



ESRD PPS Case-Mix Adjustment Technical Expert Panel (TEP)

Acumen, LLC
December 2018

TEP Agenda

Session	Time	Topic	
Morning	1	9:00 – 9:30 AM	Introductions and Purpose of the TEP
	2	9:30 – 10:15 AM	Current Measurement of ESRD PPS Costs
	Break		
	3	10:30 – 11:45 AM	Costs Associated with Length of Dialysis Treatment
Lunch			
Afternoon	4	1:15 – 2:30 PM	Variation in Costs Associated with Complex Patients
	Break		
	5	2:45 – 4:00 PM	Facility-Level Drivers of Cost
	Break		
	6	4:15 – 5:00 PM	Additional Patient Attributes Necessary for Developing a Revised ESRD Payment Model
	7	5:00 – 5:30 PM	Open Discussion

Outline

Sessions	
1	Introductions and Purpose of the TEP
2	Current Measurement of ESRD PPS Costs
3	Costs Associated with Length of Dialysis Treatment
4	Variation in Costs Associated with Complex Patients
5	Facility-Level Drivers of Cost
6	Additional Individual Patient Attributes Necessary for Developing a Revised ESRD Payment Model
7	Open Discussion

Session 1 Outline

Session Objective

- Introduce TEP attendees and goals of today's TEP

Session Topics

- Introduce TEP panelists and project staff
- Provide overview of the ESRD PPS
- Outline goals for today's TEP

Session Time

- 30 minutes

Panelists

- **Ms. Helen Currier**, Director, Renal & Pheresis Services, Texas Children's Hospital
- **Ms. Johnie Flotte**, Vice President, Clinical Services, US Renal Care
- **Mr. Mike Guffey**, Treasurer, Dialysis Patient Citizens
- **Dr. John Hartman**, CEO, Visonex
- **Ms. Alice Hellebrand**, Senior Vice President, American Nephrology Nurses Association
- **Dr. Andrew Howard**, Ad-Hoc Member, National Forum of ESRD Networks
- **Dr. Mahesh Krishnan**, Group Vice President, R&D, DaVita
- **Mr. Chris Lovell**, Director of Medical Informatics and Systems, Dialysis Clinic Inc.

Panelists Cont.

- **Dr. Klemens Meyer**, Director of Dialysis Services, Tufts Medical Center
- **Dr. Rebecca Schmidt**, Professor of Medicine, Dialysis Medical Director, West Virginia University School of Medicine
- **Dr. Siddharth Shah**, Associate Professor of Medicine, University of Pennsylvania School of Medicine
- **Ms. Elsa Spicochi**, Clinical Informatics Manager, Northwest Kidney Centers
- **Dr. Suzanne Watnick**, Chief Medical Officer, Northwest Kidney Centers
- **Dr. Daniel Weiner**, Medical Director, Dialysis Clinics Inc., Boston
- **Ms. Julie Williams**, President, National Renal Administrators Association
- **Dr. Jay Wish**, Professor of Clinical Medicine, Indiana University School of Medicine

Project Team in Attendance

- Moderator
 - David Moore
- Active Participants/Session Leads
 - Kyle Buika
 - Kevin Erickson
 - Eugene Lin
 - Sriniketh Nagavarapu
 - William Vogt

Project Team in Attendance

- Additional Team Members
 - Rishav Bashyal
 - Quinn Bornstein
 - Myrna Cozen
 - Abbey Enriquez
 - Andrew Etteldorf
 - Bruno Garcia
 - Anna Kamen
 - Zhihang Lin
 - Suraj Pant
 - Sonam Sherpa
 - Aileen Xu

Overview of the ESRD PPS

- Under the End-Stage Renal Disease Prospective Payment System (ESRD PPS), dialysis facilities receive a single payment for each dialysis treatment
- Payment is intended to reflect the cost of providing all services included in the bundle
- This payment is adjusted for patient case mix based on existing cost data
- Stakeholders have commented that existing data sources do not adequately capture patient-level differences in treatment costs
- CMS has contracted with Acumen, LLC to conduct research and analysis to refine the ESRD PPS to better account for variation in treatment cost
- This TEP is the first step to acquire stakeholder and expert input that will inform these refinements

TEP Goals

- Discuss cost and risk factor reporting in claims and facility cost reports
- Obtain input on improvements to claims and cost reports that better identify variation in treatment costs among patients
- Acquire feedback on additional patient characteristics that should be collected for evaluation as case-mix adjustment factors

TEP Organization

- **Session 2:** Discuss cost data currently collected through cost reports and claims
- **Session 3:** Discuss potential for collecting new data on treatment duration to infer patient-level differences in treatment costs
- **Session 4:** Discuss options for collecting new data on treatment costs that are unassociated with treatment duration

TEP Organization Cont.

