Use and Choice of Biologic Therapies in Medicare Patients with Rheumatoid Arthritis: Relationship with Cost-sharing and Utilization Management Tools

Sean McElligott PhD (candidate), Pengxiang Li, PhD,
J. Sanford Schwartz, MD, Jalpa A. Doshi, PhD

University of Pennsylvania

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(ARS Response Card: Channel 51)

Agenda

- Disclosure
- Learning Objectives
- Background
- Study Objectives
- Methods
- Results
- Discussion
- Conclusion

Disclosure

- This study was funded by a grant from Pfizer Inc.
  - Pfizer co-markets etanercept with Amgen Inc. and is currently developing other biologics for rheumatoid arthritis

- The funder played no role in design, analysis or interpretation of results for this study

- The authors declares no other conflicts of interest or financial interests in any product or service mentioned in this presentation, including grants, employment, gifts, stock holdings, or honoraria”

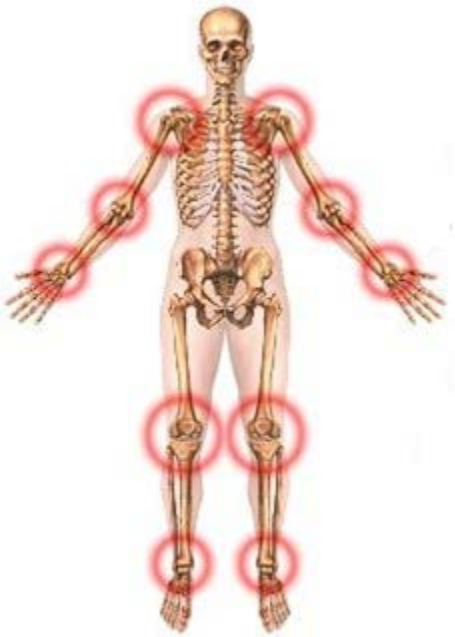
Learning Objectives

- Identify characteristics of use between physician-administered and self-administered RA biologics in the Medicare population

- Identify the potential role that differential cost-sharing and drug utilization management tools may have on choosing between a self-or physician–administered RA biologics in the Medicare population

Rheumatoid Arthritis (RA)

- Debilitating chronic, inflammatory disease
- Autoimmune disease
- Morning stiffness and joint pain
- Unknown cause
- Prevalence: 1.5 million (2007)1



[1] *Arthritis Rheum.* 2010 Jun, 62(6):1576-82;

RA Treatments

- Traditional treatments available for decades
  - Mainly consist of oral medications such as anti-inflammatories and disease-modifying antirheumatic drugs

- New biological treatments available since late 1990s
  - Significantly reduce pain, joint swelling, and radiologic damage compared to oral agents
  - Very expensive i.e. $15,000 - $20,000 per patient per year

Biological Treatments for RA

Generic name	Target	Administration	Dosing frequency	FDA approval for RA
Etanercept	TNF	Self	Weekly, twice weekly	11/1998
Infliximab	TNF	Physician	0, 2, & 6 weeks then every 8 weeks	11/1999
Anakinra	IL-1	Self	Daily	11/2001
Adalimumab	TNF	Self	Biweekly	12/2002
Abatacept	T-cells	Physician	Biweekly (weeks 0-4) then monthly	12/2005
Rituximab	B-cells	Physician	Biweekly (2 doses)	02/2006
Golimumab	TNF	Self	Monthly	04/2009
Certolizumab	TNF	Self	Biweekly (weeks 0-4), then biweekly/monthly	05/2009
Tocilizumab	IL-6	Physician	Monthly	01/2010

TNF – Tumor necrosis factor, IL – Interleukin inhibitor

Medicare Coverage for RA biologics

- Medicare covers RA biologics under
  - Part B: physician-administered biologics
  - Part D: self-administered biologics

- Prior to 2006
  - Only physician-administered biologics, namely infliximab was covered under Medicare Part B

- Starting in 2006
  - Part B coverage for new FDA approvals expanded choices for physician-administered biologics
    - abatacept (late 2005), rituximab (early 2006)
  - Part D coverage expanded coverage for self-administered biologics
    - etanercept, adalimumab, anakinra

RA Biologics Under Medicare Prior to 2006

Generic name	Target	Administration	Dosing frequency	FDA approval for RA
Infliximab	TNF	Physician	0, 2, & 6 weeks then every 8 weeks	11/1999

TNF – Tumor necrosis factor, IL – Interleukin inhibitor

RA Biologics Under Medicare in 2006

Generic name	Target	Administration	Dosing frequency	FDA approval for RA
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RA Biologics Under Medicare Since 2006

Generic name	Target	Administration	Dosing frequency	FDA approval for RA
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TNF – Tumor necrosis factor, IL – Interleukin inhibitor

Medicare Spending on Biologics[1]

- Medicare spending on biologics: $13 billion (2007)
- Part B:
  - Top biologics: Rituximab (3) and Infliximab (5)
  - $1.9 billion
  - 11% of all Part B drug spending (650 drugs)
- Part D: all biologics $3.9 billion (6% of Part D spend)
  - Top biologics: Etanercept (1) and Adalimumab (4)
  - $480 million
  - 12.3% of Part D biologics spending

[1]MEDPAC, June 2009 Report to Congress, Chapter 5, Medicare payment systems and follow-on biologics

Comparative- & Cost-Effectiveness

- Comparative effectiveness
  - TNFs (etanercept, infliximab, adalimumab) appear equally effective1-7
  - TNFs appear to be more effective than anakinra1,2,7
- Cost-effectiveness
  - Compared to DMARDs: biologic therapies are ≤ $61,600 per QALY but highly uncertain (2011)4
  - Compared to infliximab, etanercept and adalimumab are dominant (same effectiveness, lower costs) but ankinra is not cost-effective (less costly yet less effective)1,2,4,6
- Limited studies comparing newer biologics

[1]Wailoo et al., *Arth & Rheum,* 58(4), 939-46, 2008; [2]Walsh et al., *Rheum.*, 46, 1148-53, 2007; [3]Nixon et al., *Rheum*, 46, 1140-44, 2007; [4]Malottki, *Health Tech. Assessment*, 15(14), 2011; [5]Donahue et al., *Ann Intern Med.*, 148, 124-34, 2008; [6]Weycker et al., *Clin Therap.,* 27(5), 646-56, 2005; 7 Gartlehner et al., *J of Rheum.*, 33(12), 2398-408, 2006

