

# Cardiovascular Medication Use in Kidney Transplant Recipients

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USRDS

# Conflicts of Interest

- **Weinhandl**  
*none*
- **St Peter**  
**Consultant:** Ono Pharma USA  
**Grants:** Amgen, Mitsubishi Tanabe Pharma America  
**Honoraria:** American College of Clinical Pharmacy, Medical Communications Media, Foundation for Managed Care Pharmacy
- **Snyder**  
**Grants:** Bristol-Myers Squibb, Genzyme  
**Honoraria:** Genzyme  
**Scientific Advisor:** Genzyme
- **Skeans**  
*none*
- **Kasiske**  
**Grants:** Bristol-Myers Squibb, Genzyme  
**Honoraria:** Bristol-Myers Squibb  
**Scientific Advisor:** Litholink (Labcorp)



# Background

- **Pharmacological therapy for hypertension and hyperlipidemia in kidney transplant recipients may result in improved outcomes.**
- **Use of therapy is not well-characterized.**
- **We used data from the USRDS, including Medicare Part D event claims, to assess use of anti-hypertensive and lipid-lowering agents during the first 6 months post-transplants.**

# Methods

- **USRDS data (from CMS and the OPTN)**
- **All adult (age  $\geq$  18 yr) patients who received a kidney-only transplant between January 1 and June 30, 2007**
- **We required that patients:**
  - **survive without graft failure for 6 months after the transplant.**
  - **have continuous Part D coverage during the 6-month post-transplant interval.**