- **Session 5:** Discuss approaches to improving data on facility-level costs that affect the cost of treating all patients within a facility
- **Session 6:** Identify unreported patient characteristics that could be reported and considered for use as case-mix adjustment factors in a revised payment model
- **Session 7:** Acquire concluding observations and input from both TEP panelists and observers

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Session 2 Outline

Session Objective

- Identify the main components of dialysis treatment costs and limitations in their measurement

Session Topics

- Describe the existing ESRD PPS
- Review the composition of dialysis treatment costs
- Evaluate limitations of existing data on composite rate costs
- Outline alternative approaches discussed in Sessions 3-5

Session Time

- 45 minutes

Overview of the Current ESRD PPS

$$\begin{aligned} \text{ESRD Payment} = & (\text{Base Rate} * \text{Case Mix Index} * \text{Wage Index} * \\ & \text{Rural Adjustment} * \text{Low Volume Adjustment}) \\ & + \text{Outlier Payment} \\ & + (\text{Training Add-On} * \text{Wage Index}) \\ & + \text{TDAPA} \end{aligned}$$

- **Base Rate:** Reflects the average cost of all services in the bundle
- **Case Mix Index:** Accounts for patient characteristics
- **Wage Index:** Based on the hospital wage index
- **Low Volume Adjustment:** 23.9% increase for low-volume facilities
- **Rural Adjustment:** 0.8% increase for rural facilities
- **Outlier Payment:** 80% of costs exceeding a specified threshold
- **Training Add-On:** Payment for training for home dialysis
- **TDAPA:** Transitional drug add-on payment

ESRD PPS Payments Intended to Reflect Total Treatment Costs

- Total treatment costs consist of composite rate (CR) costs and formerly separately billable (FSB) costs
- CR services
 - Capital, labor, drugs, labs and supplies that have been part of the bundle since 1983
 - Examples include: direct patient care labor, dialysis machines, dialysate, heparin, and routinely used laboratory tests
- FSB services
 - Injectable drugs and their oral equivalents, labs, and supplies that were incorporated into the bundle in 2011
 - Examples include: ESAs and supplies used to administer separately billable drugs

Case-Mix Adjustment Model Currently Treats CR and FSB Services Separately

- Use of CR items and services is not identified in claims, except as charges
 - Only available at the facility level from cost reports
- FSB items and services are itemized on claims
 - Available at both the patient and facility level
- Case-mix adjustment uses a “two-equation model”
 - Facility-level model: Relates facility’s CR costs per treatment from cost reports to average patient characteristics at the facility level
 - Individual-level model: Relates monthly FSB costs from claims to patient characteristics at the patient level
- Case mix index derived by using weighted average of the coefficients from facility-level and individual-level models

Dialysis Treatment Costs can be Categorized into Six Discrete Components

Capital	Buildings and fixtures, movable equipment, operating and maintenance of plant and equipment, dialysis treatment equipment, housekeeping
Labor	Salaries and benefits for direct patient care
Administrative	Facility costs not directly related to the provision of dialysis care, such as accounting, legal services, and recordkeeping
Drugs	Drugs used to treat or manage a condition associated with an ESRD PPS functional category
Labs	Routine laboratory tests for dialysis patients, including Automated Multi-Channel Chemistry (AMCC) tests
Supplies	All supplies used to furnish direct dialysis care, such as tubes, syringes, and dialysate