Knowledge Gaps

- Little is known about overall utilization of RA biologics in the Medicare program
  - Percent of RA patients using infliximab (Part B)[1]

2002	2006
4.8%	6.1%

- Despite expansion in choices of biologic agents after Medicare Part D, little is known about utilization and choice of physician-administered vs. self-administered biologics
  - Compared to privately insured patients, Medicare patients were 30% more likely to receive infliximab compared to etanercept [2]
- All studies were before Part D

1 Doshi et al., *Arth Care &* Res, 62(3), 354-61; 2 DeWitt et al., *Arch Intern Med.,* 166, 57-63, 2006;

Potential Factors Affecting Choice of Agents

- Patient Factors
  - Out of pocket costs[1]
  - Frequency of dosing, professional administration, leisure time[3]
  - Flexibility with treatment timing, administration time, home therapy[3]
- Physician Factors
  - Financial incentives - Reimbursement[2]
    - Administration
    - Part B drug
- Plan Design Factors
  - Cost-sharing
  - Utilization Management tools

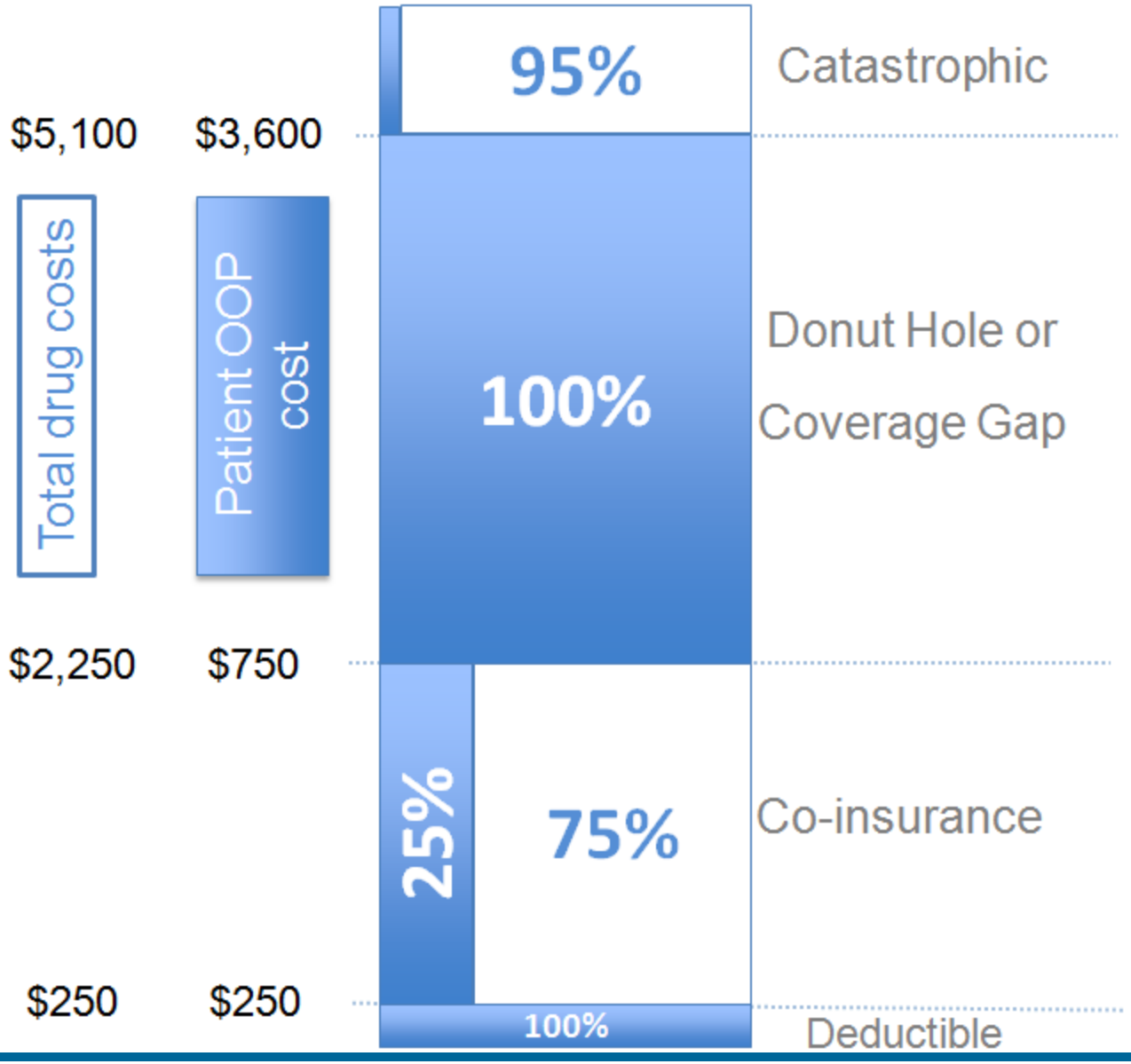
[1] Curkendall et al., *Arth & Rheum*, 59(10), 1519-26, 2008; [2] DeWitt et al., *Arch Intern Med.*, 166, 57-63, 2006; [3] Fajri et al., *Clin Rheum*, 28, 599-602, 2009

Medicare Coverage, Cost-Sharing, and Utilization Management Tools

	Part B	Part D
Coverage	Physician-administered biologics	Self-administered biologics
Cost-sharing	• 20% co-insurance, lower or none if supplemental insurance	Depending on LIS status and type of plan enrolled • LIS – minimal cost sharing* • Non-LIS in standard Part D plan ➢ 25% co-insurance in initial phase ➢ 100% co-insurance in donut hole ➢ 5% during catastrophic coverage
Utilization management tools	• None	• Specialty tier placement • Step-therapy • Prior authorization

* Low-income subsidies (LIS) required $3 copay for full benefit dual with income < 100% FPL in 2006; $5 copay for full benefit dual with income ≥ 100% FPL (or individuals with incomes < 135% FPL) in 2006; and 15% cost-sharing for individuals with income 135%-150% FPL

