the patient's body. The Kt/V for this patient would be 54/42, or 1.3 (1.2 and above is considered adequate).

The Kt/V is more accurate than the URR in measuring how much urea is removed during dialysis, primarily because Kt/V also considers the amount of urea removed with excess fluid.

These numbers—a URR of 65 percent or a Kt/V of 1.2—have been determined to be benchmarks of dialysis adequacy. Studies have shown that patients with lower Kt/V and/or URR numbers had more health problems and a greater risk of death.

## The Impact of Signing Off Early

Imagine the examples of Mr. and Mrs. X. For comparison purposes only - we will assume both people weigh the same, gain the same amount of fluid, run the same amount of time and use the same type of dialyzer. (We do this to show the only difference in their total blood volume processed over a week, a month, a quarter and a year.)

Rx Treatment Information	Mr. X	Mrs. X	Differences
4 hours or 240 minutes	240	230	Mrs. X signs off 10 minutes early each treatment
Blood flow 500	500	500	Same
Volume "V" of blood processed during this treatment	120	115	Mrs. X processed 5 Liters less than her husband this treatment.
"V" for a week	360	345	Mrs. X processed 15 Liters less than her husband this week.
"V" for 3 months	4,320	4,140	Mrs. X processed 180 Liters less than her husband this quarter.
"V" for a year	18,000	17,250	Mrs. X processed 750 Liters less than her husband this year.

**By signing off as little as 10 minutes early each treatment, in one year, Mrs. X has processed 750 Liters of blood LESS than her husband. This amount is equal to almost 2 full weeks of dialysis!**