Availability of Data in Cost Reports and Claims Differs by Type of Service

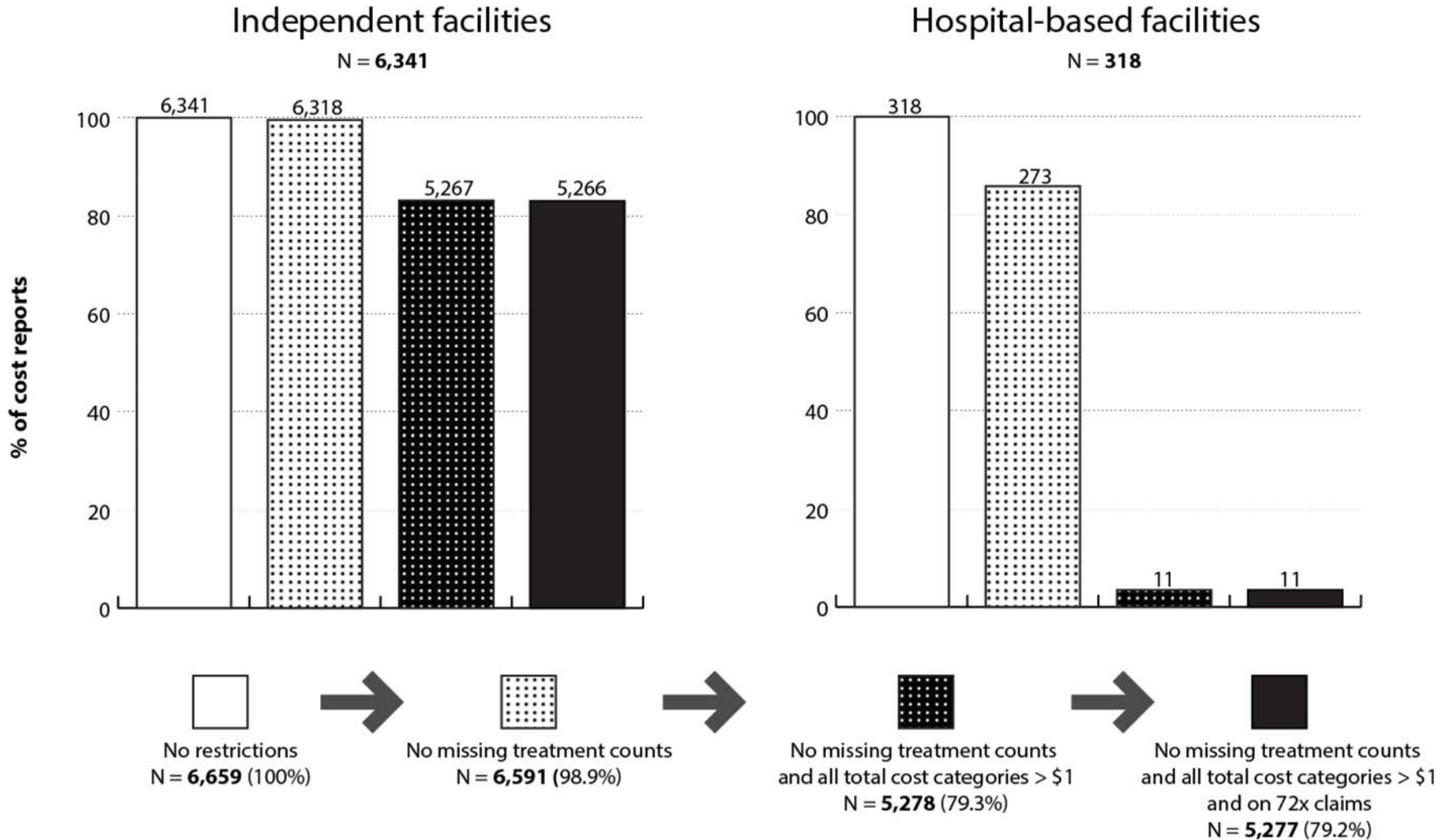
Cost Component	CR	FSB
Capital	X	
Labor	X	
Admin	X	
Drugs	X	X
Labs	X	X
Supplies	X	X

- Capital, Labor, and Administrative costs are only reported at the facility level on cost reports and are not itemized on claims
- CR drugs are reported at the facility level on cost reports, while FSB drugs are reported on claims and cost reports
- CR labs and supplies are reported at the facility level on cost reports, while FSB labs and supplies are reported on claims and on hospital-based facility cost reports

How Significant is Each CR Cost Component Relative to Total Cost?

- Quantitative analysis examines:
 - Size of CR costs versus FSB costs
 - Size of each component of CR costs
- Requires imposing restrictions on cost reports and claims and construction of cost-to-charge ratios (CCRs)
 - Empirical results in Sessions 3-6 will also apply similar methodological assumptions
- Empirical findings placed into context using qualitative findings from 9 interviews conducted in September 2018 with dialysis facility representatives
 - Later sessions will discuss findings from these interviews

Analysis Requires Restrictions to Cost Reports



Analysis Requires Restrictions to Claims

- The population of ESRD beneficiary Medicare claims includes all non-AKI Medicare 72x claims with the following restrictions:
 - Limit to beneficiary-month-facilities with at least one claim with a paid dialysis session
 - Remove claims at the beneficiary-month level with Medicare as a secondary payer
 - Remove claims at the beneficiary-month level where the beneficiary is enrolled in Part C
- These restrictions parallel those applied in rulemaking

Identifying the Size of Composite Rate Costs Requires Use of CCRs

- Freestanding facility cost reports do not provide separate fields for CR labs and supplies versus FSB labs and supplies
- FSB vs. CR costs for labs and supplies can be broken out using an assumption on cost-to-charge ratios (CCRs)
 - Calculate average per-treatment FSB lab and supply charges from the claims
 - Calculate a CCR as a facility's total Medicare FSB drug costs divided by its total FSB drug charges
 - Use the CCRs to convert charges for FSB labs and supplies to costs

CR Costs Constitute Almost 90% of Treatment Cost

Cost Category from Cost Reports	Freestanding and Hospital-Based Facilities (5,277)	
	Average Facility Cost per Treatment	Percent of Total Per-Treatment Costs
Total Treatment Cost	\$287.15	100.00%
Total CR Costs	\$255.71	89.05%
Total FSB Costs	\$31.44	10.95%

- Without the methodological assumption, total CR costs plus FSB labs/supplies account for 89.90% of per-treatment costs
 - The methodological assumption has little impact
- FSB labs and supplies are small relative to CR labs and supplies

Capital, Labor, and Administrative Costs Constitute Almost 90% of Total CR Treatment Costs