Standard Part D Benefit for Non-LIS Patients in 2006



Subsidies Under Part D for LIS Patients in 2006

LIS	Subsidy level	Deductible	Premium	Copayments		
				Generic	Brand	Catastrophic
Full LIS	Income < 100% FPL	$0	$0	$1	$3	$0
	Income ≥ 100% FPL and < 135% FPL + asset test	$0	$0	$2	$5	$0
Partial LIS	Income 135%-150% FPL + asset test	Sliding scale to $37	$50	15%	15%	$2/generic $5/brand

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Study Aims

- To examine the use and choice of biologic therapies in Medicare patients with RA

- To examine the relationship between cost-sharing and utilization management tools and the use and choice of RA biologics

Data

- 2005-2008 5% Chronic Conditions Warehouse (CCW) Medicare files
  - Hospital claims (Part A)
  - Outpatient and physician claims (Part B)
  - Prescription drug event data (Part D)
- 2006-2008 Part D Plan characteristics file
  - Contract, Plan, and Formulary identifiers
- 2006-2008 Area resource file (county level information)
  - Education level
  - Urban/rural
  - Median income
  - Region of country

Study Sample & Design

- Sample
  - Medicare beneficiaries in each year with
    - 12 months fee-for-service Part A and Part B
    - 12 months stand-alone Part D enrollment
    - 1 inpatient or 2 outpatient diagnoses of RA (ICD9-CM 714.xx)

- Study Design
  - Cross-sectional analysis
  - Pooled annual cross-sections from 2006 to 2008

Main Outcomes

- Use: Any RA biologic use
  - Sample: All RA patients

- Choice: Any Part D biologic use (vs. only Part B biologic use)
  - Self-administered biologics identified by NDC codes in Part D PDE files
  - Physician-administered biologics identified by HCPCS codes in Part B files

  Sample: Among RA biologic users

Key Independent Variables of Interest

- Cost-sharing
  - Low-income subsidy (LIS) status serves as a proxy
    - **Non-LIS**
    - **Full LIS**
    - Partial LIS
    - Switch LIS

- Utilization Management Tools
  - Step-therapy (fail first)
  - Prior authorization
  - Specialty tier/highest tier placement
  - Any UM tool for any biologic
    - Step, prior authorization, and/or highest tier

LIS Serves as Proxy for Cost-sharing

	Part B		Part D	
	Full LIS	Non-LIS	Full LIS	Non-LIS
Coverage	Physician-administered biologics	Physician-administered biologics	Self-administered biologics	Self-administered biologics
Cost-sharing	20% co-insurance, but lower with supplemental insurance (i.e. Medicaid)	20% co-insurance, but lower with supplemental insurance (e.g. Medigap)	No deductible Small copay* No donut hole	Deductible 25% co-insurance Donut hole
UM tools	None	None	Prior auth., step-therapy	Prior auth., step-therapy, specialty tier placement

* $3 copay if full benefit dual with income < 100% FPL and $5 copay if full benefit dual with income ≥ 100% FPL (or individuals with incomes < 135% FPL) in 2006

Covariates

- Patient characteristics
  - Patient level
    - Age group (< 65, 65-69, 70-74, 75-79, 80+)
    - Gender
    - Race (White, Black, Hispanic, Asian, Other race)
    - Prescription drug hierarchical condition category risk score (RxHCC, prior year)
    - RA hospitalizations (any)
    - RA physician visits (1-2, 3-4, 4 or more)
  - County level
    - Mean income
    - Low education
    - Urban/rural status
    - Region of country
- Year Dummies

Statistical Analysis

- Logistic regression using general estimating equations with robust standard errors clustered at Part D plan formulary level
- Binary outcome variable (biologics use/no use, any Part D use/only Part B use)
- Logistic regression – model probability of outcome

$$f(z) = \frac{1}{1 + e^{-z}} \quad \text{where} \quad z = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \cdots + \beta_k x_k$$

- Robust standard errors – heteroskedastic error term
- Clustered – intra-group correlations (formulary level)

Sensitivity analyses

- 2006 Data
  - First year of part D
  - Enrollment deadline for non-LIS 15-May-2006
  - 2007/2008 pooled analysis
- Regressions run on LIS and non-LIS separately
- Inclusion criteria: 1 inpatient or 1 outpatient RA claim
- Model specification: All models re-run as probit and LPM
- Multinomial logistic regression (part B only, part D only, both B and D)
- Standard errors clustered at plan level and contract level

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Sample Characteristics - Sociodemographics

