



# **The State of Kidney Disease in the US: New Findings & High Impact Practices Linked to Improved Patient Outcomes**

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# Acknowledgment, Disclaimer, Conflict of Interest Statement

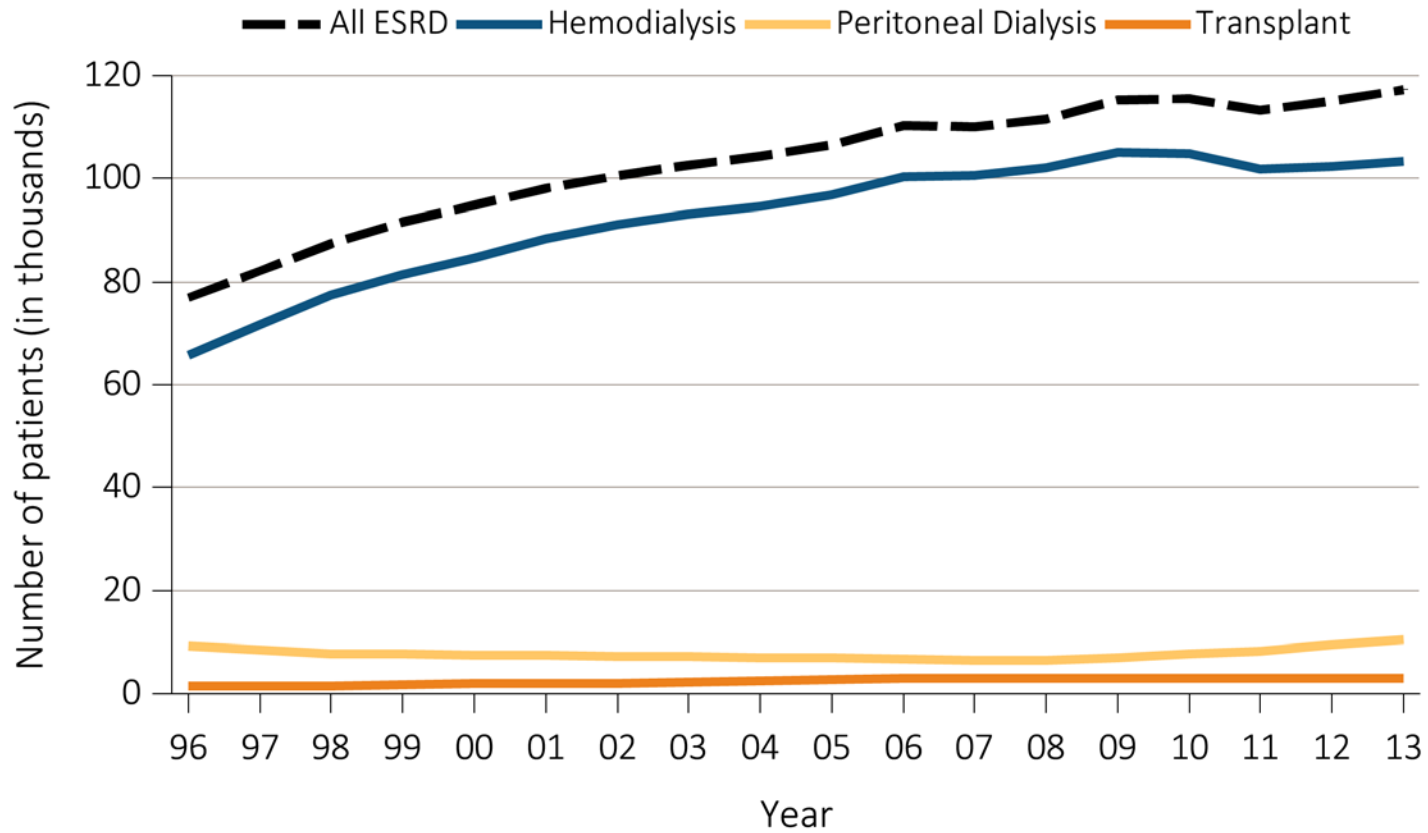
- The USRDS Coordinating Center is funded by NIDDK, through NIH contract HHSN276201400001C

[The interpretation and reporting of these data are the responsibility of the authors and in no way should be seen as an official policy or interpretation of the U.S. government]

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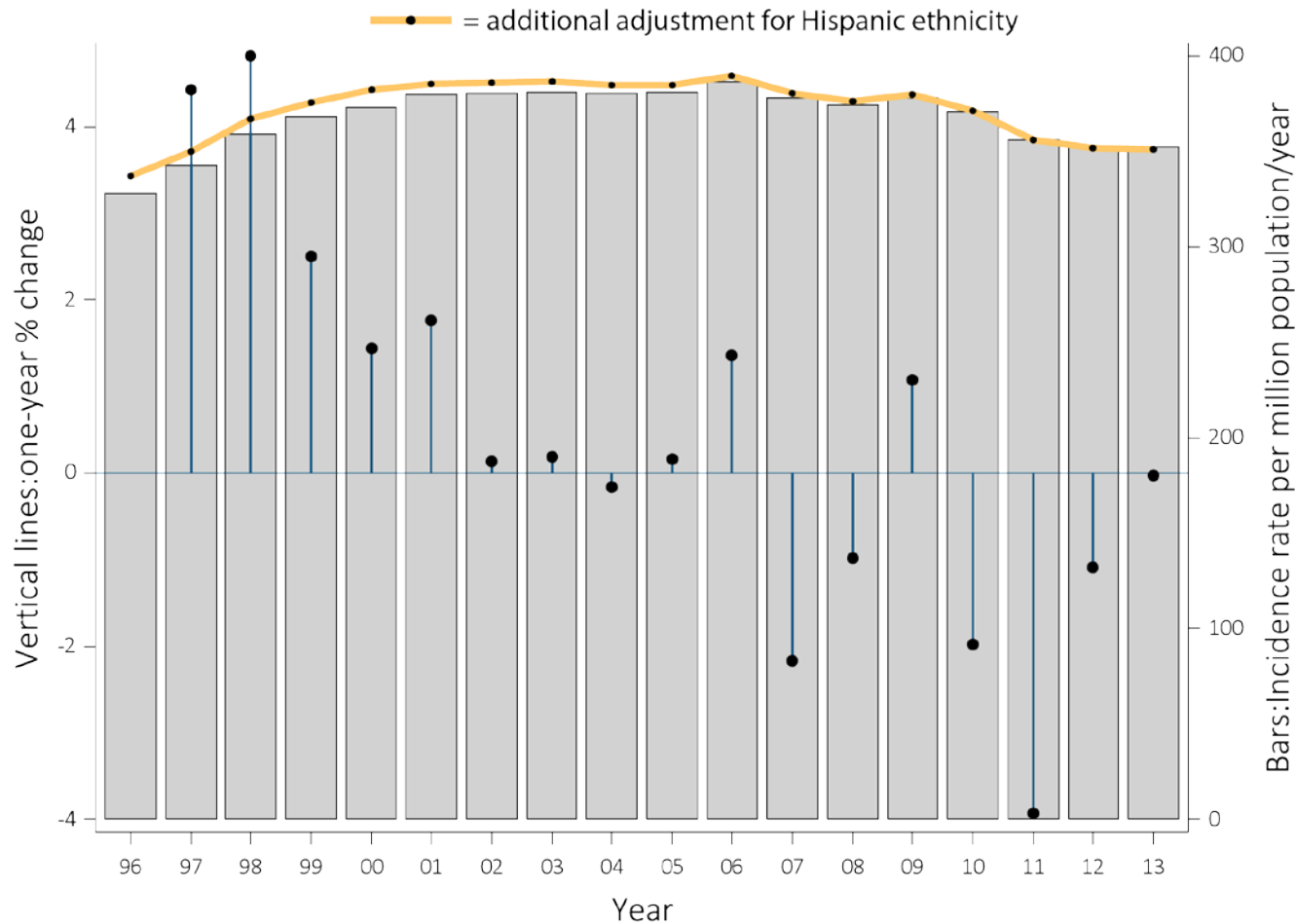
# Trends in the annual number of incident ESRD cases