Cost Category from Cost Reports	Freestanding and Hospital-Based Facilities (5,277)	
	Average Facility Per-Treatment Costs	Percent of Total Per-Treatment CR Costs
Total CR Costs	255.71	100.00%
Total CR Capital Costs	63.14	24.69%
Total CR Labor Costs	80.62	31.53%
Total CR Admin Costs	81.00	31.68%
Total CR Drug Costs	1.49	0.58%
Total CR Lab Costs	1.86	0.73%
Total CR Supply Costs	27.59	10.79%

Findings Demonstrate the Need to Better Understand CR Costs

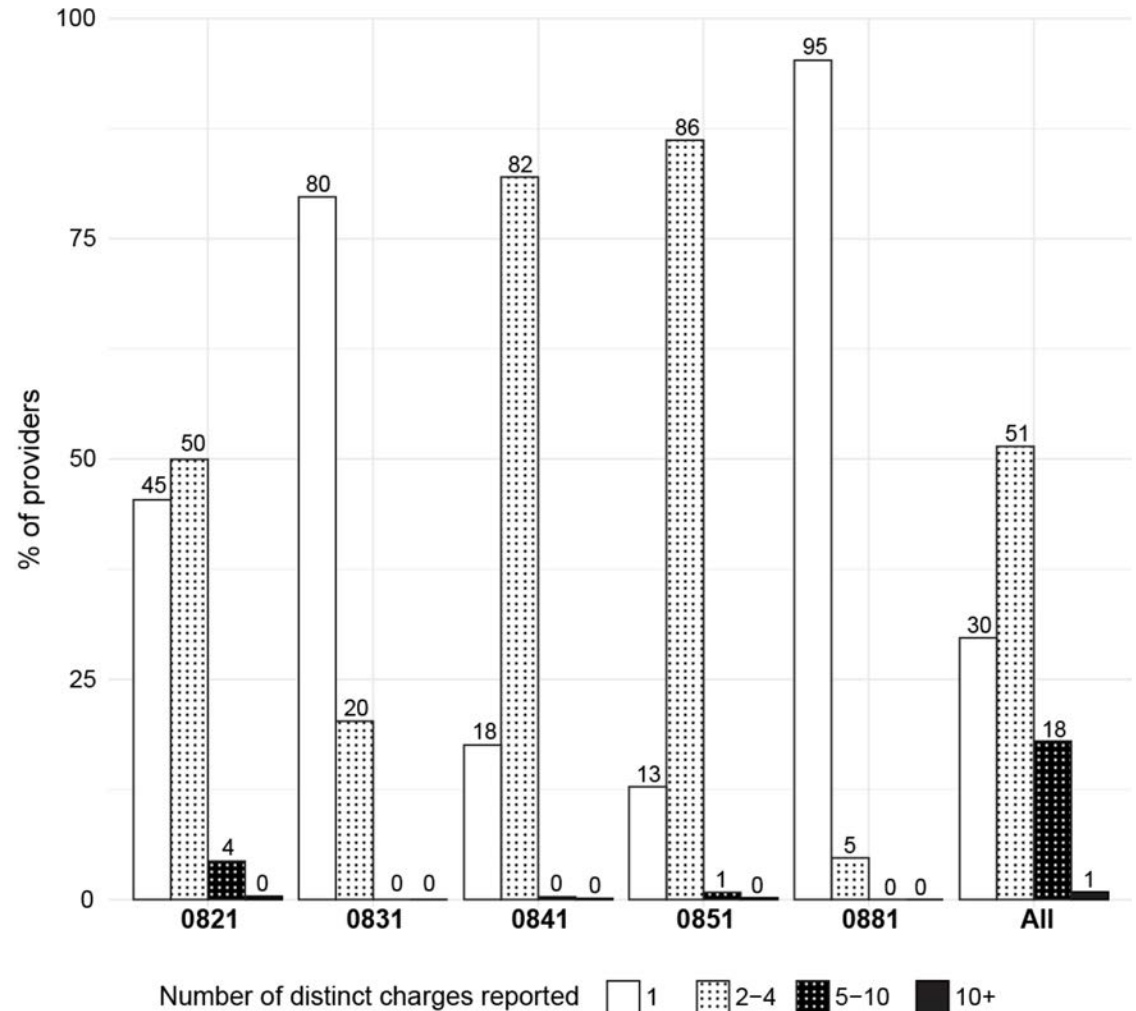
- CR costs form the vast majority of treatment costs, so it is important to identify whether there are patient-level differences in these costs and how large the differences are
- Drugs, labs, and supplies form only a small fraction of CR costs
- Consistent with evidence from pre-TEP interviews indicating the importance of labor costs (e.g. set-up prior to dialysis sessions) and capital costs (e.g. isolation rooms)
- Refinement of the ESRD PPS requires obtaining data on CR costs – particularly labor and capital costs – to accurately infer patient-level cost variation

Two Appealing Approaches to Collecting CR Cost Data Face Severe Challenges

- Reported charges per dialysis session are currently collected on claims
 - However, for any given revenue center code, each facility only reports a small number of distinct charges
- Itemizing all CR items and services on claims is unlikely to succeed
 - Reporting of even the limited set of CR items/services mandated by CMS has been minimal

