Stopping Preventable Infections in Dialysis

By Alan S. Kliger MD, NTDS Project Committee Chair, and Susan Stark, NTDS Director

It is now one year since Nephrologists Transforming Dialysis Safety (NTDS) began its work. The Centers for Disease Control and Prevention (CDC) awarded the American Society of Nephrology (ASN) 3 years of funding to sponsor NTDS, as part of its effort to improve infection-control practices in dialysis facilities across the United States.

The critical need to eliminate preventable infections in dialysis is shown in the dialysis databases. The PEER Report (2014) demonstrates only modest improvement in the rate of patient admission for infection between 2004 and 2014.

The USRDS 2016 Annual Data Report (vol 2, ESRD, Ch 5) shows hospitalization rates for dialysis patients, indicating that while all-cause and cardiovascular hospitalization rates have been declining from 2005 to 2014, hospitalization for infection has not improved substantially.

The 2014 PEER Report, “Cause of death in prevalent dialysis patients” shows that infection causes 9.5% of all deaths (1).

For several years, the CDC worked with dialysis companies to promote evidence-based practices and useful tools to prevent bloodstream infections (BSI) and hepatitis C virus (HCV) infections. The NTDS project aims to more directly involve nephrologists as team leaders and as professional role models to reduce the burden of BSI and other healthcare-related infections in dialysis patients.

Building upon the foundational principles of the CDC's Making Dialysis Safer for Patients Coalition, the NTDS 2016 project aims to make infection prevention part of the fabric of everyday care for dialysis patients. The specific project aims include:

1. Adhere to CDC-recommended infection prevention practices
2. Screen and detect infections
3. Implement clinical protocols to ensure accurate detection and treatment of infections
4. Facilitate collaboration between nephrologists and state/federal healthcare-associated infection programs

Year one achievements

NTDS believes that ending preventable infections requires a cultural change in dialysis facilities—where daily infection prevention is a priority, where caregivers and patients accept accountability for their part in stopping infections, and where a culture of safety encourages sharing and reporting of safety practices in a community that welcomes opportunities to correct and improve daily performance. Cultural change requires thoughtful planning and stakeholder input. In year one, NTDS successfully reached out to decision-makers across the nephrology community to incorporate their insights into the work of the Project Committee and Workgroups.

We then devised an implementation plan to determine best strategies for infection prevention and to garner feedback from the community on useful tools for leading improved practice. We led community meetings and focus groups to identify specific infection-control practices, barriers, and opportunities.

We performed a root-cause analysis exercise among NTDS members, and augmented those insights during ASN's Kidney Week 2016. Contributing to this effort were 737 physicians, researchers, nurses and nurse practitioners, pharmacists, physician assistants, other healthcare professionals, and trainees. Barriers to infection prevention that were identified included lack of education and training; lack of policies, protocols, and procedures; absence of data; presence of central venous catheters; absence of leadership; and lack of governmental collaboration.

NTDS synthesized these wide-ranging views, and developed a roadmap to guide each workgroup’s activities. To support this work, NTDS launched a robust set of online resources. We created a series of NTDS webpages within ASN’s website that includes a resource library of infection prevention tools.

One important objective was to prepare for the unknown. When the Ebola epidemic reached into the US, including the need to prevent infection spread during dialysis care, it became clear that the dialysis community needed to quickly learn new and critical methods for isolation, spent dialysate disposal, bloodline management, and possible Ebola exposure among our chronic dialysis patients. We were unprepared as a community to manage such virulent infection, and those few nephrologists who faced the challenge needed to deal with these challenges "on the fly." We want to be better prepared for the next epidemic. To this end, NTDS conducted a gap analysis to identify lessons learned by speaking with the nephrologists who managed the few cases of Ebola that required dialysis treatment in the US.

To reach a broad audience of dialysis caregivers, we launched an educational series, including webinars, regional lectures and interactive seminars, and seminars at ASN’s Kidney Week. The first webinar, attended by nearly 500 nephrologists and other professionals, was titled “Targeting Zero Infections: Where Do We Begin?” This case-based conference stressed several key educational points, including the virulence of hepatitis C, the role of the nephrologist as a leader, and direction to the online resource library. Almost 100% of attendees found the webinar content useful and anticipate participating in Webinar 2, “Targeting Zero Infections: Combating Blood Borne Pathogens,” scheduled for September 27, 2017. For ASN’s Kidney Week 2017, NTDS will conduct several activities, including an Early Program seminar titled “The Dialysis Infection Crisis in the United States: A Call to Action,” and a presentation during the annual meeting, “Infection Prevention: Are You Prepared for the Next Ebola?” Engaging those who will make a difference to care requires a multi-dimensional approach. NTDS has es-