*(in 1000s) by modality, in the U.S. population, 1996-2013*



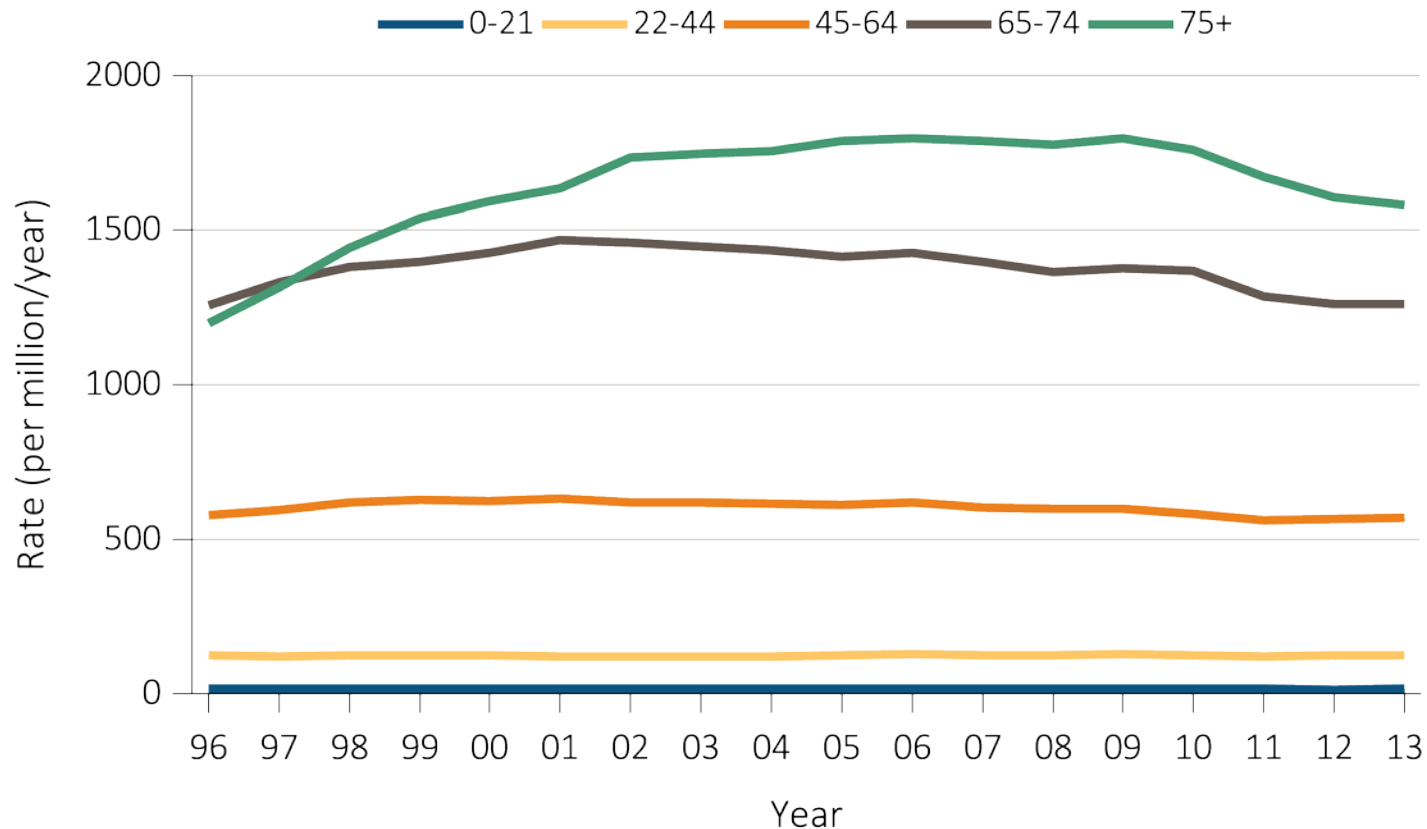
Data Source: Reference Table D1. Abbreviation: ESRD, end-stage renal disease.

# Trends in adjusted incidence rate (per million/year) of ESRD



Data Source: Reference Table A.2(2) and special analyses, USRDS ESRD Database. \*Adjusted for age, sex, and race. The standard population was the U.S. population in 2011. Abbreviation: ESRD, end-stage renal disease.

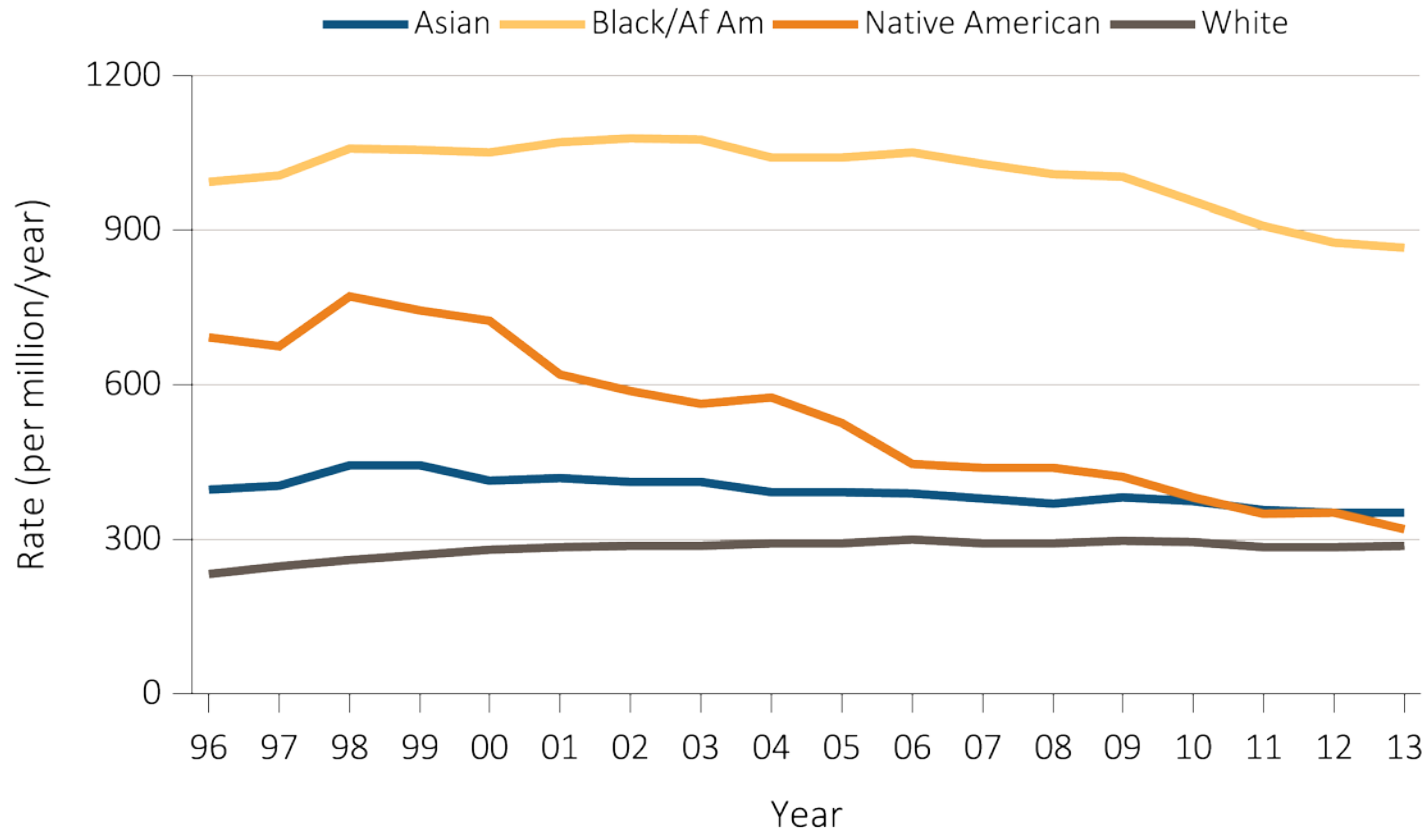
# Trends in adjusted\* ESRD incidence rate (per million/year), by age group, U.S. population, 1996-2013



Data Source: Special analyses, USRDS ESRD Database. \*Adjusted for sex and race.

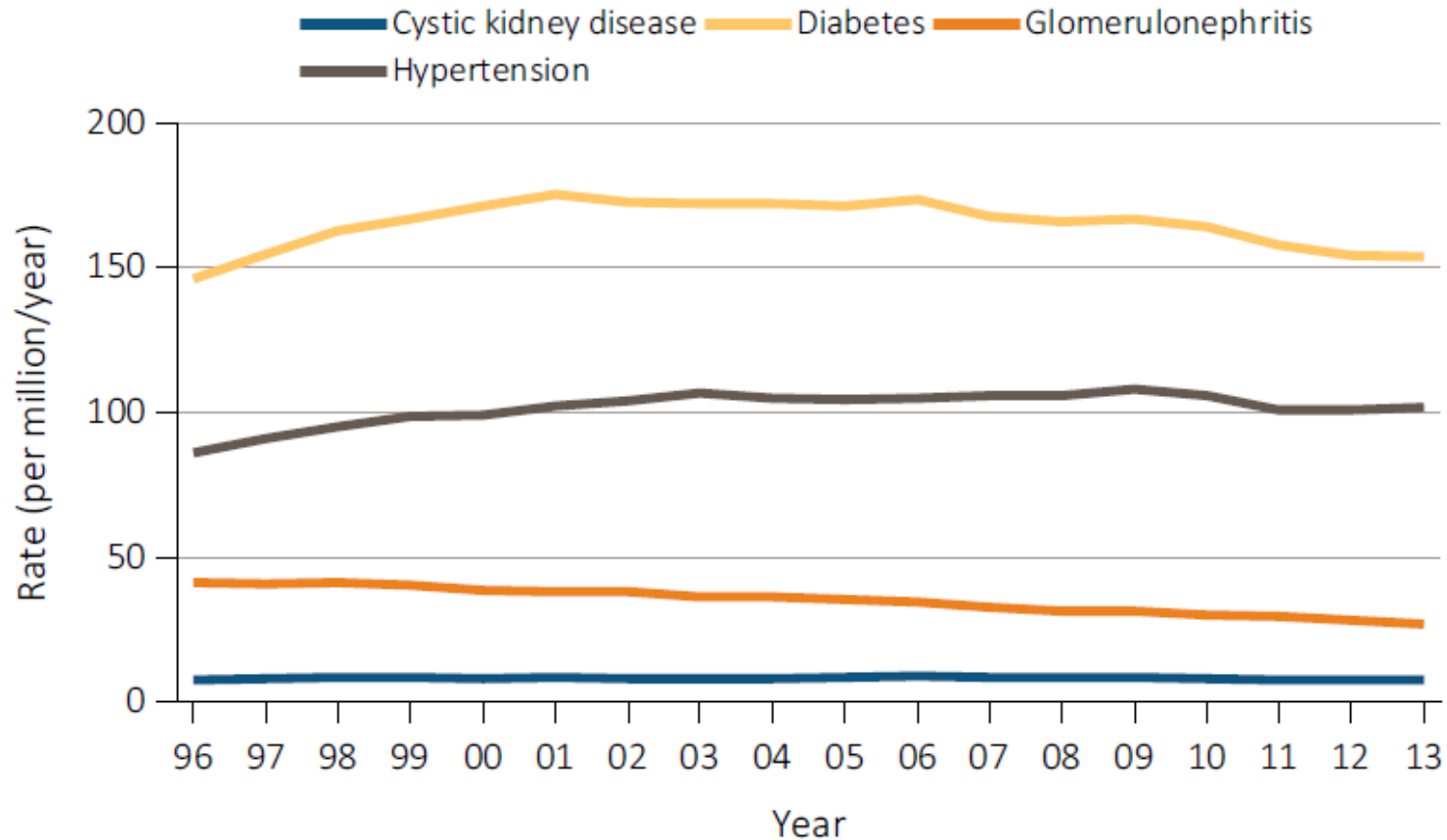
The standard population was the U.S. population in 2011. Abbreviation: ESRD, end-stage renal disease.