Per-Treatment Charges Reported on 2016 Claims Show Very Little Variation

- 0821 – Hemodialysis (HD)
- 0831 – Peritoneal Dialysis (PD)
- 0841 – Continuous Ambulatory Peritoneal Dialysis (CAPD)
- 0851 – Continuous Cycling Peritoneal Dialysis (CCPD)
- 0881 - Ultrafiltration



Itemizing All CR Items and Services on Claims Poses Significant Challenges

- Difficult for providers to adequately allocate all costs to individual treatments
 - Drugs, labs and supplies are divisible, but tracking these for each treatment involves significant burden
 - Allocating labor, administration, and capital costs to each treatment is even more challenging
- Reporting of Consolidated Billing list (CBL) items and services on claims after new CMS requirements effective January 1, 2015 was limited
 - In 2016, roughly 40 percent of facilities never reported CR drugs on the CBL

Remaining Sessions Offer Approaches to Augment Existing Reporting Structure

- Sessions 3-5 focus on how to address challenges with existing approaches and better capture CR treatment cost for use in estimating a new case mix adjustment model
- **Session 3:** Collecting treatment duration data to infer patient-level treatment costs associated with the length of dialysis treatment
- **Session 4:** Collecting data on patient-level costs unrelated to the length of dialysis treatment
- **Session 5:** Collecting data on facility-level costs that affect costs of treating all patients within a facility

Discussion Questions

- Do the six cost components include all aspects of dialysis treatment costs covered by Medicare?
- Within each component, are there quantitatively significant costs that are currently missing from cost reports?
- Given the small role of drugs, labs, and supplies in CR costs, does it make sense to focus the discussion of CR costs on capital, labor and administrative components?
- Why is there such limited variation in reported charges per dialysis session?
 - Would it be useful to focus on improving reporting of these charges instead of collecting new information on cost reports or claims?
- Why is reporting of costs for Consolidated Billing items and services limited?
 - Are there subsets of CR items/services that could be successfully reported on claims?

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Session 3 Outline

Session Objective

- Discuss the use of time on dialysis as a proxy for treatment costs

Session Topics

- Discuss the use of dialysis session length to estimate certain CR costs
- Review reliability of time on dialysis as reported in CROWNWeb
- Discuss practical implications of routine reporting of time on dialysis on claims

Session Time

- 75 minutes

Collecting Data on Treatment Duration Offers a Way to Measure Cost Variation

- Since full itemization of CR costs presents challenges, identifying an alternative approach to estimate patient-level variation in CR costs is required
- Patient-level differences in CR costs in a facility can be due to (1) differences in treatment duration and (2) differences in costs unrelated to treatment duration
 - All else equal, when a dialysis session lasts longer, it will have higher CR costs
 - Cost reports can be used to derive cost per unit of time for different types of patients
 - This can be combined with data on treatment times to infer differences in CR cost across patient-months due to (1) above
- This session discusses the measurement of (1), while Session 4 focuses on improved measurement of (2)

Example of Treatment Duration's Role in Patient-Level Cost Variation

- Imagine an ESRD patient, Patient A, who receives treatment from a single outpatient dialysis facility
- Patient A has no major complications or comorbidities, and prescribed and actual treatment time is generally 3.5 hours
- Patient A consistently comes to dialysis with large fluid gains, so her nephrologist increases her prescribed treatment time to 4 hours to ensure sufficient fluid removal
- Let's consider how this may affect Patient A's CR costs over time

Treatment Duration Potentially Affects Four Components of Total Costs

CR Cost Component	Impact
Capital	<ul style="list-style-type: none">• Increased utility costs• Accelerated depreciation and required maintenance of dialysis machines• Potential for lower average daily patient throughput
Labor	<ul style="list-style-type: none">• Additional labor hours for patient care, assuming staffing model is not fixed
Supplies	<ul style="list-style-type: none">• Increased dialysate and water treatment
Drugs	<ul style="list-style-type: none">• Increased heparin dosage

- Cost differences due to drugs and supplies may be relatively small compared to differences due to capital and labor
- Additions/revisions to cost reports and claims may be necessary to ensure that cost differences in these components due to treatment duration are accurately reflected

Key Questions in Collecting and Using Treatment Duration Data

- Can facilities report meaningful, valid information on treatment duration with minimal burden?
 - CROWNWeb currently collects monthly information on time on dialysis, which can be assessed for data validity
- Which cost components are most affected by treatment duration, and is there sufficient information on cost reports to capture these relationships?
 - Relationship between CROWNWeb time on dialysis data and facility costs from current cost reports can be examined
- Is current collection of time on dialysis information in CROWNWeb sufficient, or must treatment duration be collected on claims? If the latter, how best to operationalize this?
- Remainder of this session addresses each of these questions