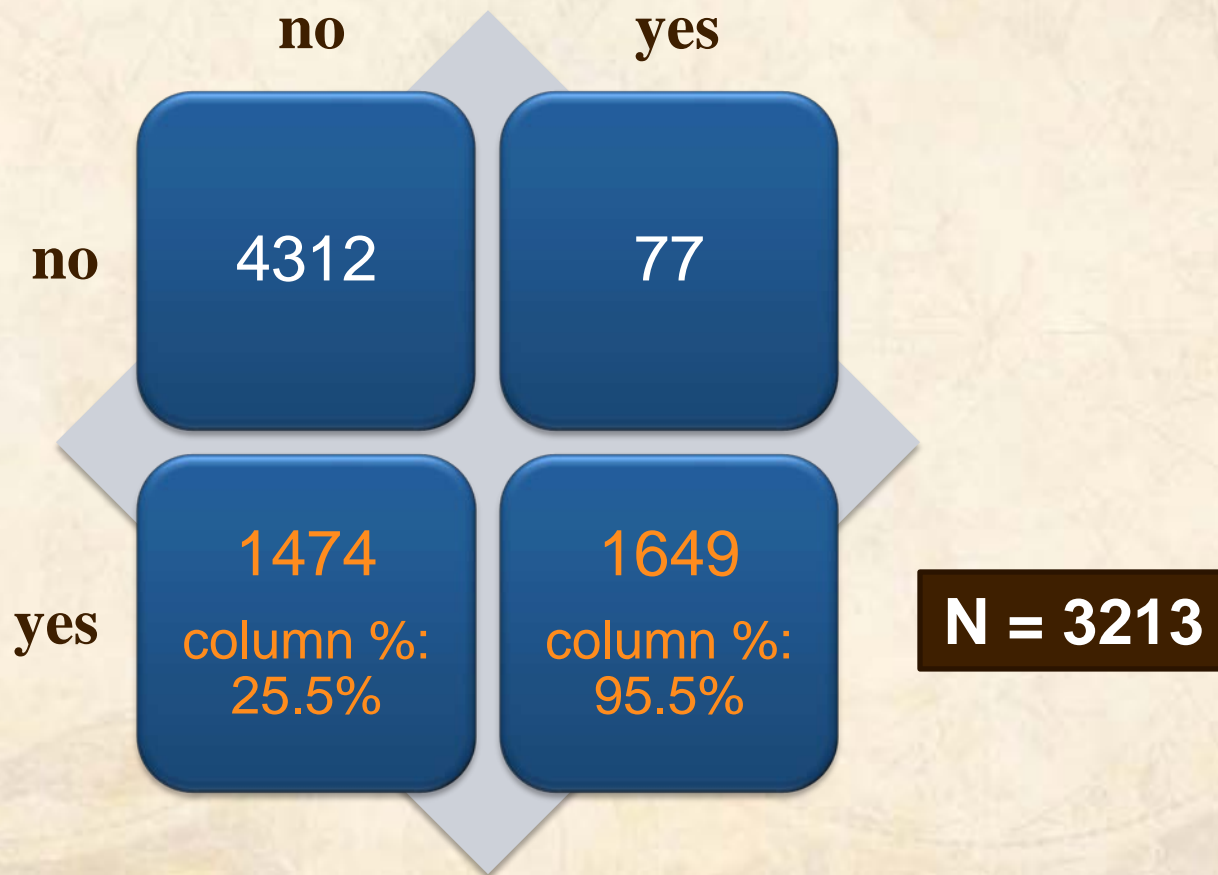
# Analyzed Medications

- We analyzed prescription fills during the 6-month post-transplant interval.

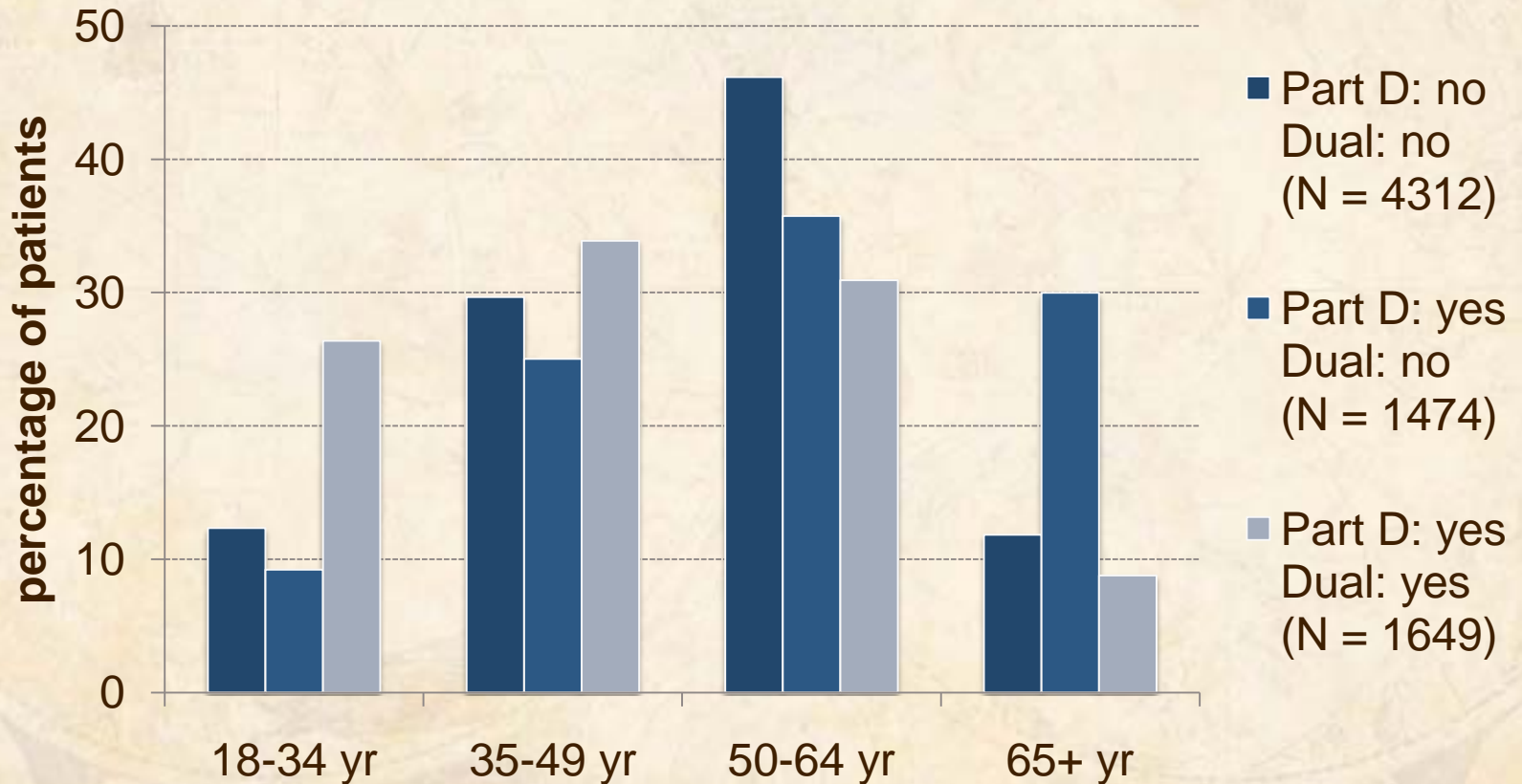
Anti-hypertensive agents	Lipid-lowering agents
Angiotensin-converting enzyme inhibitor (ACEI)	Cholesterol absorption inhibitor [ezetimibe]
Angiotensin receptor blocker (ARB)	Fibrate
Beta blocker ( $\beta$ B)	Statin
Calcium channel blocker (CCB) [dihydropyridine CCB only]	Other agent [bile acid sequestrant, niacin, omega-3 fatty acid]
Diuretic	