# Adjusted ESRD incidence rate, by race categories (1996–2013)



Data Source: Special analyses, USRDS ESRD Database. \*Adjusted for age and sex. The standard population was the U.S. population in 2011. Abbreviations: Af Am, African American; ESRD, end-stage renal disease.

# Adjusted incidence rate by primary cause of ESRD (1996–2013)



Data Source: Special analyses, USRDS ESRD Database. \*Adjusted for sex. The standard population was the U.S. population in 2011. Abbreviations: ESRD, end-stage renal disease.



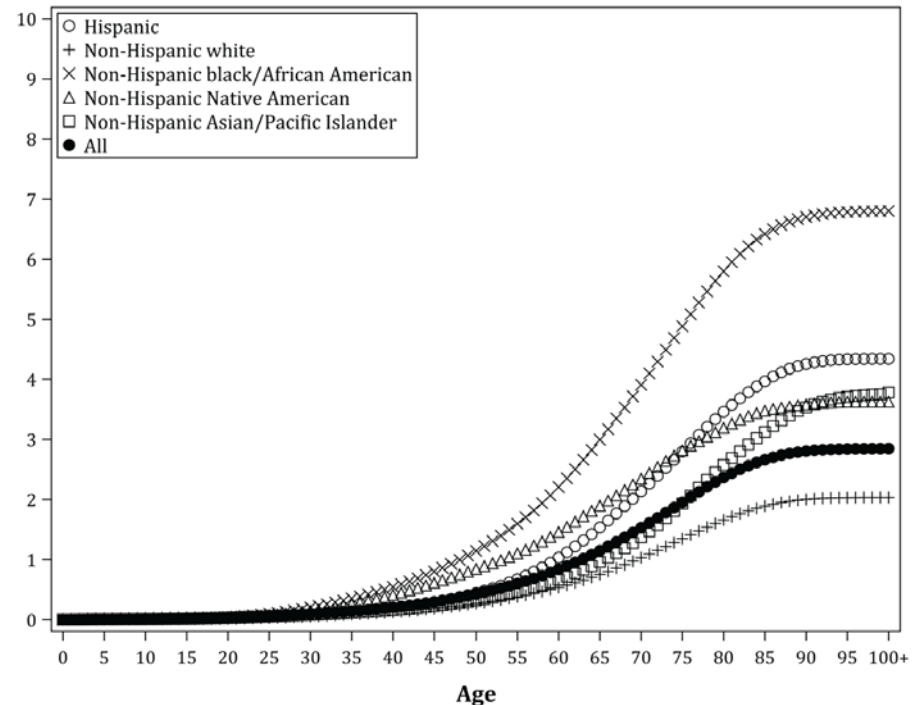
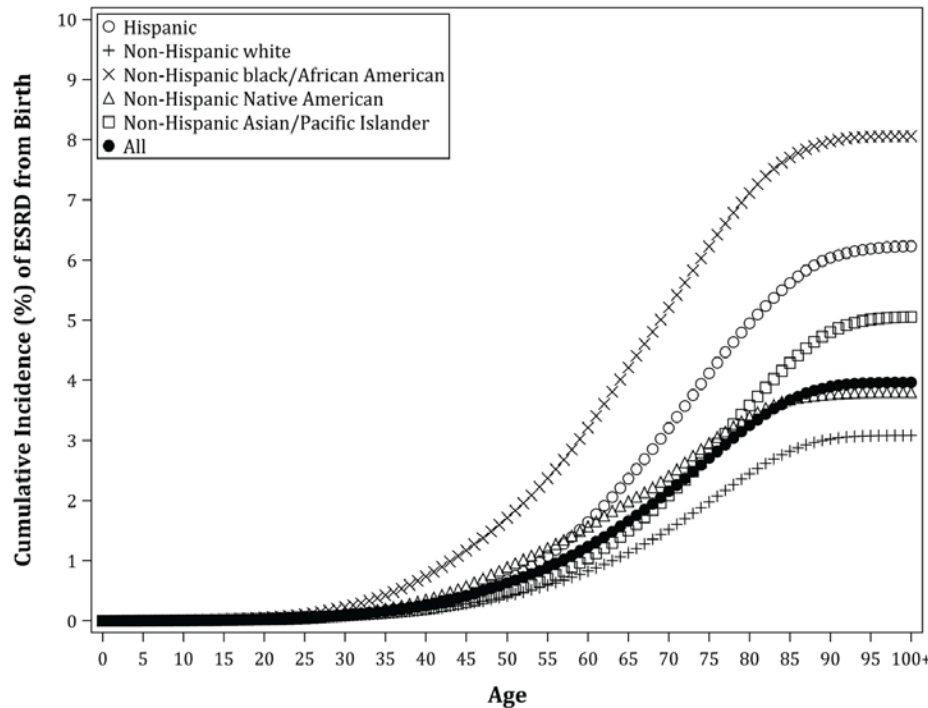
# **Risk of End-Stage Renal Disease in the United States**

Patrick Albertus<sup>1</sup>, Hal Morgenstern<sup>1</sup>, Bruce  
Robinson<sup>1,2</sup>, Rajiv Saran<sup>1</sup>

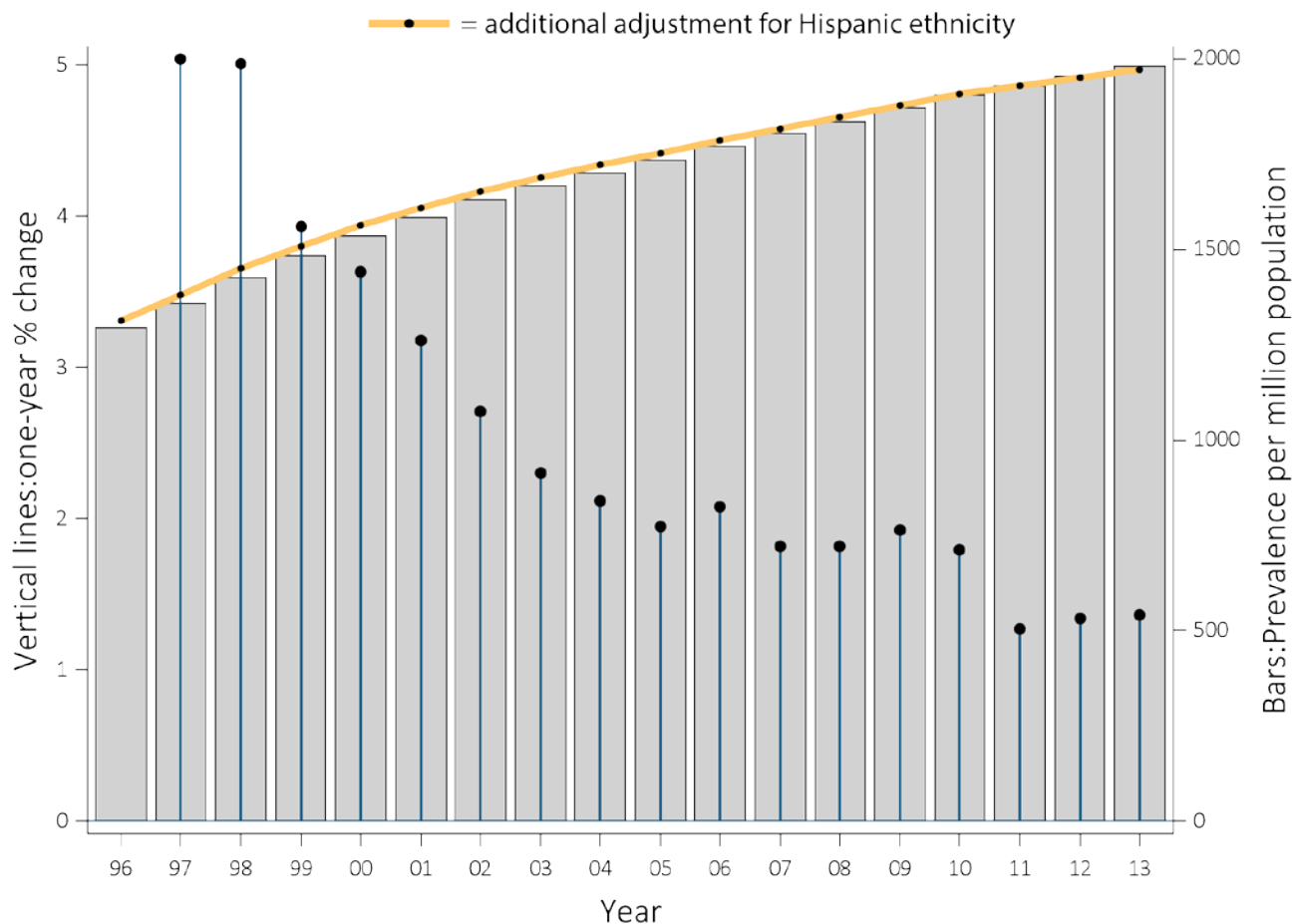
<sup>1</sup>University of Michigan, Ann Arbor, MI; <sup>2</sup>Arbor  
Research Collaborative for Health, Ann Arbor, MI



# Cumulative incidence (%) of ESRD from birth to age 100+, by race/ethnicity, in the U.S. (a) male & (b) female population, 2013