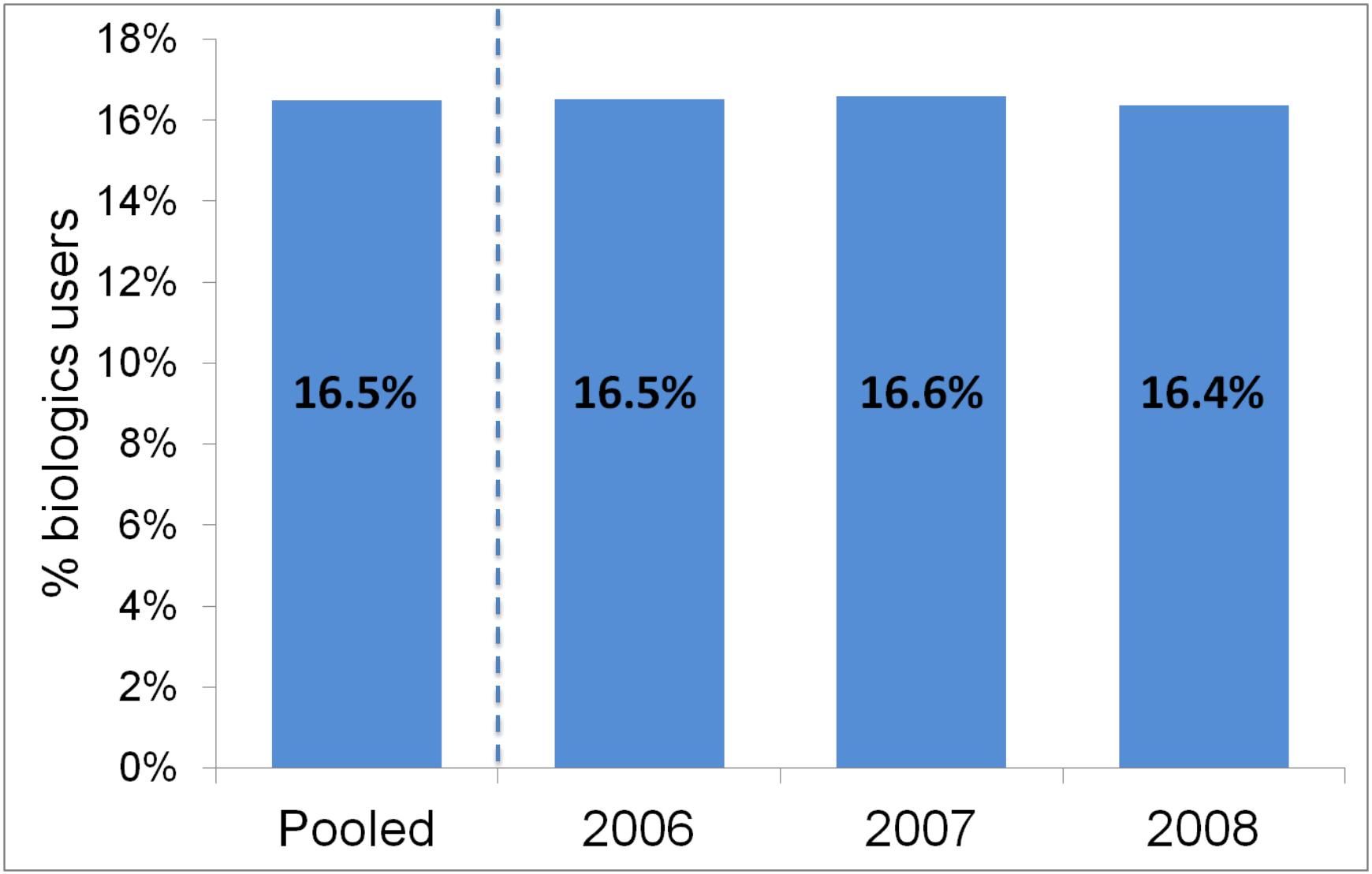
		All RA	Biologics Users
N		47,511	7,831
Female		78%	81%
Age(mean):		70.2	65.9
Race:	White	78%	81%
	Black	12%	10%
	Hispanic	5%	5%
	Asian	2%	1%
	Other	2%	2%
County low education		19%	16%
County income (mean, $)		30,142	29,839
Urban		75%	73%
Northeast		19%	16%
Midwest		22%	23%
South		41%	42%
West		18%	19%

Sample Characteristics – LIS Status and UM tools

	All RA	Biologic Users
N	47,511	7,831
LIS eligibility status		
Non-LIS	47%	48%
Full LIS	44%	47%
Partial LIS	2%	1%
Switch LIS	7%	4%
UM tools in Part D plan		
Prior Authorization	6%	7%
Step Therapy	91%	90%
Specialty/Highest Tier	88%	88%
Any UM tools	93%	92%
None	7%	8%

Any RA Biologic Use

Percent of RA Beneficiaries with any Biologic Use



Any Biologic use by LIS Status and UM Tools

	N	% biologics users
Overall	47,511	16.5%
LIS status		
Non-LIS	22,330	16.8%
Full LIS	20,905	17.7%
Partial LIS	950	8.2%
Switch LIS	3,326	9.4%
In Part D plan with		
Any UM tool	43,124	16.3%
No UM tool	4,387	18.4%

Main Regression Results for Any Biologic Use

n= 47,511

	Adjusted odds ratios	95% CIs
LIS status		
Full non-LIS	1.00	ref
Full LIS	1.23**	(1.14-1.32)
Partial LIS	0.82**	(0.67-1.00)
Switch LIS	0.90	(0.65-1.25)
UM tools in Part D plan		
None	1.00	ref
Any	0.83**	(0.74-0.95)

* *p < 0.05

Other Regression Results for Any Biologic Use

n= 47,511

	Unadjusted Rates	Adjusted Odds ratios	95% CIs
Overall	16.5%		
Gender			
Males	13.9%	1.00	ref
Females	17.2%	1.26**	(1.18-1.34)
Age			
< 65	24.3%	1.57**	(1.44-1.72)
65-69	18.7%	1.00	ref
70-74	16.9%	0.86**	(0.79-0.95)
75-79	14.1%	0.76**	(0.70-0.82)
> 80	7.8%	0.47**	(0.42-0.54)
Region			
Northeast	13.5%	1.00	ref
Midwest	17.4%	1.19**	(1.11-1.28)
South	16.9%	1.11**	(1.02-1.20)
West	17.7%	1.21**	(1.10-1.33)

* *p < 0.05,

Other Regression Results for Any Biologic Use (2)