Facilities Currently Report Time on Dialysis in CROWNWeb

- Monthly CROWNWeb reporting requires facilities to indicate “Delivered Minutes of Blood Urea Nitrogen (BUN) Hemodialysis Session”
 - The measure indicates the actual delivered time on hemodialysis during the session
 - Valid values range between 60 and 600 minutes
- BUN time on dialysis is a good proxy for treatment duration, with two caveats
 - Treatment duration includes time on dialysis machine (e.g. excluding set-up)
 - BUN time on dialysis is collected once per month as a part of a particular lab test, rather than once every treatment
- Quality of reporting on BUN time on dialysis indicates how accurately and easily facilities can report treatment duration for every treatment, if asked to do so
 - If BUN time on dialysis is reported sufficiently well, may be sufficient to use this variable for revised case mix adjustment, with no additional data collection on treatment duration

Most Facilities Report Clinically Reasonable Time on Dialysis Data

Year	Number of CCN/beneficiaries	Number and percentage of CCN- beneficiaries reporting					
		100%	90-100%	75-90%	50-75%	0-50%	Never reporting
2015	482,521	195,959 (41%)	19,037 (4%)	22,507 (5%)	23,193 (5%)	90,542 (19%)	131,283 (27%)
2016	490,610	303,184 (62%)	29,491 (6%)	35,482 (7%)	27,105 (6%)	7,339 (1%)	88,009 (18%)
2017*	431,002	304,174 (71%)	0 (0%)	31,741 (7%)	20,606 (5%)	5,167 (1%)	69,314 (16%)

*2017 data are for 7 months only

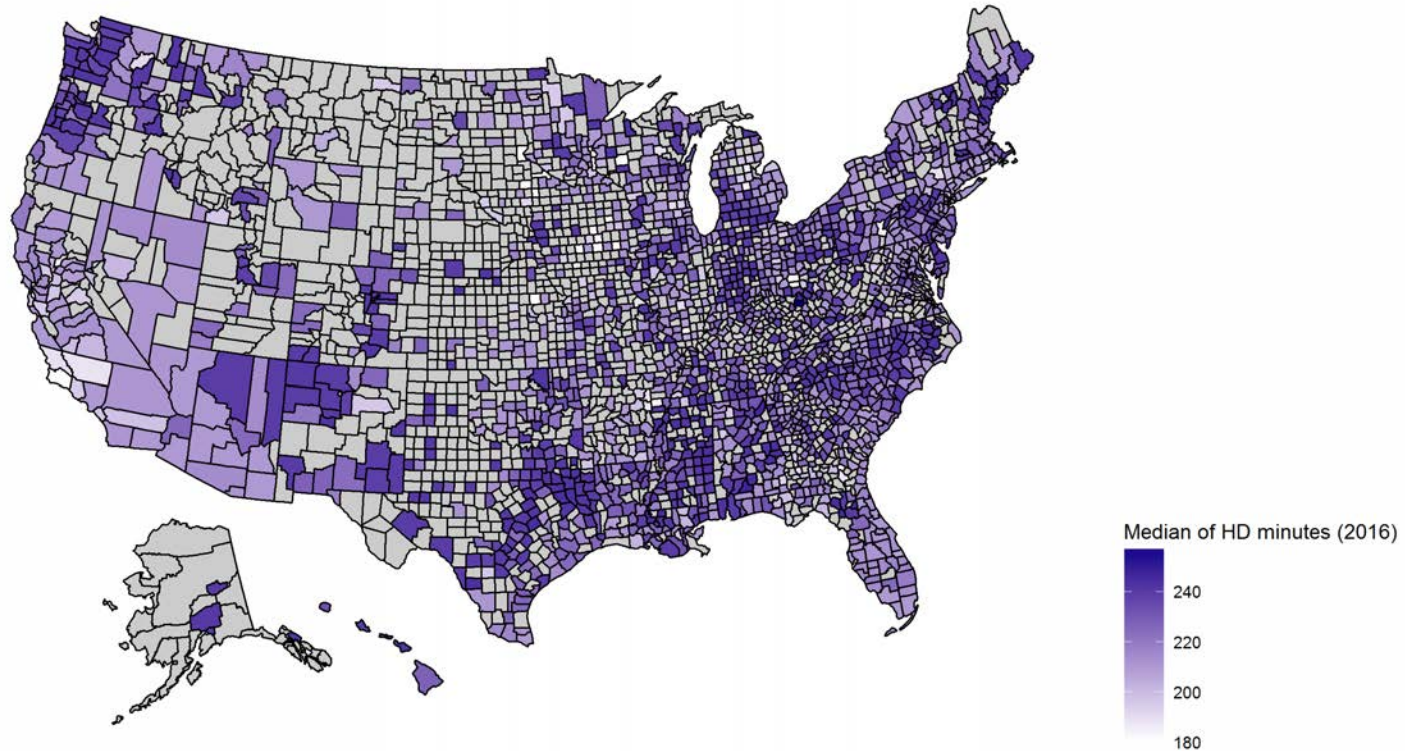
Note: Includes non-missing and non-negative values

Year	Number of providers	Percentage of providers reporting same values		
		Where min = max	Where p10=p90	Where p25=p75
2015	6,060	0.23%	0.41%	1.01%
2016	6,340	0.08%	0.30%	1.01%
2017*	6,490	0.17%	0.26%	0.89%