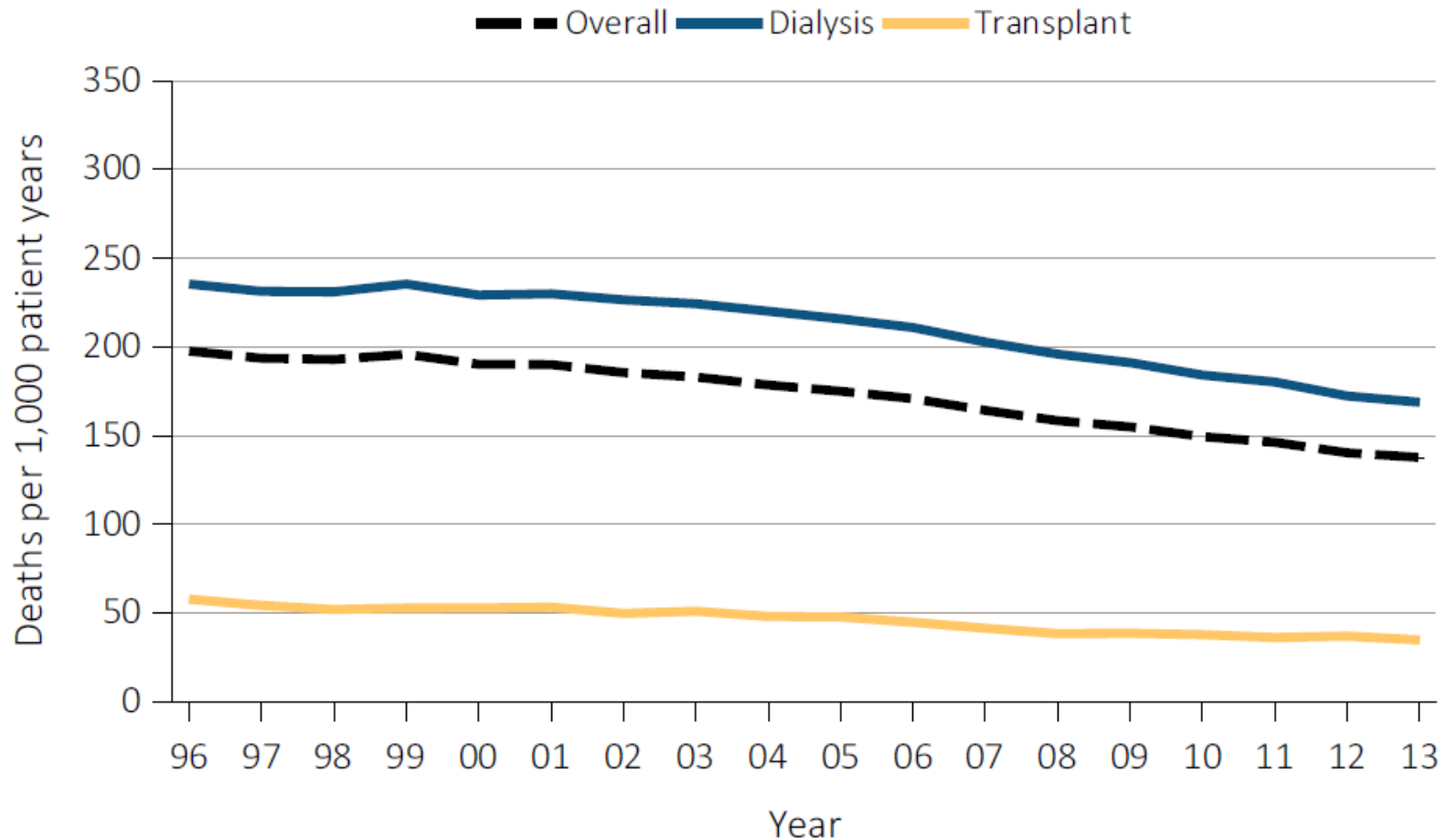


# Trends in adjusted\* ESRD prevalence (per million) and annual change (%) in adjusted\* prevalence of ESRD in the U.S. population, 1996-2013



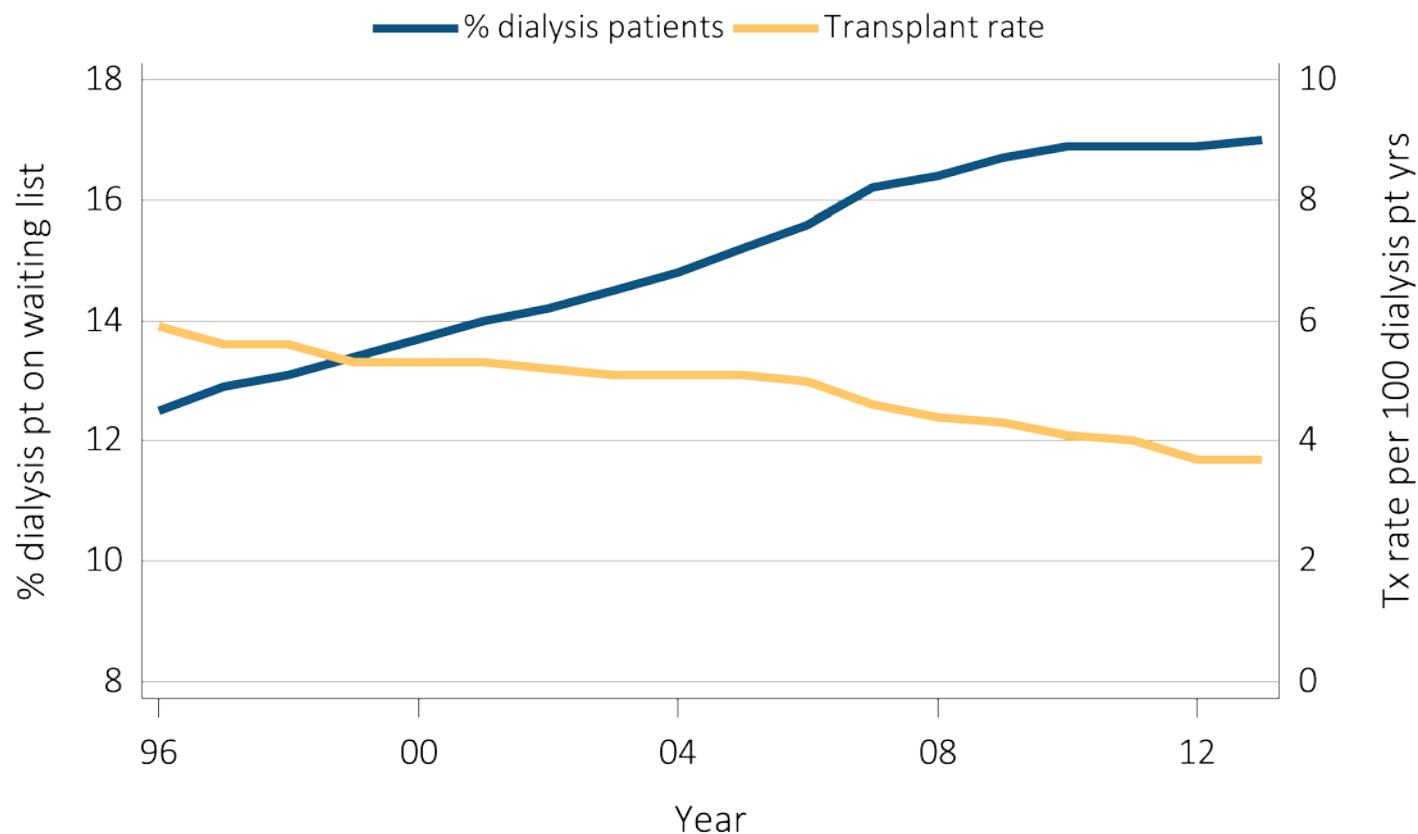
Data Source: Reference Table B.2(2) and special analyses, USRDS ESRD Database. \*Adjusted for age, sex, and race. The standard population was the U.S. population in 2011. Abbreviation: ESRD, end-stage renal disease.

# Adjusted all-cause mortality (deaths per 1,000 patient-years) by treatment modality overall,



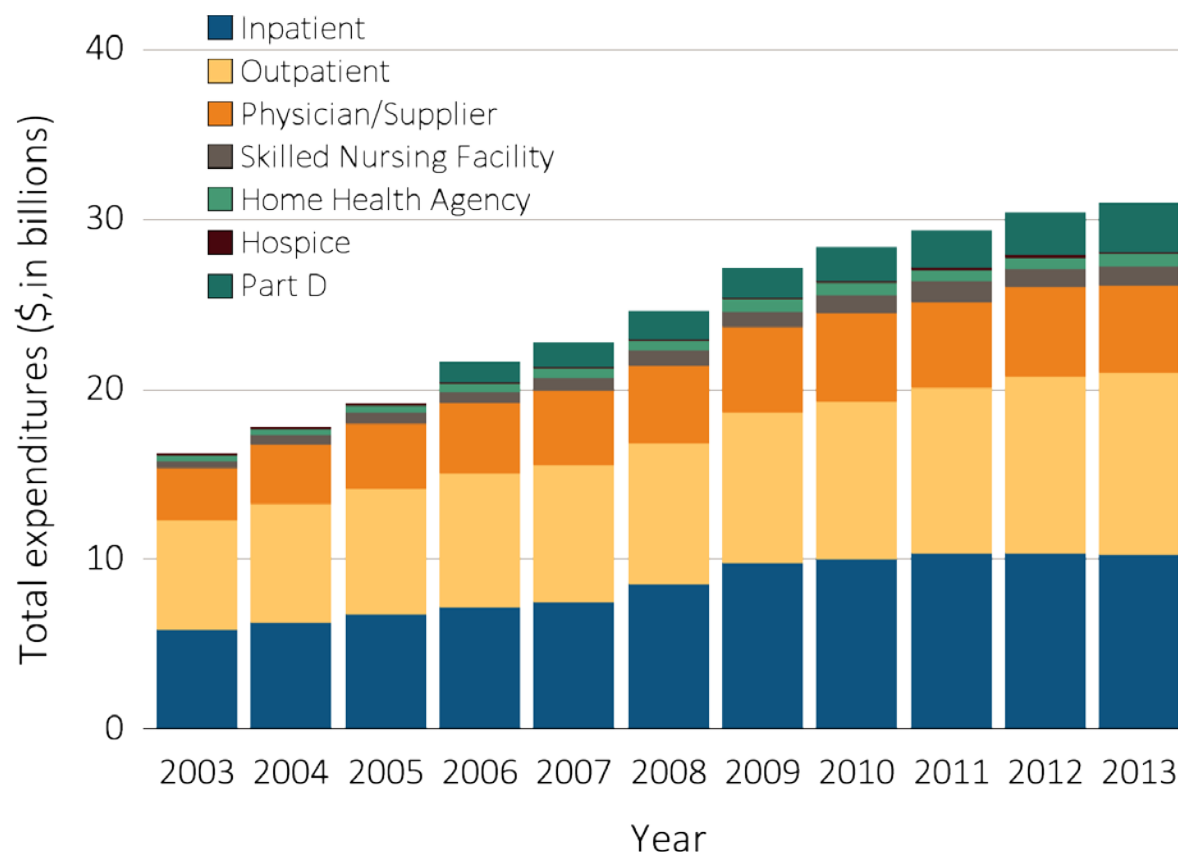
Data Source: Reference Tables H.2\_adj, H4\_adj, H.8\_adj, H.9\_adj, and H.10\_adj; and special analyses, USRDS ESRD Database. Adjusted for age, sex, race, ethnicity, primary diagnosis and vintage. Ref: period prevalent ESRD patients, 2011. Abbreviations: HD, hemodialysis; PD, peritoneal dialysis.