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established a presence on several communication platforms, including:
1. Website URL: https://www.asn-online.org/ntds. This includes a resource library highlighting current topics, including data and quality improvement, identification and treatment of bloodstream pathogens, regulations, and leadership and culture
2. Facebook administered by ASN: https://www.facebook.com/AmericanSocietyofNephrology. Posts including ASN President’s invitation to the NTDS Town Hall, links to Kidney News Online articles, promotions for the NTDS website, and information about NTDS webinars
3. Twitter administered by ASN: Hashtags: #ASN_, NTDS, and #targetzeroinfections.
4. NTDS Community in ASN Communities: highlights have included NTDS Town Hall, regular goose vs. sangleen use, ClearGuard HD Antimicrobial Barrier Cap, and anti-infection or infection resistant surfaces.

If infection control practices are to become part of the fabric of daily dialysis care, the next generation of nephrologists and leaders will need robust education and practice patterns. NTDS identified several education and training needs:
1. Incorporate current guidelines: policies, procedures, and protocols
2. Fellow’s Curriculum: infection prevention and leadership education and training
3. Hand hygiene
4. Human factors engineering, continuous quality improvement, and best practices
5. Credentialing
6. State/Federal healthcare-associated infections (HAI) program introduction and mandates

Antibiotic stewardship has been deployed in hospitals, but is not generally part of dialysis facility operations. These efforts improve outcomes in several ways. When antibiotics are administered only when there are clear indications for their use, fewer patients harbor antibiotic-resistant organisms or develop multiple antibiotic-resistant infections. Tailoring antibiotic administration to the agent appropriate for the organism and type of infection reduces the pressure on organisms to develop antibiotic resistance. In addition, it is now becoming clearer that the health-promoting gut microbiome can be permanently altered by multiple courses of antibiotics. Antibiotic stewardship reduces unnecessary exposure to antibiotics, and better conserves the normal gut microbiome. Dialysis patients are often prescribed courses of antibiotics, including wide spectrum agents. Antibiotic stewardship programs in dialysis facilities have the potential to substantially reduce unnecessary exposure of patients to these antibiotics.

NTDS identified several leadership mandates to facilitate. We will succeed only if we collaborate closely with dialysis organizations. We have engaged the leadership of the large and medium-sized dialysis companies, and seek ways to work together to enhance lines of communication, enhance training for medical directors, identify dialysis facility infection control leaders/coordinators, and collaborate with state/federal HAI programs and regulatory organizations. We also seek to reduce inconsistencies among government agencies and eliminate knowledge gaps between dialysis facilities and governmental HAI programs.

Education, an indicator of socioeconomic status, was also related to diabetes prevalence: 12.6% for adults with less than a high school education, 9.5% for those with a high school education, and 7.2% for those with more than a high school education.

Estimates for prediabetes were staggering—33.9% of US adults in 2015, or 84.1 million people. That included nearly half (48.3%) of adults aged 65 or older. The figures were somewhat lower than in the 2014 report, which estimated that 86 million US adults had prediabetes.

Only 11.6% of adults with prediabetes were aware of their condition. In contrast to the situation with diabetes, there was no significant difference in the prevalence of prediabetes by racial/ethnic group.

High burden of complications and death

“Persons with diabetes are at higher risk of developing serious complications, including blindness, lower extremity amputation, and kidney failure,” said Nilka Rios Burrows, MPH, of the CDC’s Chronic Kidney Disease Initiative, Division of Diabetes Translation. “However, people with diabetes can take steps (e.g., keeping blood sugar and blood pressure levels under control) to manage their diabetes and delay or prevent complications.”

Diabetes was a listed diagnosis in 7.2 million hospital discharges in US adults in 2014, including 1.5 million discharges for cardiovascular disease: a crude rate of 70.4 per 1000 persons with diabetes. These included approximately 400,000 patients with ischemic heart disease and more than 250,000 with stroke. There were 108,000 hospitalizations for lower extremity amputations and 168,000 for cataract surgery.

Diabetes was listed as any diagnosis in 14.2 million emergency department visits, including 245,000 visits for hypertensive and 207,000 for hypertensive crisis. Diabetes was the seventh-leading cause of death in the US in 2015, with a crude rate of 24.7 per 100,000 persons.