n= 47,511

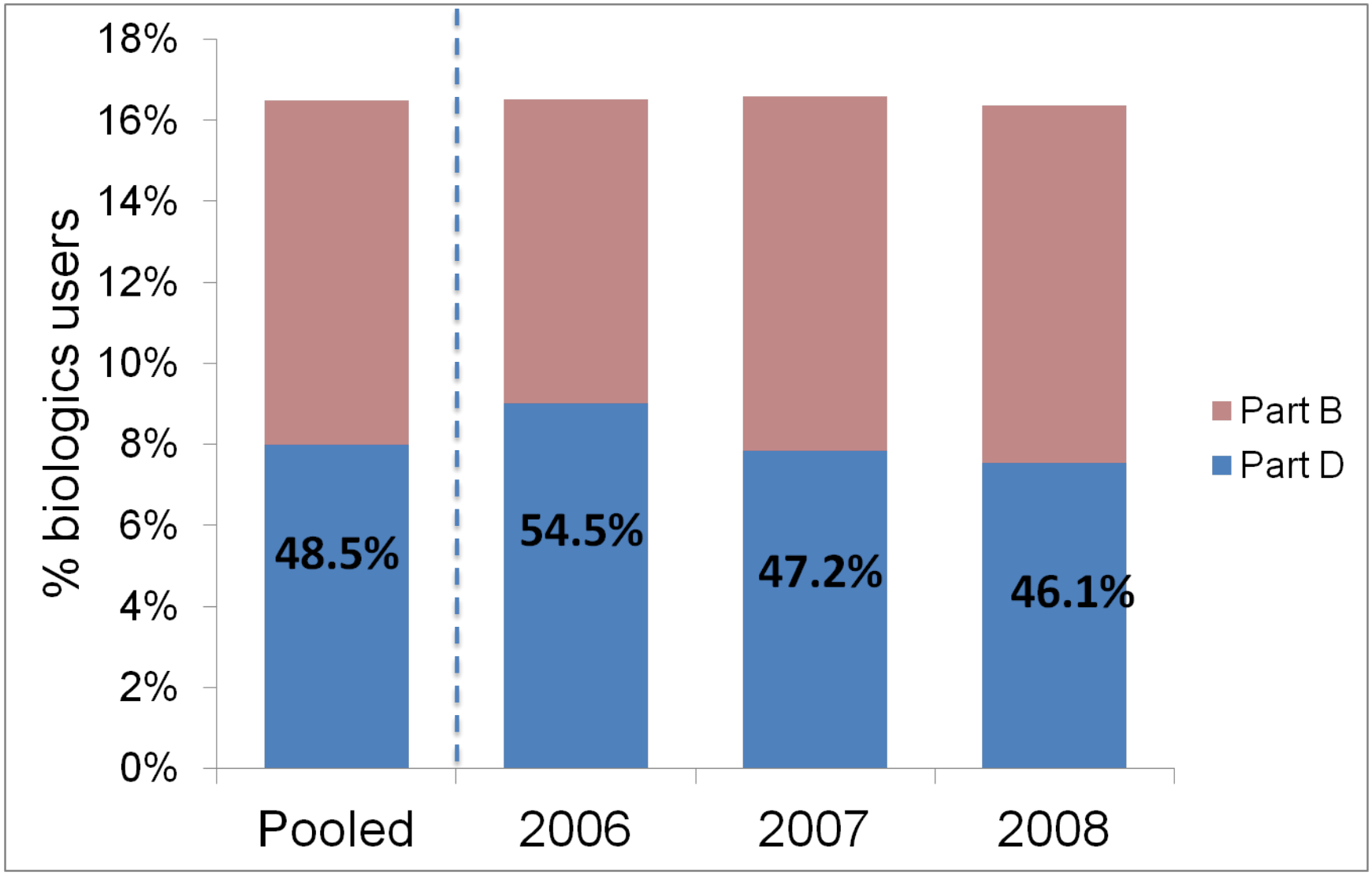
		Odds ratios	95% CIs
Hospital RA claims			
None	16.2%	1.00	ref
Any	29.2%	1.40**	(1.18-1.67)
Evaluation & Management visit for RA			
None	2.8%	1.00	ref
1 to 2	10.5%	1.13**	(1.02-1.25)
3 to 4	24.4%	4.57**	(4.23-4.94)
5 or more	45.2%	11.8**	(11.1-12.7)
RxHcc score		0.73**	(0.65-0.81)

** $p < 0.05$

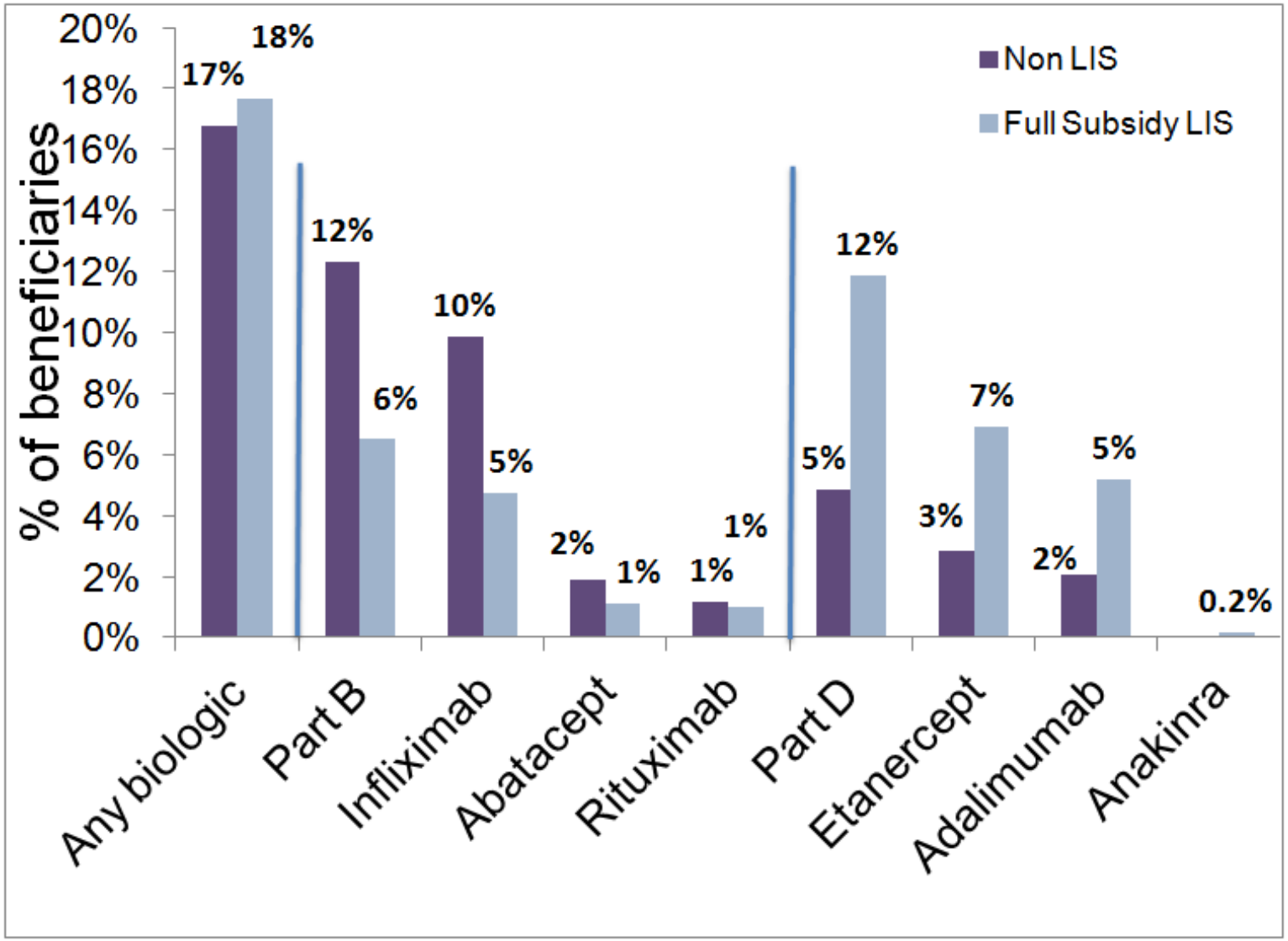
Choice of RA Biologic:

Physician-Administered (Part B) versus Self-Administered (Part D)

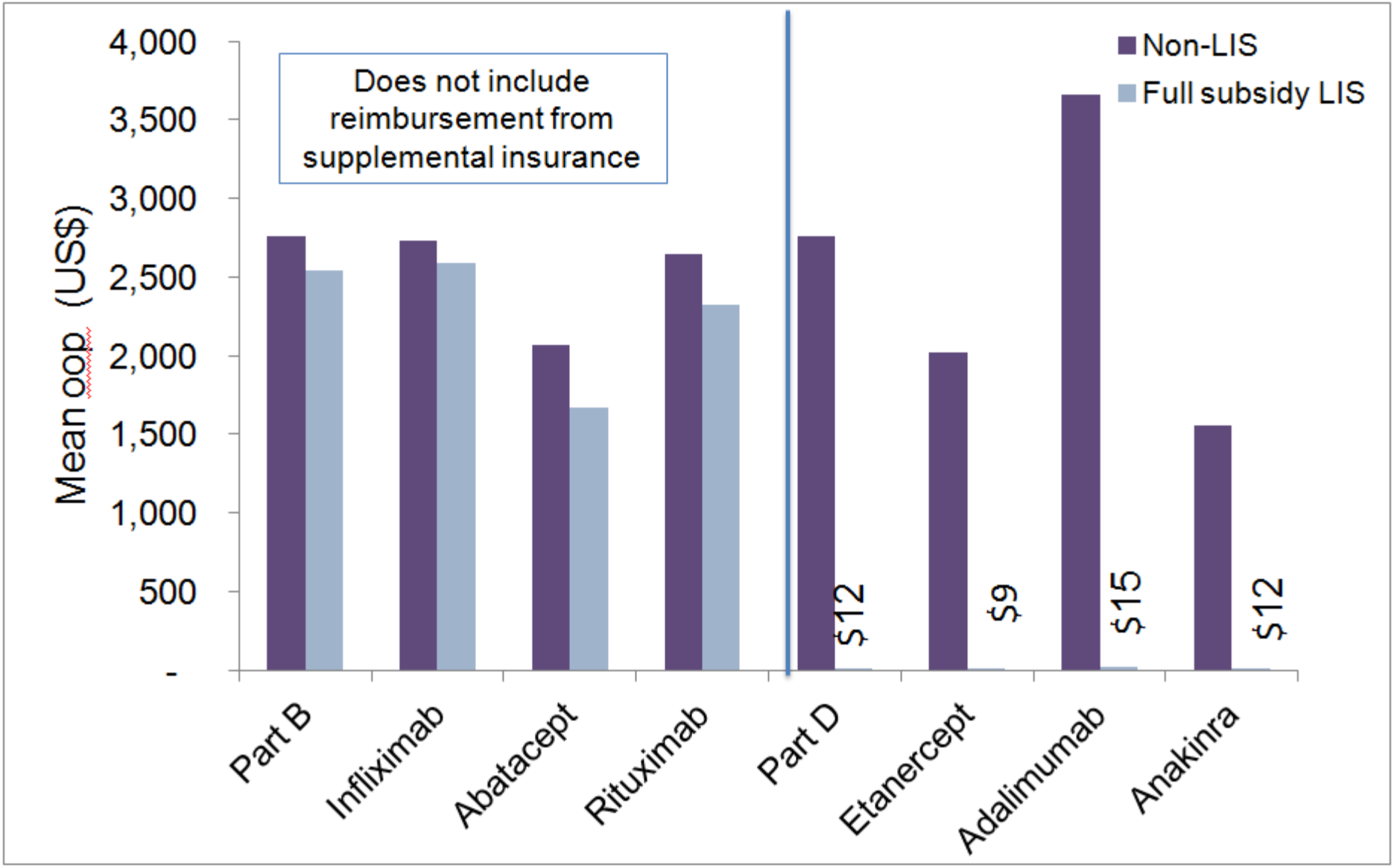
Percent of Biologic Users with Part D Biologic Use