# Percentage of dialysis patients wait-listed, and unadjusted kidney transplant rates, 1996-2013



*Data Source: Reference Tables E4 and E9. Percentage of dialysis patients on the kidney waiting list is for all dialysis patients. Unadjusted transplant rates are for all dialysis patients. Abbreviations: Tx, transplant; pt yrs, patient years.*

# Trends in Total Medicare Fee For Service Spending for ESRD, by Type of Service, 2003-2013

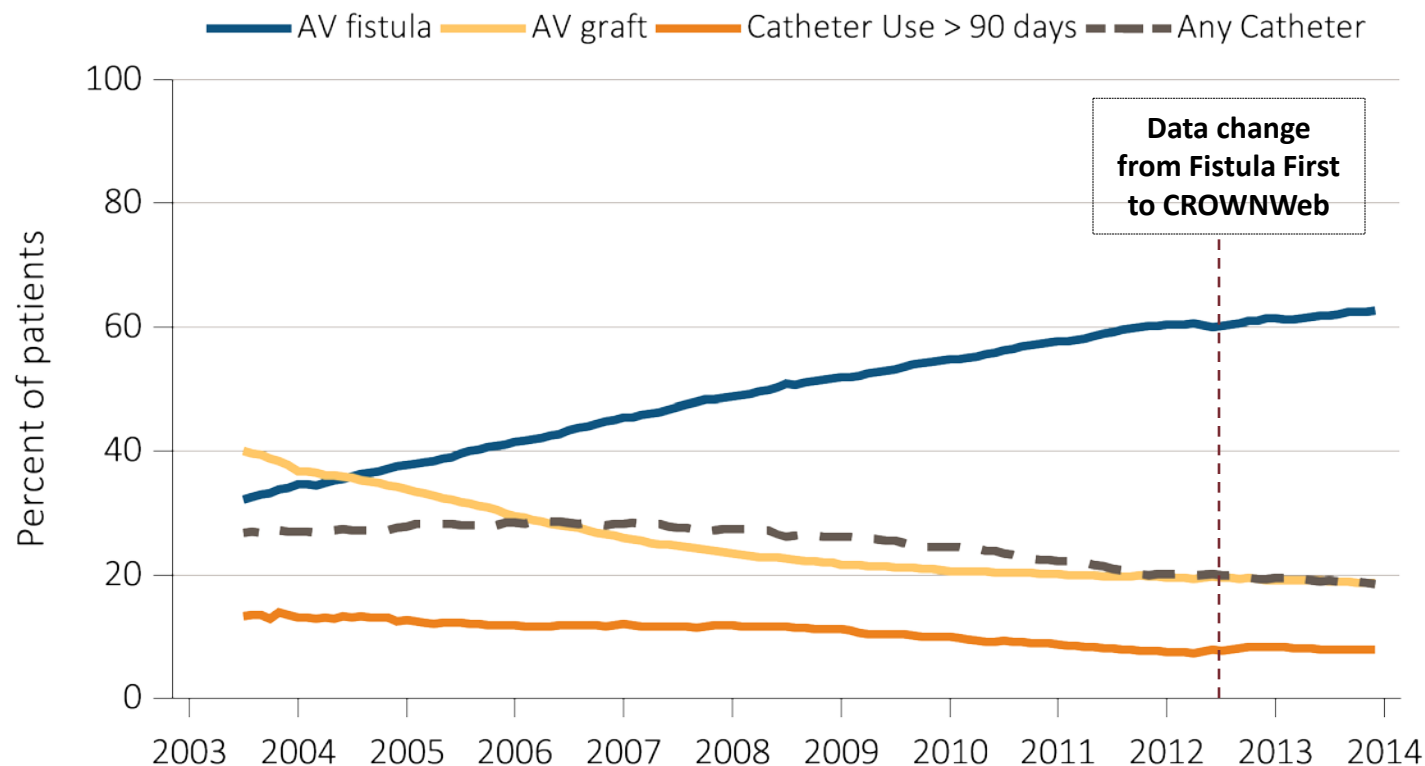


Data Source: USRDS ESRD Database. Total Medicare costs from claims data; includes all claims with Medicare as primary or payer. Abbreviations: ESRD, end-stage renal disease.

**New to the 2015 USRDS  
Annual Data Report (ADR):**

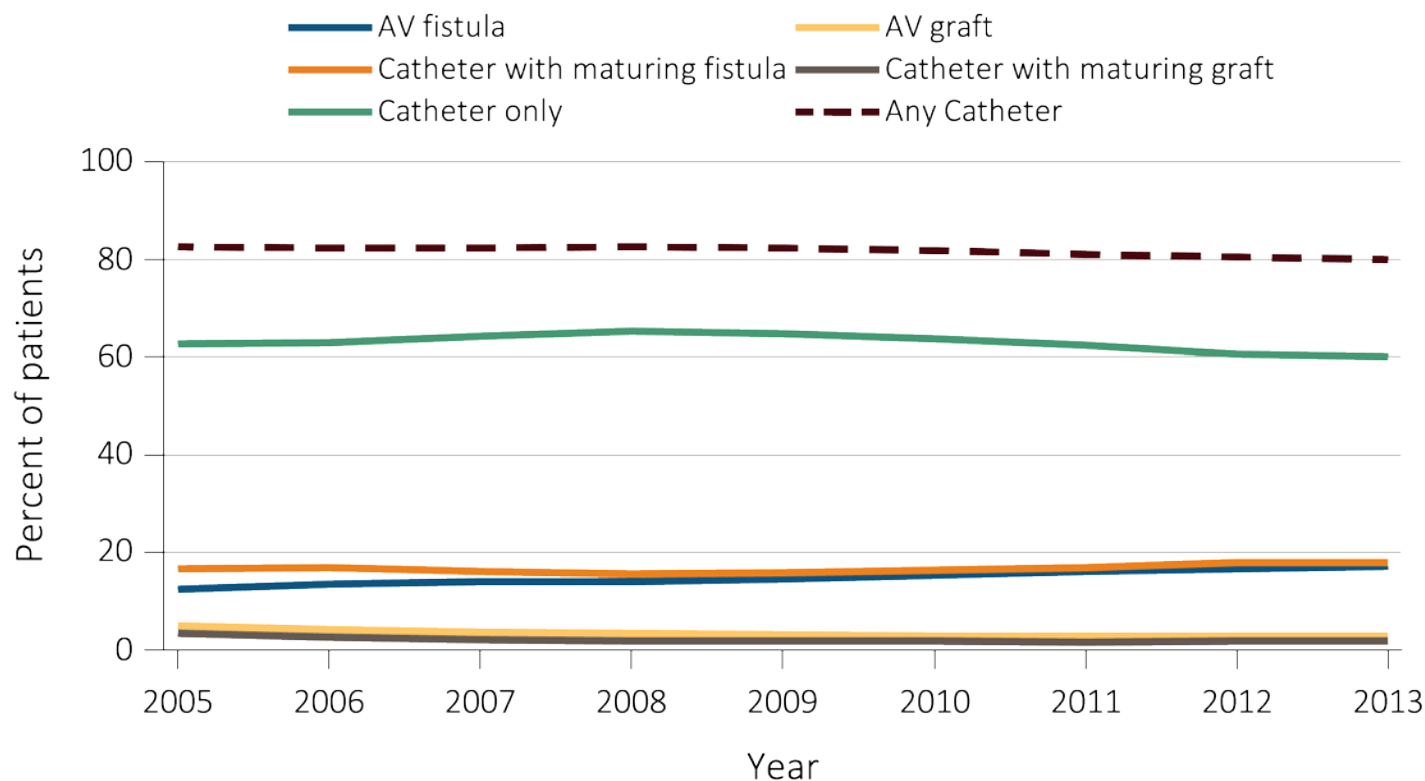
*Chapter on Vascular Access*

# Trend in Vascular Access Type in Use Prevalent Patients, 2003-2014



Data Source: Fistula First data from July 2003 to April 2012; CROWNWeb data from June 2012 to Dec 2013; Use (%) for 2003/2009: AVF 32/63, AVG 40/19, catheter 27/19; c90 17/8.