Total direct and indirect costs of diagnosed diabetes in the US were estimated at $245 billion in 2012, according to research by the American Diabetes Association. With adjustment for age and sex, average medical costs for people with diabetes were 2.34 times higher than for those without diabetes.

For nephrologists, the high prevalence of diabetes and prediabetes heralds high rates of diabetic nephropathy in the years ahead. “More than 30 million people in the United States are living with diabetes, placing them at risk of developing kidney disease,” Rios Burrows said.

A report by the CDC’s Chronic Kidney Disease Surveillance Team estimated that 36.5% of adults with diagnosed diabetes had stage 1 to 4 CKD during 2011–2012. As reported last year in ASN Kidney News, that study found continued increases among African Americans. The authors highlighted the need for continued vigilance to lessen the impact of CKD in the population, including efforts on the part of nephrologists to promote better awareness and care among primary care clinicians.

“Claims data indicate that testing for urine albumin, the earliest marker of kidney disease in diabetes, is done in less than half of patients,” Rios Burrows said. “Testing for kidney disease among people who are at high risk for developing CKD—those with diabetes or with high blood pressure—has been shown to be a cost-effective tool to identify people with CKD. CDC’s kidney team is currently designing an online tool to help primary care physicians and other health care providers evaluate a patient’s need for and frequency of screening for CKD.” The latest CDC National CKD Fact Sheet can be found at https://www.cdc.gov/diabetes/pubs/pdf/kidney_factsheet.pdf.

What are diabetes rates in your area?
The 2017 National Diabetes Statistics report includes age-adjusted, county-level data on adult diabetes prevalence, providing a unique snapshot of diagnosed diabetes, based on 2013 data from the US Diabetes Surveillance System. Median county-level prevalence was 9.4%. Age-adjusted prevalence of diagnosed diabetes varied widely: from 3.8% in Eagle County, Colorado, to 20.8% in Lowndes County, Alabama. The data can be explored in depth at https://www.cdc.gov/diabetes/atlas/countydata/atlas.html.

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ESRD was 154.4 per 1 million persons.

The National Diabetes Statistics Report is a periodic update on diabetes in the US, with estimates drawn from CDC data systems and other sources. The 2017 report estimates that 9.4% of all Americans—and 1.2% of adults—are affected by diagnosed or undiagnosed diabetes. In the absence of a physician diagnosis, diabetes was defined as a fasting plasma glucose level of 126 mg/dl, or higher, or an HbA1c level of 6.5% or higher. Prediabetes was defined as fasting plasma glucose of 100 to 125 mg/dl or HbA1c of 5.7% to 6.4%.

The estimates don’t differentiate between type 1 and type 2 diabetes. “However, the report states, ‘because type 2 diabetes accounts for 90% to 95% of all diabetes cases, the data presented are likely to be more characteristic of type 2 diabetes.’ Overall prevalence appeared steady—the previous CDC diabetes statistical report, issued in 2014, estimated about 29 million Americans with diabetes, or 9.3% of the population.

In 2015, an estimated 1.5 million US adults received a new diagnosis of diabetes.

The prevalence data suggested that more women had diagnosed diabetes than men, but that differential may not mean much, as more men had undiagnosed diabetes (4.0 million men versus 3.1 million women). Also, most adults with diabetes were of working age: 4.6 million aged 18 to 44 and 14.3 million aged 45 to 64. At age 65 or older, total diabetes prevalence was 25.2%.

Analysis by race/ethnicity found that diabetes prevalence was highest for American Indians/Alaska Natives, 15.1%; followed by non-Hispanic blacks, 12.7%; Hispanic, 12.1%; Asians, 8.0%; and non-Hispanic whites, 7.4%.

Within these categories, there were some important differences by subgroup: prevalence was 13.8% among Mexican Americans, 12.0% among Puerto Ricans, and 11.2% in Asian Indians.

Year two plan

For the coming year, NTDS will continue to expand our education and physician engagement activities, present a series of articles in Clinical Journal of the American Society of Nephrology, complete and share a curriculum for trainees and medical directors to stop preventable infections, complete and share a guideline for anticipating and preparing for emerging threats, and encourage collaboration between dialysis professionals and state/federal HAI programs. In addition, NTDS will work with dialysis companies to develop and refine programs to transform the dialysis culture to a culture of safety and individual accountability. By engaging nephrologists, dialysis facility owners, and other stakeholders in these many transforming activities, NTDS believes we can get to our target of zero preventable infections.

Reference

Disclaimers
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