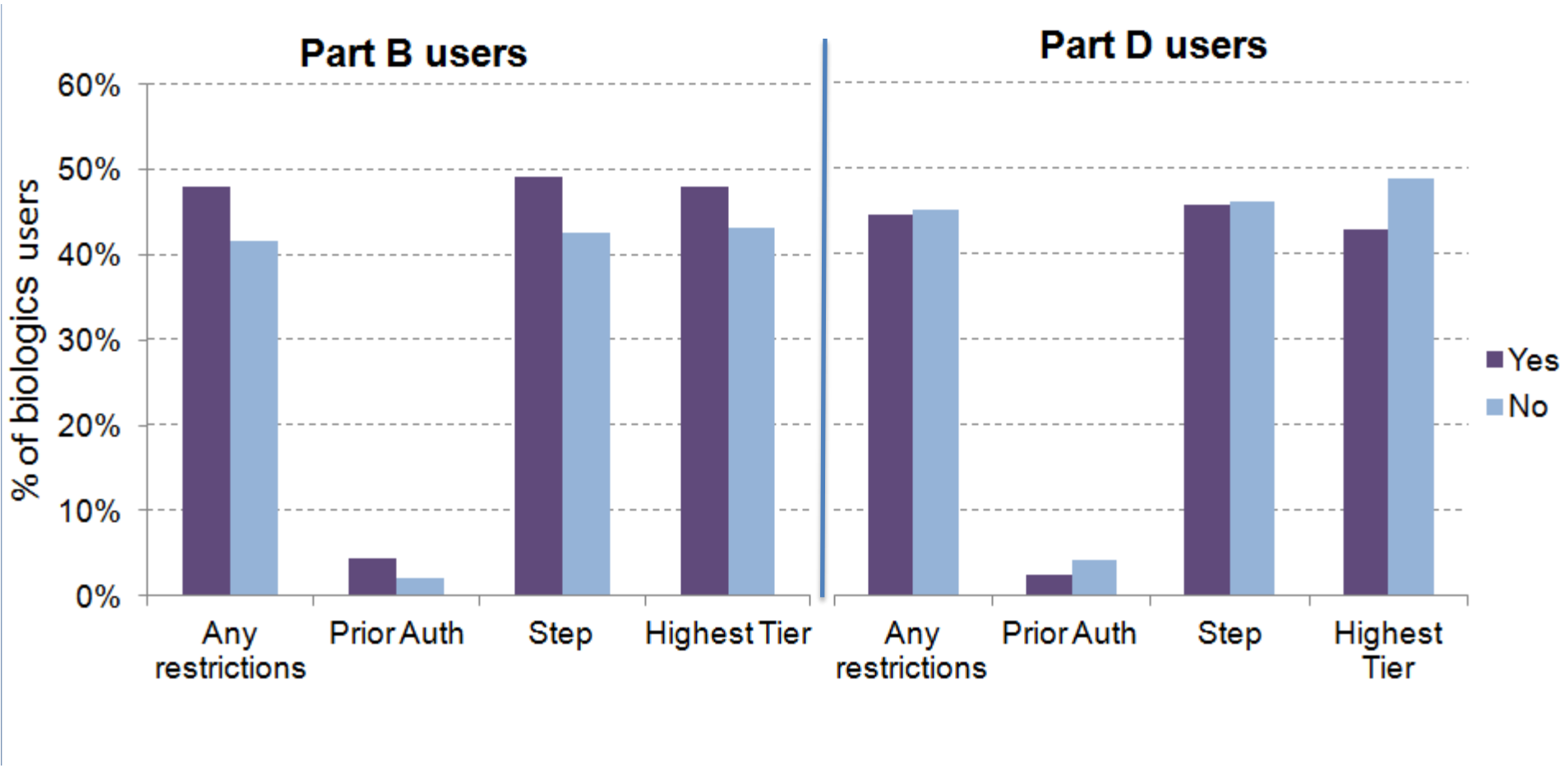
Choice of RA Biologic by LIS Status



Out-of-Pocket Costs per User by Low-Income Subsidy Status



Choice of RA Biologic by UM Tools



Main Regression Results for Part D Biologic Use

n= 7,831

	Unadjusted Rates	Adjusted Odds Ratio	95% CIs
Overall	48.5%		
LIS status			
Full non-LIS	29.0%	1.00	ref
Full LIS	67.2%	1.86**	(1.40-2.47)
Partial LIS	55.0%	1.27	(0.88-1.82)
Switch LIS	65.2%	0.84	(0.47-1.49)
Utilization management tools			
Any step therapy	49.8%	0.67**	(0.46-0.99)
Any prior authorization	36.7%	0.90	(0.66-1.23)
Any top tier (specialty)	48.6%	0.44**	(0.32-0.60)

* *p < 0.05

Other Regression Results for Part D Biologic Use

n= 7,831

	Unadjusted Rates	Adjusted Odds Ratios	95% CIs
Overall (Part D use)	45.4%		
Gender			
Males	45.9%	1.00	ref
Females	45.2%	0.96	(0.87-1.06)
Age			
< 65	60.1%	1.37**	(1.20-1.56)
65-69	40.9%	1.00	ref
70-74	35.3%	0.79**	(0.67-0.93)
75-79	33.9%	0.73**	(0.59-0.89)
> 80	34.3%	0.74**	(0.61-0.89)
Region			
Northeast	50.8%	1.00	ref
Midwest	40.2%	0.72**	(0.60-0.85)
South	46.2%	0.83**	(0.71-0.97)
West	45.0%	0.80**	(0.68-0.94)

* *$p < 0.05$

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Use of Biologics in Medicare RA Patients

- First nationally representative study
- 1 in 6 RA Medicare beneficiaries use biologics
- Being eligible for the LIS (lower cost sharing) increases your likelihood of utilizing biologics therapy

	Non-LIS	LIS
Overall use	16.8%	17.7%
Part D use	32.9%	73.4%
Avg. OOP (D)	$2,763	$12
Avg. OOP (B)*	$2,757	$2,542

- Enrollment in a Part D plan that has UM Tools for RA biologics reduces the likelihood of starting any biologic

*90% of beneficiaries have some form of supplemental coverage that pays for Part B cost-sharing [1]

[1] Kaiser family foundation, Medicare Chartbook, 4th edition, 2010

Choice of Biologics in Medicare RA Biologic Users

- Cost-sharing and placement of biologics on a formularies top tier, or requiring step therapy appears to decrease Part D biologic use and increase Part B biologic use
- RA biologics are 11% of all Medicare Part B drug spending with inflixmab being the most frequently used
- Infliximab not cost-effective compared to etanercept and adaliumab, more research need on newer biologics
- Further research needed to determine how UM tools are impacting optimal biologics use and choice

Other Findings

- Self-administered RA biologics use declining

	2006	2008
Percent of biologic use with Part D biologic	55%	46%
Percent of RA patients enrolled in a plan with etanercept on highest tier	45%	84%

- Unexplained regional variation in biologics use
  - Living outside northeast:
    - More likely to use biologics and Part B biologics
    - LIS living outside the northeast more likely to use part B biologics
  - Practice patterns?

Limitations

- Cross-sectional claims based retrospective study
- No clinical measures of severity, only claims based
- No control for patient and physician preferences
- Limited to 2006-2008 timeframe and biologics available during this time period

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Conclusions

- Part D cost-sharing appears to influence use of biologics
  - Lower likelihood of taking any biologic
  - Lower likelihood of taking a self-administered (Part D) RA biologic among biologic users
- Part D UM tools are also associated with:
  - Lower likelihood of taking any biologic
  - Lower likelihood of using self-administered (Part D) RA biologic among biologic users
- Substantial regional variation in use of RA biologics exists
- Overall cost implications for Medicare should be studied given decreased likelihood of Part D biologic use and increased likelihood of Part B biologic use

Assessments

Assessment Question 1

Which of the following characteristics of RA Medicare beneficiaries is associated with having a statistically significantly HIGHER likelihood of using any biologic therapy?