# Vascular access use at HD initiation: from the Medical Evidence Form 2728, 2005-2013

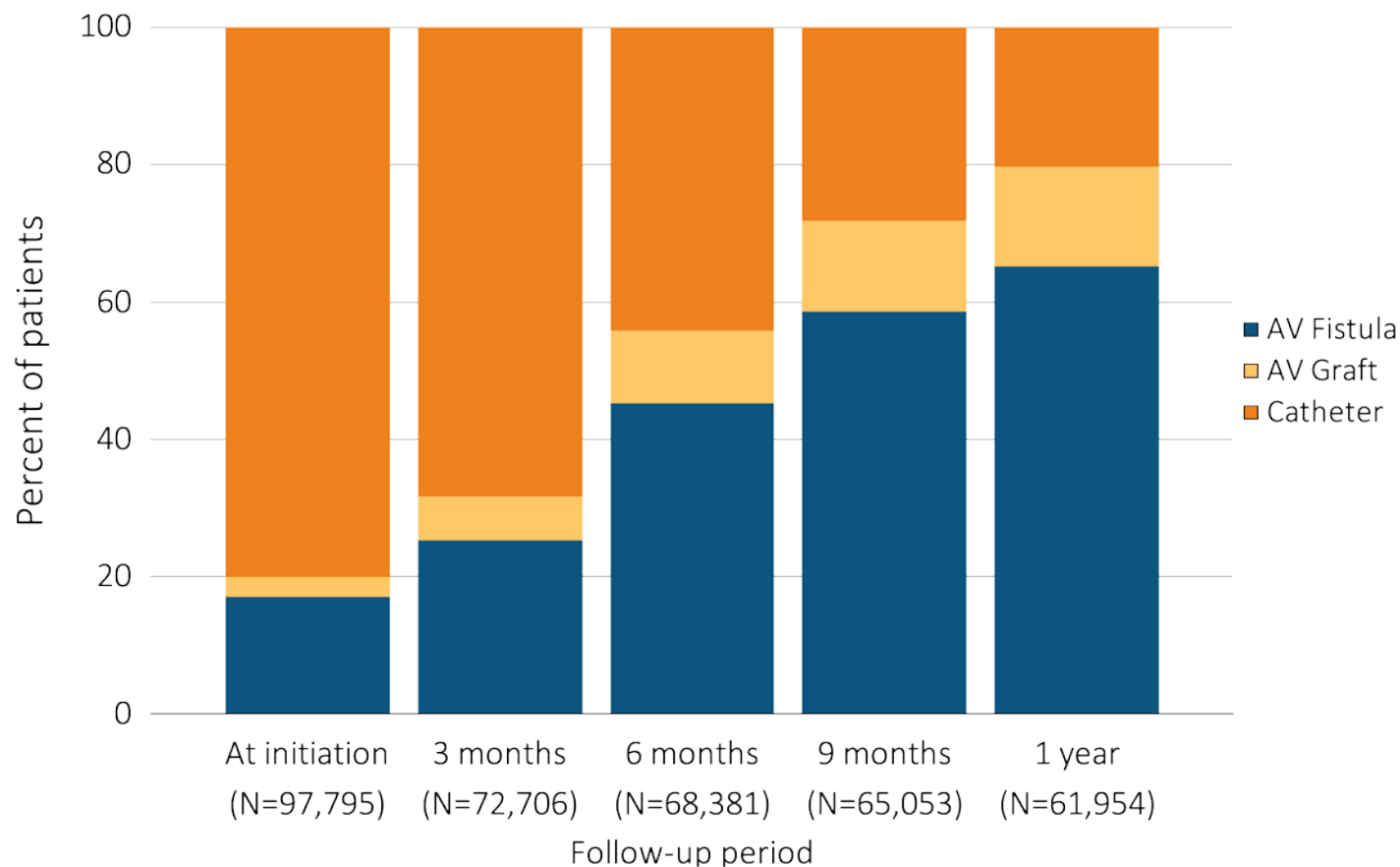


Data Source: Medical Evidence 2728 Form



# Vascular access use during first year of HD, 2012

*(among patients with VA data at each time point)*



Data Source: Medical Evidence 2728 Form at initiation and CROWNWeb for remaining time periods.

# **AVF Maturation in Patients on HD: Results from the USRDS**

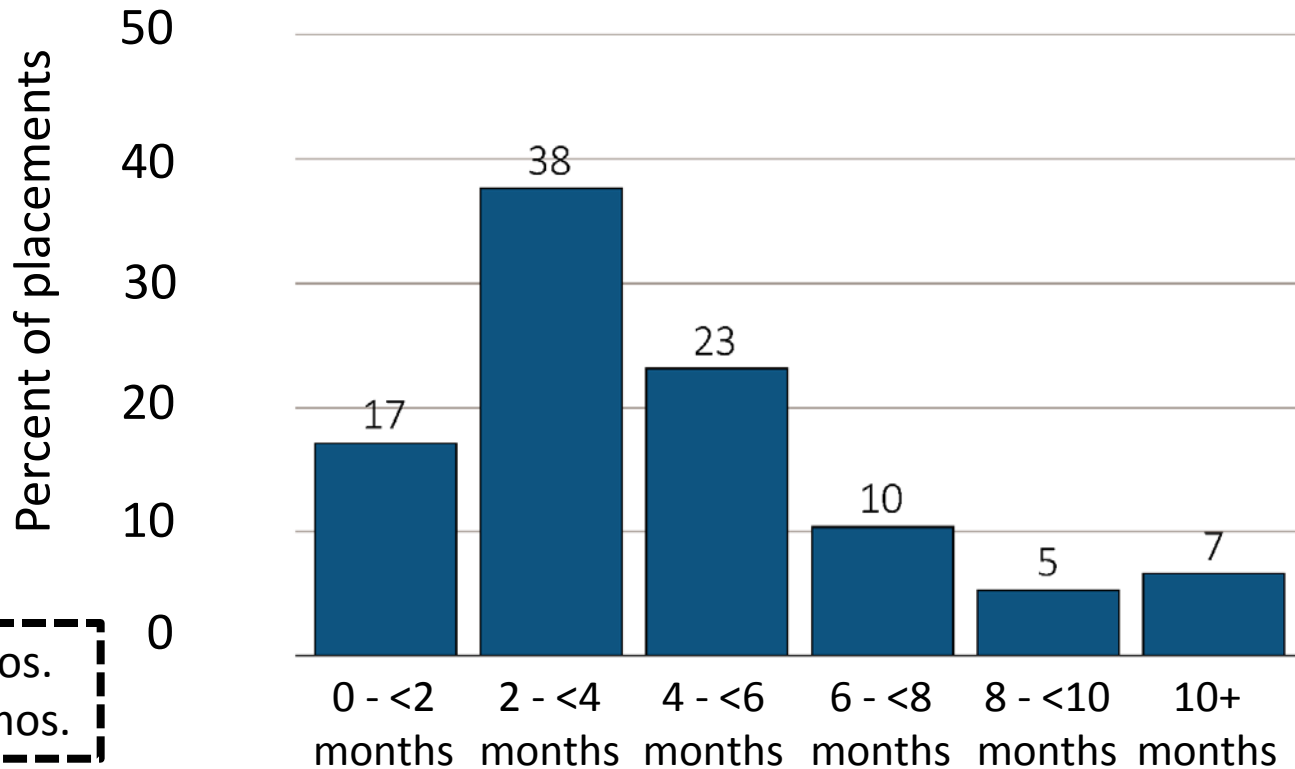
Woodside KJ, Bell S, Eckard AS, Plattner BW, Schaubel  
DE, Dasmunshi S, Mukhopadhyay P, Pearson J, Pisoni  
RL, Saran, R

ASN Abstract, 2015

# Background: AVF Maturation

- The DAC clinical trial, where AVF maturation was a secondary outcome, had very high failure of newly placed fistulae (2008)
- This finding, and others, led to the NIDDK-funded Hemodialysis Fistula Maturation Study
- Early HFM findings indicate the prominent influence of practice variation, rather than clinical/biological characteristics alone, on AVF maturation

# Time to Fistula Maturation (First Use)



Mean: 4.5 mos.  
Median: 3.7 mos.

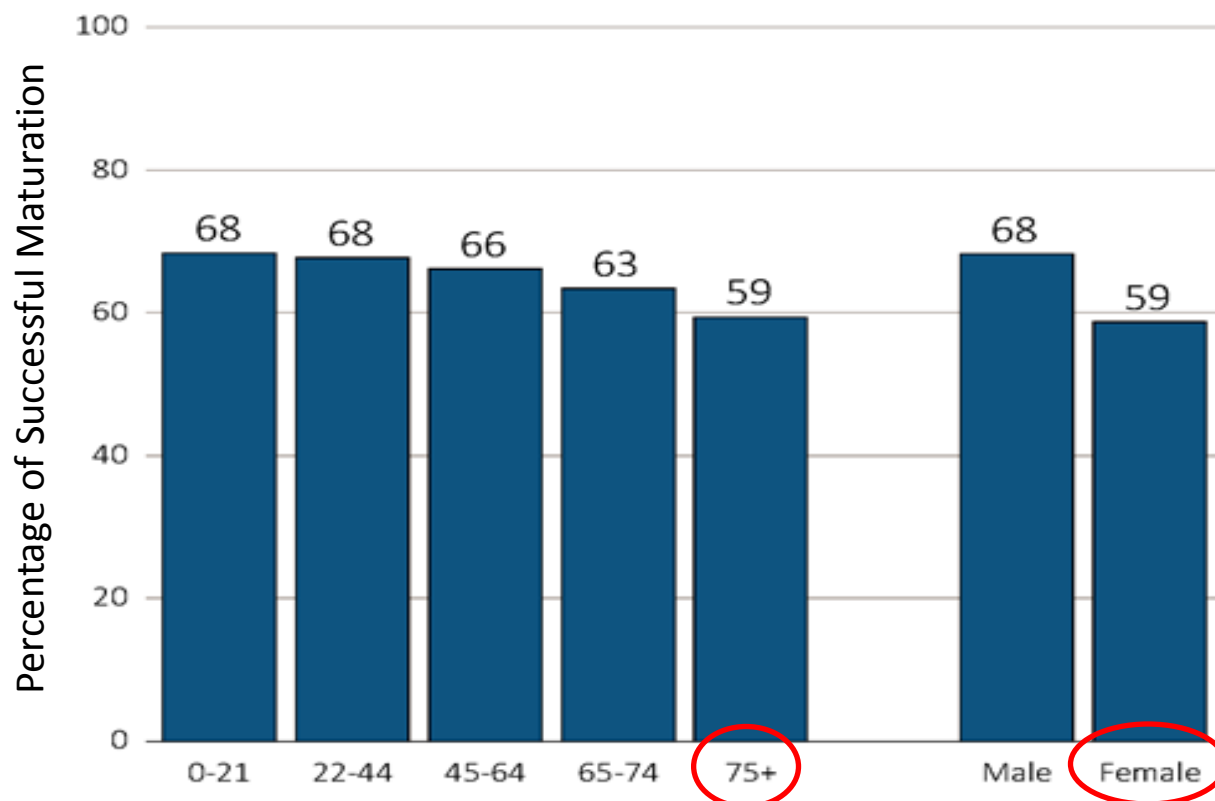
Number of months between fistula placement and first use