# Dual eligibility for both Medicaid and Medicare

## Part D

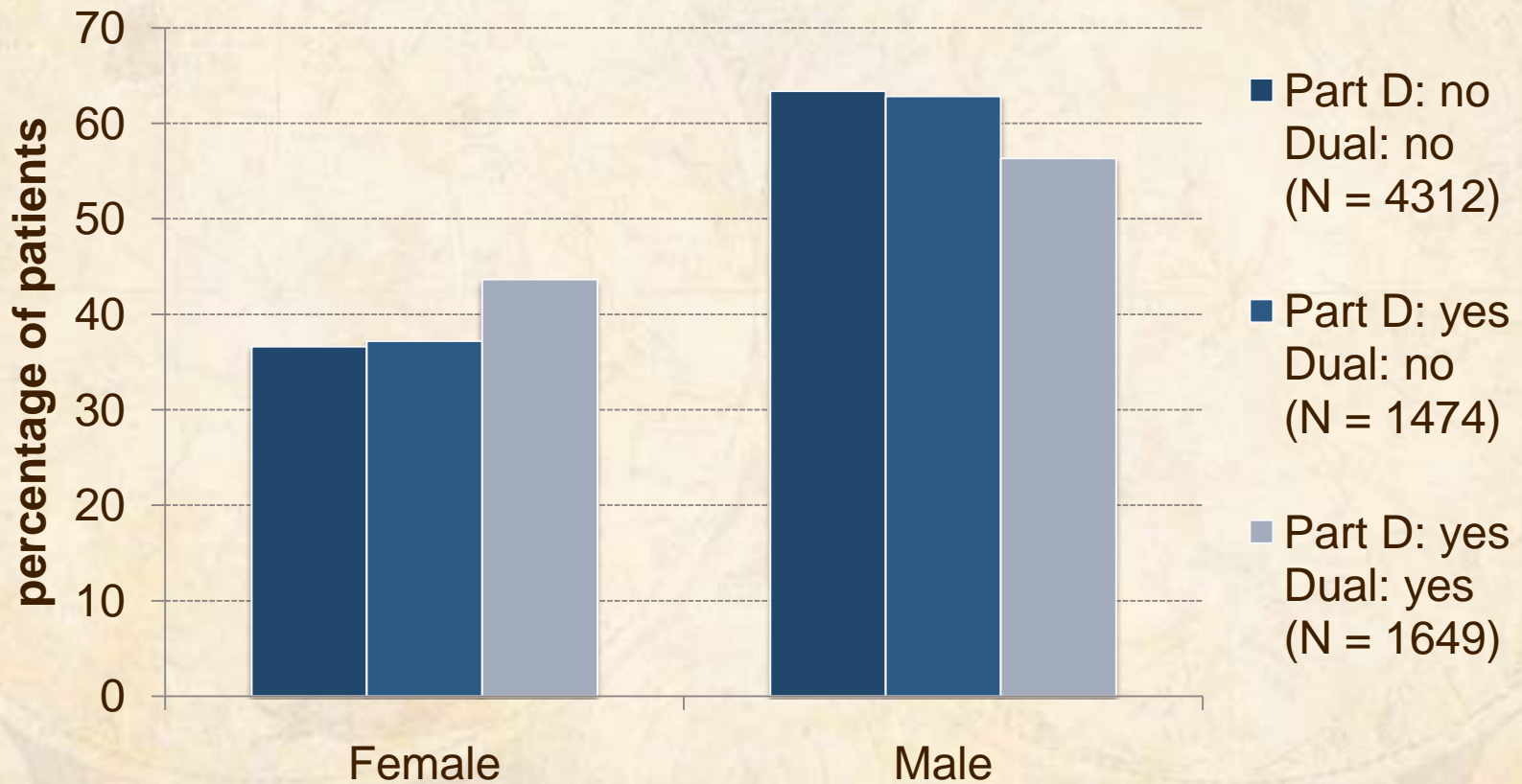


# Age Distribution in Included and Excluded Patients



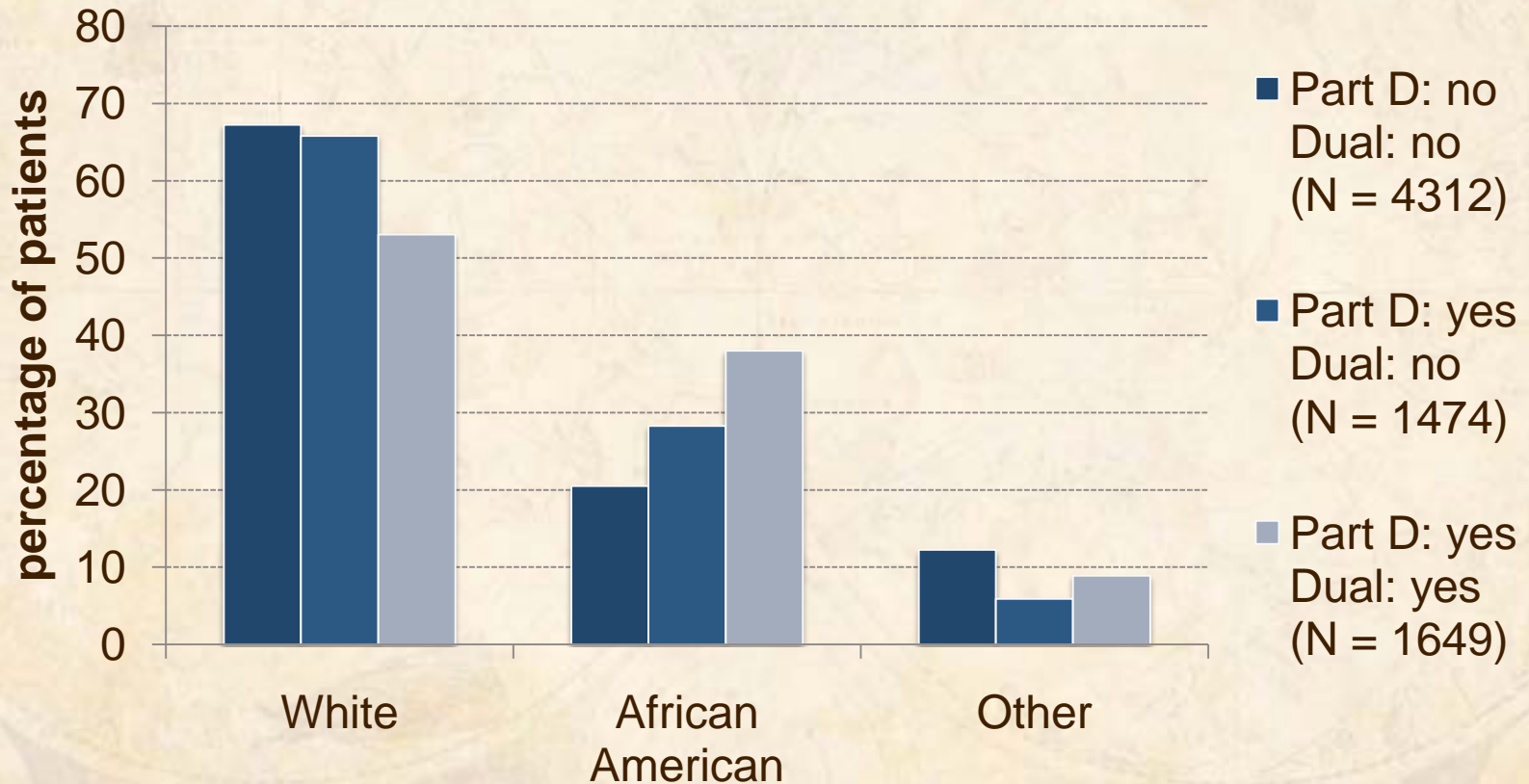


# Gender Distribution in Included and Excluded Patients





# Race Distribution in Included and Excluded Patients



# Anti-hypertensive Agent Use

- **88% took  $\geq 1$  anti-hypertensive medication.**

Medication	Percent Using	DeKAF†	PORT‡
$\beta$ B	73%	63%	67%
CCB	60%	43%	60%
Diuretic	43%	---	45%
ACEI or ARB	24%	24%	25%
ACEI	16%	---	---
ARB	9.1%	---	---