*2017 data are for 7 months only

- This finding is unsurprising, as interview respondents consistently answered that their facilities already record information on both prescribed and actual treatment time in medical records

Substantial Across- and Within-Facility Variation in BUN Hemodialysis Time



- CROWNWeb variable shows meaningful variation in median of HD minutes across US counties with outpatient dialysis facilities
- Data also shows within-facility variation
 - Average IQR = 34.6 minutes | Average P90/ P10 = 1.37

Time on Dialysis Variation Translates to Meaningful Cost Variation

- Assigning a dollar value to time on dialysis is useful to roughly assess the importance of variation in this variable
- Imputed cost per treatment of an HD session can be calculated: Variation is observed in the distribution of average imputed cost per HD session, as shown in table below

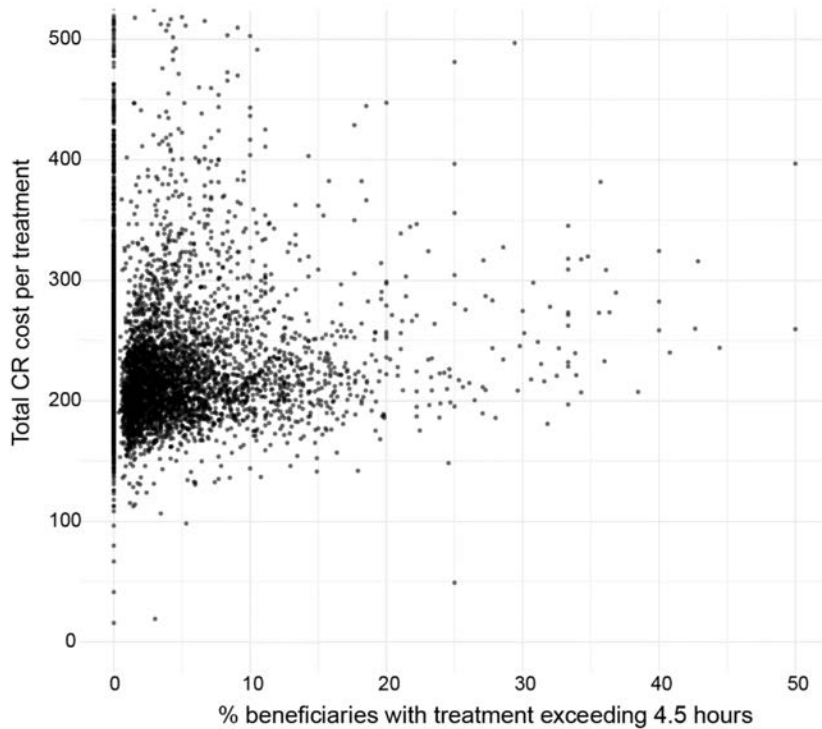
- Across facility IQR=\$62.62 | P90/ P10=1.68

- $$\frac{\text{Average cost per treatment}}{\text{Average minutes per treatment}} * \text{Number of minutes per session}$$

Year	# of Provider Beneficiary Months	Mean	P1	P10	P25	P50	P75	P90	P99	Std Dev
2016	3,147,736	\$252.83	\$145.91	\$190.24	\$213.83	\$242.36	\$276.46	\$320.28	\$494.84	\$70.08

Note: Detailed methodology for imputed cost per treatment can be found in the background packet

CR Costs Increase with Longer Treatment Times



Percentile among providers	Percentage Beneficiaries >= 4.5 Hours	# Providers	# Treatments	CR Cost per Treatment
0%	0%	2,243	22,521,173	228.7
> 0 % - P40	0% - 1.28%	339	6,616,958	207.0
P40 - P60	1.28% - 3.03%	1,211	15,907,231	217.3
P60 - P80	3.03% - 6.14%	1,219	14,500,854	223.8
P80 - P99	6.14% - 27.27%	1,141	13,924,894	227.5
P99 - max	>27.27%	61	500,548	259.6

Note: Excludes providers with less than 500 treatments

Relationship Between Longer Treatments and Cost is Observed in Most Cost Components

Percentile Among Providers	% Benes >= 4.5 Hours	# of Providers	# of treatments	Average Cost per Treatment by Component						
				Total CR	CR Capital	CR Labor	CR Admin	CR Drug	CR Lab	CR Supply
> 0 % - P40	0% - 1.28%	339	6,616,958	207.0	34.1	84.4	57.8	1.4	3.7	25.7
P40 - P60	1.28% - 3.03%	1,211	15,907,231	217.3	40.4	81.4	64.0	2.4	3.7	25.4
P60 - P80	3.03% - 6.14%	1,219	14,500,854	223.8	42.7	82.7	66.3	1.8	4.0	26.4
P80 - P99	6.14% - 27.27%	1,141	13,924,894	227.5	42.0	84.8	67.0	2.2	4.0	27.6
P99 - max	>27.27%	61	500,548	259.6	46.2	81.0	76.7	7.6	4.1	44.1