Data Source: Medicare claims at initiation and CROWNWeb for remaining time periods. (N=28,741)

If the fistula was indicated as being used in CROWNWeb following its placement (and prior to any subsequent fistula placements), the fistula was considered to have successfully matured for use

# Percent successful AVF maturation, 2013, Overall and by Age and Sex

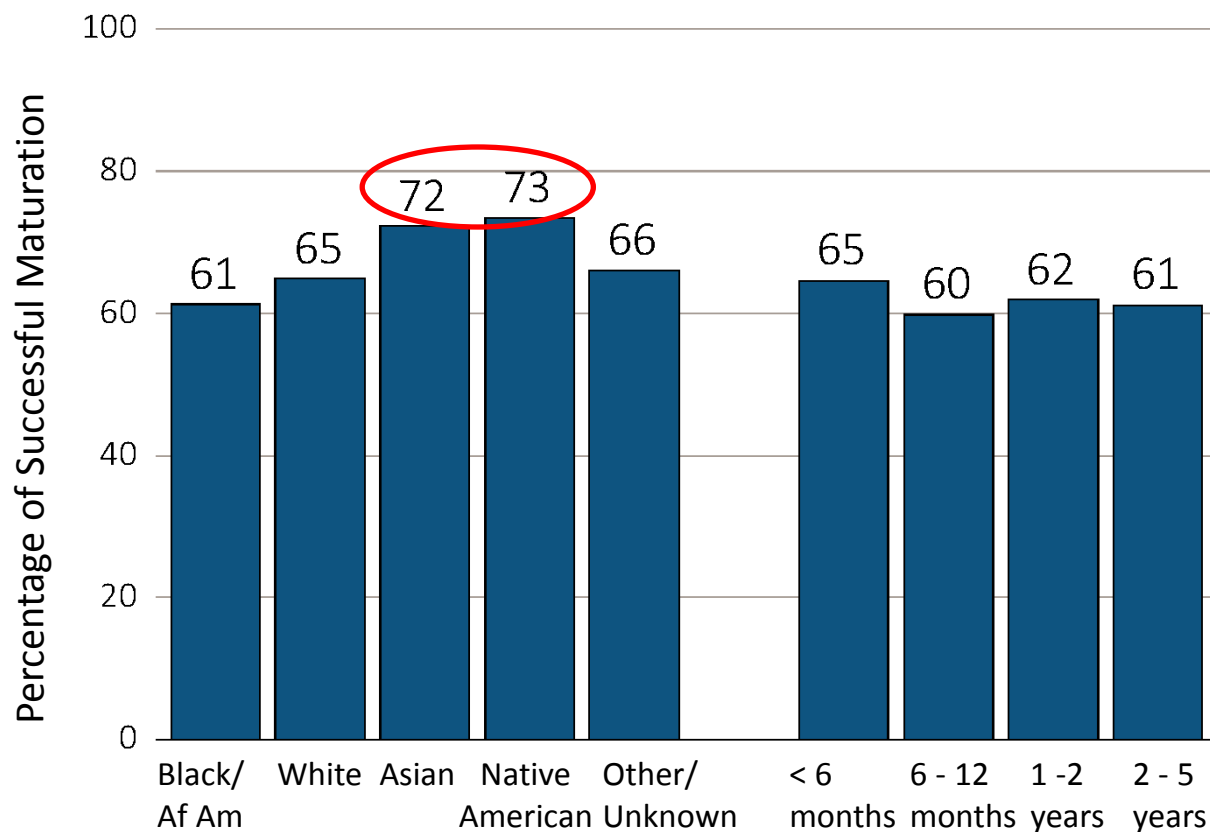
Overall AVF  
maturation  
64.1%



Data Source: CMS claims for placement; CROWNWeb for determining successful use, 2013 (N = 45,475)

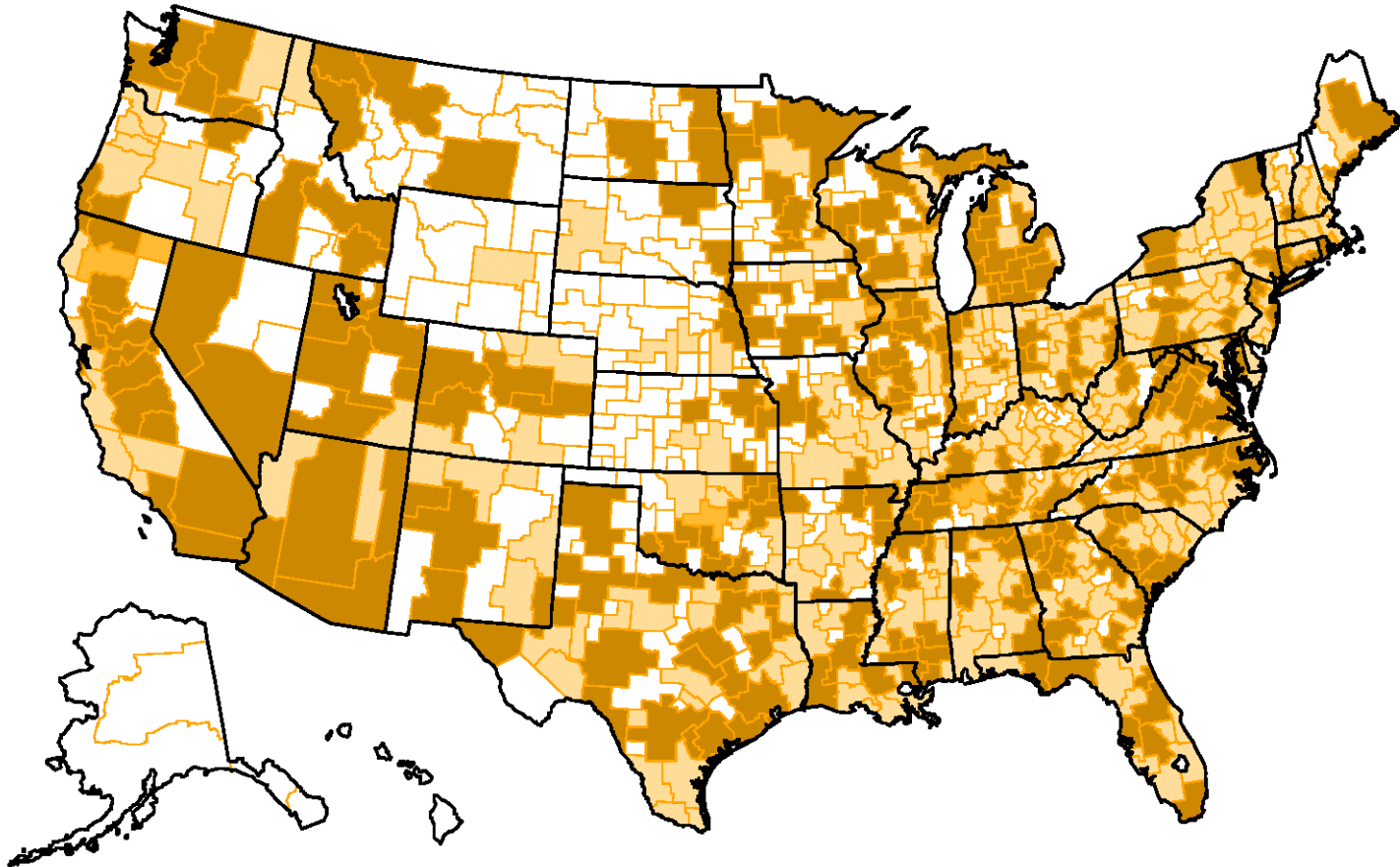
If the fistula was indicated as being used in CROWNWeb following its placement (and prior to any subsequent fistula placements), the fistula was considered to have successfully matured for use. Pre-ESRD placements were excluded.

# Percent successful AVF maturation, 2013, By Race and Dialysis Vintage



Data Source: CMS claims for placement; CROWNWeb for determining successful use, 2013 (N = 45,475) If the fistula was indicated as being used in CROWNWeb following its placement (and prior to any subsequent fistula placements), the fistula was considered to have successfully matured for use. Pre-ESRD placements were excluded.

# Geographic Variation in AVF Maturation





# **Primary Care of Patients on Chronic Dialysis**

**Vahakn Shahinian, Deanna Chyn, Patrick Albertus, Yi Li, John Ayanian, Richard Hirth, William Herman, Paul Eggers, Rajiv Saran**

ASN Abstract 2015. Manuscript in Preparation



# Question

- **Who should be responsible for “primary care” of chronic dialysis patients?**

## Dialysis-related care

Dialysis Prescription

Access

Anemia

MBD

## Primary Care

Care coordination

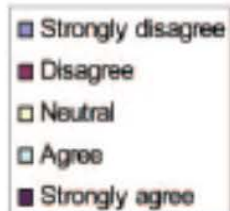
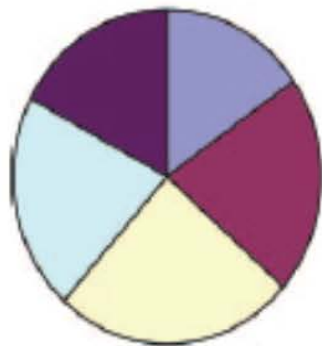
Preventive care

Medication Mgmt

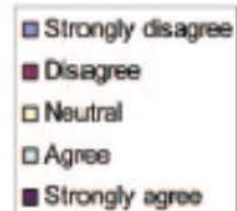
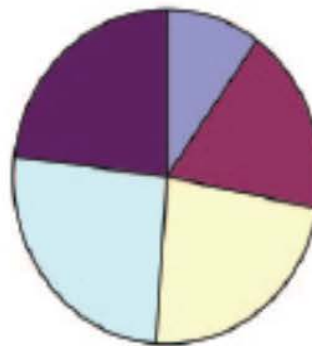
Other medical issues

# ASN Survey

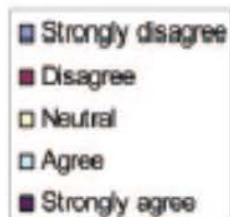
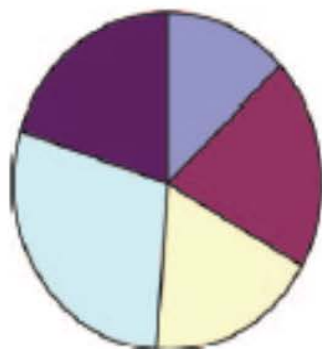
Nephrologists should provide most primary care.