† At 6 months post-transplant (Gaston RS, et al, *AJT* 2009; 9:1811-1815)

‡ During 4-month post-transplant interval (Pilmore HL, et al, *Transplant Int* 2009, ESOT abstract)



# 2-drug Hypertension Polytherapy

- **65% took  $\geq 2$  anti-hypertensive medications for at least 30 days.**

Medication	Percent Using
$\beta$ B + CCB	47%
$\beta$ B + Diuretic	30%
CCB + Diuretic	23%
ACEI + $\beta$ B	11%
ACEI + CCB	8.6%

## 3- and 4-drug Hypertension Polytherapy

- **27% took  $\geq 3$  anti-hypertensive medications for at least 30 days.**

Medication	Percent Using
$\beta$ B + CCB + Diuretic	18%
ACEI + $\beta$ B + CCB	7.1%
ARB + $\beta$ B + CCB	4.5%
ACEI + $\beta$ B + Diuretic	4.0%
ARB + $\beta$ B + Diuretic	3.1%

- **4.4% took  $\geq 4$  anti-hypertensive medications.**



# Important Predictors of Anti-hypertensive Agent Use

- In all patients with Part D coverage

Predictor	OR (95% CI)
Age, per 5 yr	1.11 (1.06-1.16)
Race: black vs. white	1.28 (0.99-1.67)
Primary cause of ESRD: diabetes vs. other	1.39 (1.04-1.86)
Primary cause of ESRD: hypertension vs. other	1.54 (1.13-2.09)
Donor status: living vs. deceased	0.77 (0.60-0.99)
Low-income subsidization: yes vs. no	1.57 (1.20-2.05)

# Important Predictors of Anti-hypertensive Agent Use

- In 2,384 patients (74%) with Part D coverage and 6 months of pre-transplant Medicare coverage

Predictor	OR (95% CI)
Ischemic heart disease	1.38 (0.95-2.00)
Congestive heart failure	1.35 (0.91-2.01)
Other cardiac disease (incl. valvular disease)	1.35 (0.96-1.91)
Cancer	0.66 (0.36-1.23)
Liver disease	0.62 (0.41-0.93)
Low-income subsidization: yes vs. no	1.34 (0.95-1.90)



# Lipid-lowering Agent Use

- 40% took  $\geq 1$  lipid-lowering agent.

Medication	Percent Using	DeKAF†	PORT‡
Statin	37%	41%	44%
Ezetimibe	5.0%	---	10%
Fibrate	2.9%	---	
Other agent	1.4%	---	

† At 6 months post-transplant (Gaston RS, et al, *AJT* 2009; 9:1811-1815)

‡ During 4-month post-transplant interval (Pilmore HL, et al, *Transplant Int* 2009, ESOT abstract)

# Important Predictors of Lipid-lowering Agent Use

- In all patients with Part D coverage

Predictor	OR (95% CI)
Age, per 5 yr	1.17 (1.13-1.20)
Race: black vs. white	0.73 (0.62-0.87)
Primary cause of ESRD: diabetes vs. other	1.46 (1.22-1.75)
Low-income subsidization: yes vs. no	1.09 (0.91-1.30)



# Important Predictors of Lipid-lowering Agent Use

- In 2,384 patients (74%) with Part D coverage and 6 months of pre-transplant Medicare coverage

Predictor	OR (95% CI)
Ischemic heart disease	1.62 (1.32-1.98)
Diabetes	1.53 (1.21-1.93)
Cancer	0.56 (0.36-0.87)
Low-income subsidization: yes vs. no	1.07 (0.87-1.33)

# Limitations

- **Limited scope of sample**
  - 1) **Transplants were accrued during only 6 months.**
  - 2) **Medication use with Part D coverage may differ from use with other sources of drug coverage.**
  - 3) **Exposure time was concentrated in first half of 2007, possibly limiting effect of coverage gap.**



# Conclusions

- **Use of anti-hypertensive medications is common, as is polytherapy (e.g.,  $\beta$ B + CCB).**
- **Patients receiving the low-income subsidy are more likely to use anti-hypertensive medications.**
- **Use of lipid-lowering agents (statins) is modest, but relatively higher in recipients with existing diabetes and ischemic heart disease.**
- **Despite limitations, conclusions from Part D data mostly mirror previous studies.**



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in Kidney Transplant Recipients**

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