Being 80 years of age or older

Being sicker, as measured by a person's RxHCC score

Being male

Living outside of the northeast

None of the above

Assessment Question 2

Which of the following characteristics of RA Medicare beneficiaries is associated with having a statistically significantly HIGHER likelihood of using a self-administered biologic therapy?

Being 80 years of age or older

Being eligible for Medicare's low-income subsidy (LIS)

Being enrolled in a plan that has a step therapy requirement for biologics

None of the above

Questions?

Contact Information

For more information please contact:

Jalpa Doshi, PhD (PI)
Assistant Professor of Medicine
jdoshi@mail.med.upenn.edu

University of Pennsylvania
423 Gaurdian Drive
Blockley Hall, Office 1222
Philadelphia, PA 19104

Sean McElligott
Sr. Economic Analyst
seanmc@wharton.upenn.edu

University of Pennsylvania
423 Gaurdian Drive
Blockley Hall, Office 1208
Philadelphia, PA 19104

Presentation Evaluation

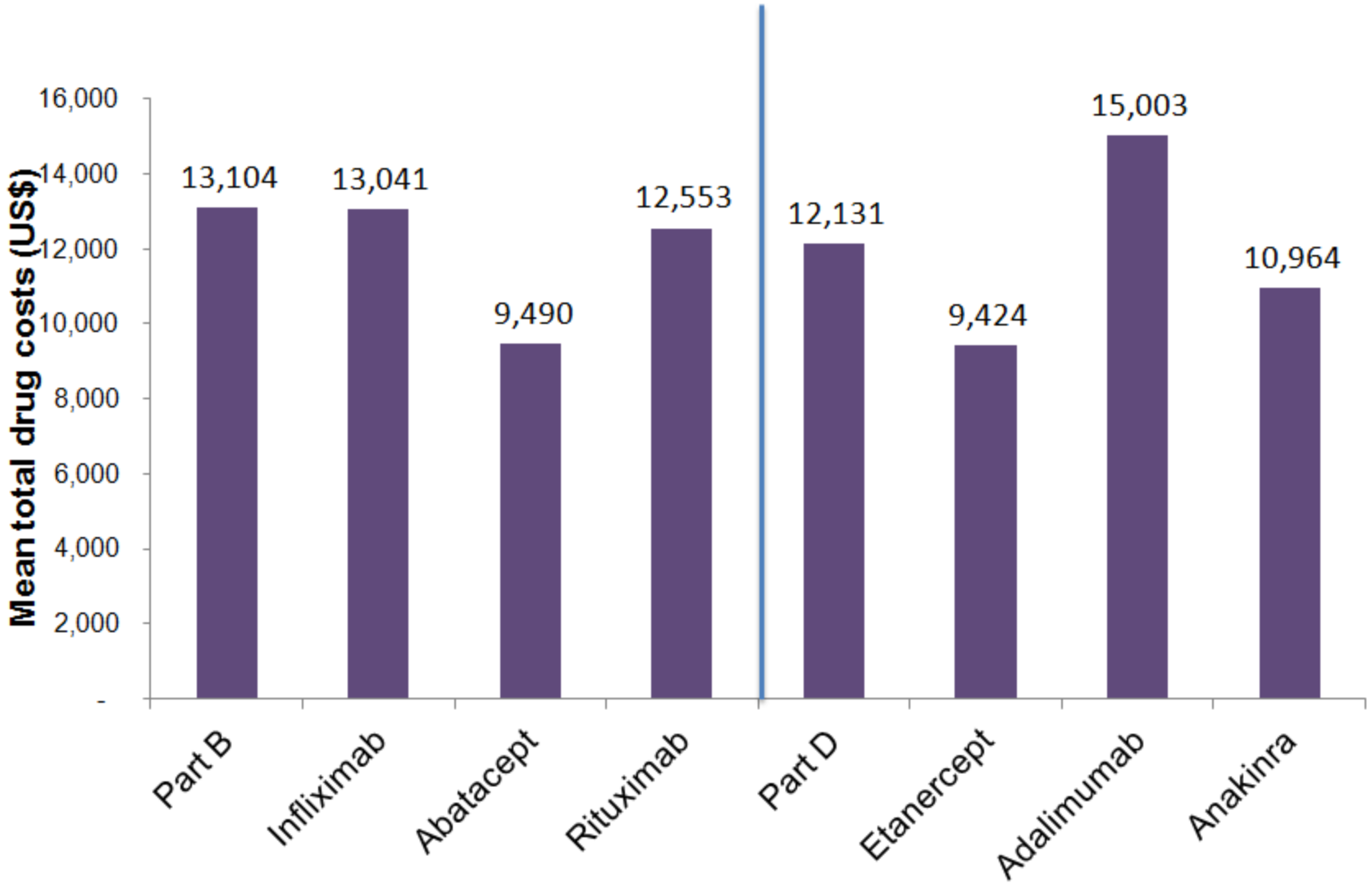
Please get your ARS Response Card ready

Appendix and Backup Slides

Percent of Patients in Sample

	Pooled	2006	2007	2008	2006	2007	2008
All RA	47511	11287	17570	18654	24%	37%	39%
Biologics Users	7831	1863	2916	3052	24%	37%	39%
Part D bio users	3552	947	1287	1318	27%	36%	37%
Part B bio users	4029	847	1537	1645	21%	38%	41%

Type of Use - Total Drug Costs Per User



Choice of Biologics

- Patients preferences
  - Part B
    - Health professional administration
    - Dosing frequency
    - Leisure time
  - Part D
    - Treatment timing
    - Administration time/driving time
    - Home treatment
- Physician effects
  - Rheumatologist: 50% of total Medicare payments Part B drugs[1]

[1] Medicare Payment Advisory Commission, Report to congress, impact of changes in Medicare payments for part B drugs (2007)