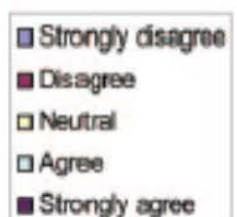
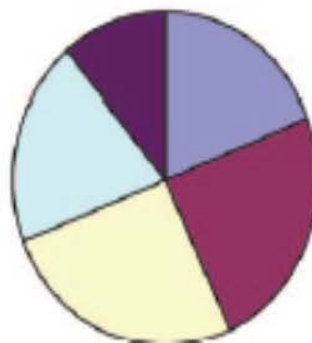
Nephrologists are better able to provide primary care.



PCPs should provide most primary care.



PCPs are better able to provide primary care.



# Policy Relevance

- Current national efforts to improve quality of care while reducing costs are particularly applicable to dialysis population
  - Patient Centered Medical Homes (PCMH)
  - Accountable Care Organizations (ACO)
  - ESRD Seamless Care Organizations (ESCO)
  - Development of Clinical Performance Measures

# Hypotheses

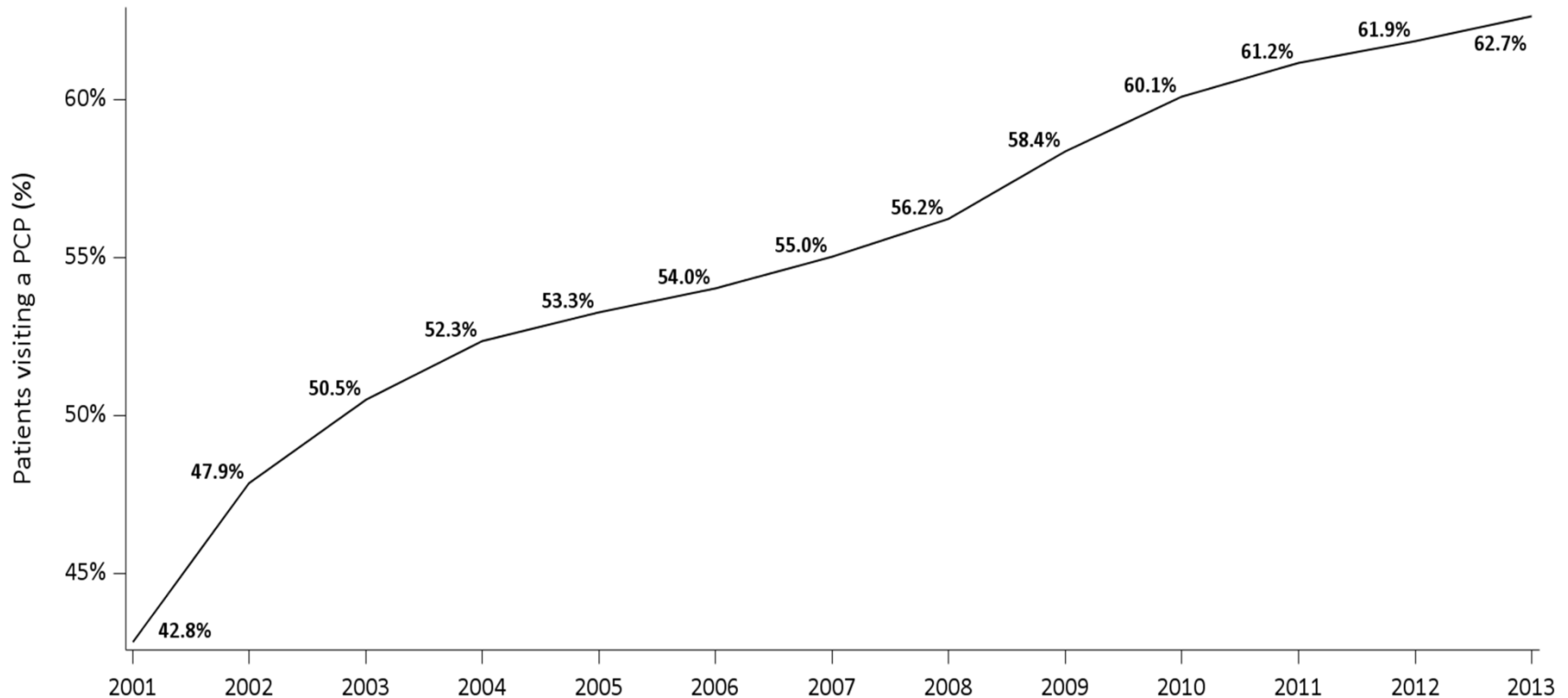
- Patients with a PCP are more likely to receive preventive services, including care for diabetes mellitus, vaccinations, etc.
- Patients with a PCP will have improved outcomes, such as lower rates of hospitalization and mortality
- Effect on costs of care may be cost saving if implemented without duplication of services and with greater coordination of care

# National Data Analyses

- Using USRDS data on national Medicare ESRD program
- Limited to prevalent dialysis patients with Medicare as primary insurer
- 2001-2013
- Claims-based definition of PCP visit and delivery of care

# Time Trends: PCP Involvement in the Care of HD Patients in the US

Percentage of dialysis patients visiting a PCP, 2001-2013



*Note: Among dialysis patients who were Medicare primary and alive for the entire calendar year.*

# Determinants of PCP involvement

Patient Characteristic	1+ PCP Visit a Year
Year	
2001 (ref)	-
2004	1.18 (1.18, 1.19)
2005	1.20 (1.19, 1.20)
2007	1.23 (1.22, 1.24)
2010	1.34 (1.33, 1.35)
2011	1.37 (1.36, 1.38)
2013	1.40 (1.40, 1.41)
Age at ESRD Onset	1.03 (1.03, 1.03)
Sex	
Male (ref)	-
Female	1.05 (1.05, 1.05)
Race	
White (ref)	-
Black	0.93 (0.93, 0.93)
Other	1.01 (1.01, 1.02)
Primary Cause of ESRD	
Diabetes (ref)	-
Hypertension	0.91 (0.91, 0.92)
Glomerulonephritis	0.90 (0.90, 0.91)
PCPs per capita (county)	1.0004 (1.0002, 1.0005)
Comorbidity Score	1.0066 (1.0062, 1.0069)
Medicare/Medicaid Dual	0.964 (0.961, 0.968)
Rural or Urban County	1.08 (1.07, 1.08)

# Preventive Care

Care area	No PCP visits (n=76,653)	1+ PCP visit (n=118,730)
Vaccination in 2012–13 flu season	63.9	76.2
Diabetes-related care in 2013*	No PCP visits (n=26,974)	1+ PCP visit (n=53,615)
1+ HbA1C test	79.0	87.1
1+ Lipid test	55.4	67.1
1+ Diabetic eye exam	38.3	47.9
All 3 tests	22.8	32.5



# Preventive Care

Patient characteristic	Flu vaccination	All 3 tests*
1+ PCP visit in 2012	1.18 (1.17–1.18)	1.40 (1.36–1.43)
Age at ESRD onset**	1.00 (1.00–1.01)	1.05 (1.05–1.06)
Sex		
Female	1.01 (1.01–1.02)	1.05 (1.03–1.06)
Male ( <i>ref</i> )	—	—
Race		
White ( <i>ref</i> )	—	—
Black	0.94 (0.94–0.95)	0.84 (0.82–0.86)
Other	0.96 (0.95–0.97)	0.92 (0.88–0.96)
Primary disease causing ESRD		
Hypertension ( <i>ref</i> )	—	—
Diabetes	1.02 (1.01–1.03)	—
Glomerulonephritis	0.98 (0.97–0.99)	—

# Summary / Conclusions

- At the USRDS CC
  - Central mission continues to be to comprehensively track the epidemiology of kidney disease in the United States
- The Annual Data Report
  - New/expanded major topics (e.g., vascular access, pediatric ESRD)
- Research Mission (Conduct and Facilitate)
  - Practices of significance: guiding care of patients and those with policy implications (e.g., PCP involvement, vascular access practices, etc.)

# Acknowledgments

- **The USRDS Coordinating Center Team at the University of Michigan Kidney Epidemiology and Cost Center (UM-KECC)**
  - *In partnership with* Arbor Research Collaborative for Health (subcontract with UM)
  - Deputy Directors (Bruce Robinson and Yi Li)
  - Project Manager (Vivian Kurtz) and ADR Editors (Janet Kavanaugh and Ruth Shamraj)
  - Team of Programmers and Analysts (Haoyu Gu, Anca Tilea, Diane Steffick, Lan Tong, Jas Sokhal, Valarie Ashby & Tempie Shearon)
  - Co-investigators – A multi-talented, experienced, multidisciplinary group at UM Medical School
  - Partnership with Institute for Health Policy and Innovation, UM (John Ayanian & B. Nallamothu)
- **Project Officials at NIH – NIDDK**
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- **Centers for Medicare & Medicaid**
  - Sharrilyn Evered and Team
- **Special Study Center Teams**
  - Kamyar Kalantar-Zadeh, Csaba Kovesdy, and Steve Jacobsen
  - Ann O'Hare, Manjula Kurella, and Danielle Lavalley
- **External Expert Panel to NIDDK**

# Thank you!



# Patterns of Care

- Limited empirical data; most studies quite old
- Nephrologist serves as PCP: 40-80% of patients
- USRDS data suggests substantial room for improvement in primary/preventive care in ESRD population
- Patient surveys show only 31% and 21% rated nephrologists' accessibility and ability to coordinate care as excellent, respectively