Note: Excludes providers with less than 500 treatments

Approaches to Collecting Treatment Duration for Revised Case Mix Model

- Use existing monthly report of BUN time on dialysis in CROWNWeb, encouraging facilities that do not currently report consistently to do so
 - Data is only reported for HD sessions
 - Unclear how home dialysis sessions are recorded
- Collect treatment duration for each session in Medicare claims, using either:
 - New HCPCS code, or
 - New revenue center code

Options for Reporting Treatment-Level Duration in Claims

- Units of service could be reported in minute increments (e.g. 15 minutes) on 72x claims using one of two methods:
 - 1) A new HCPCS is used to indicate units of treatment time within the context of the 0821, 0831, 0841 revenue center code

Revenue Code	HCPCS	Units
0821	90999	1
0821	New HCPCS	12 (1 unit = 15 mins)

- 2) One line and a new revenue center code are used to indicate duration of treatment time for a single treatment with corresponding HCPCS code and units of time

Revenue Code	HCPCS	Units
0826	90999	12 (1 unit = 15 mins)

Discussion Questions

- Which of the six cost components are most likely to have CR cost vary with treatment duration?
- Should new information for these cost components be collected on cost reports, for use in better inferring the CR costs associated with treatment duration?

Discussion Questions Cont.

- What are the advantages and disadvantages of obtaining treatment duration information from BUN time on dialysis through CROWNWeb, versus collecting treatment duration through new fields on claims?
- Do you anticipate challenges to reporting treatment duration on claims using one of the specified options?
- Are there alternative proxies for resource utilization that can be reported at the patient/treatment level?

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Session 4 Outline

Session Objective

- Discuss data collection options for specific types of CR costs that are independent of treatment duration

Session Topics

- Present information from pre-TEP interviews on CR cost variation due to patient factors other than treatment duration
- Describe methodological approaches for collecting usable data on these CR costs
- For each patient factor, present existing cost data and collect specific proposals for improved cost data collection

Session Time

- 75 minutes

CR Costs Vary Across Patients in Ways Unrelated to Treatment Duration

- For two patients with identical treatment duration, CR costs of treating the patients can differ due to:
 - Resources involved in set-up and post-session care
 - Intensity of direct patient care required during the session
 - Types of drugs, supplies, and capital utilized during the session
- Ability to infer costs of such CR items and services from existing claims and cost report data is limited
- This session discusses options for improving data collection to identify variation across patients in the most important types of CR costs

Example of Patient-Level Cost Variation Conditional on Treatment Duration

- Consider two ESRD patients, Patient A and Patient B, who receive hemodialysis from a single outpatient dialysis facility
 - Both have prescribed and actual treatment durations of 3.5 hours
 - Patient A has no major complications or comorbidities, has supportive care partners, and dialysis access is through an AV Fistula
 - Patient B has chronic Hepatitis B (HBV) infection, suffers from mental health problems, lacks caregiver support, and has dialysis access through a catheter
- Consider the additional costs of treating Patient B that are not currently accounted for

Impacts on CR Costs for Patient B are Substantial

CR Cost Component	Additional CR Resource Use
Capital	<ul style="list-style-type: none">• Maintenance of an isolation room• Specific equipment cannot be used for other patients due to HBV infection
Labor	<ul style="list-style-type: none">• Depending on state, RN must administer dialysis instead of Medical Technician due to catheter• RN / Technician must have HBV+ antibodies and cannot treat other patients• Additional social worker/ case management hours required
Supplies	<ul style="list-style-type: none">• Additional gowns, face shields required since supplies cannot be shared across patients
Drugs	<ul style="list-style-type: none">• Additional IV antibiotics may be required

Pre-TEP Interviews Identified Key Costs Unrelated to Treatment Duration

- Nine interviews were conducted with representatives from dialysis facilities prior to the TEP to better understand CR cost drivers and reporting
- Facilities included a pediatric hospital, two private LDOs, three non-profits, including an LDO, two regional chains, and one independent facility
- Respondents indicated specific types of CR costs associated with caring for patients who are more complex and that are independent of treatment duration
- Ability to infer costs of such CR items and services from existing claims and cost report data is limited
- This is the starting point for this session's discussion

Interviews Noted Especially High CR Costs for Particular Patient Groups

Patient Types	Capital	Admin	Labor	Drugs	Labs	Supplies
Pediatric	X	no data	X	no data	no data	X
Incident		X	X	X		X
Home Dialysis	X	no data	X	no data	no data	X
HBV+	X		X			X
Catheterized	no data	no data	X	X	no data	X
Behavioral Problems, including Mental Illness and Drug Dependency			X			
Non-ambulatory/ Frail	X	no data	X	no data	no data	no data

- Increased labor costs were consistently identified across groups

Remainder of Session Examines CR Cost Reporting For Each Patient Group

- For each high cost patient group, identify variation in use of resources as suggested by:
 - Provider interviews
 - Input from internal nephrology team
- Examine whether current cost report and claims data corroborate interviews and clinical understanding
 - If not, why not?
- Discuss proposed solutions for improved cost reporting

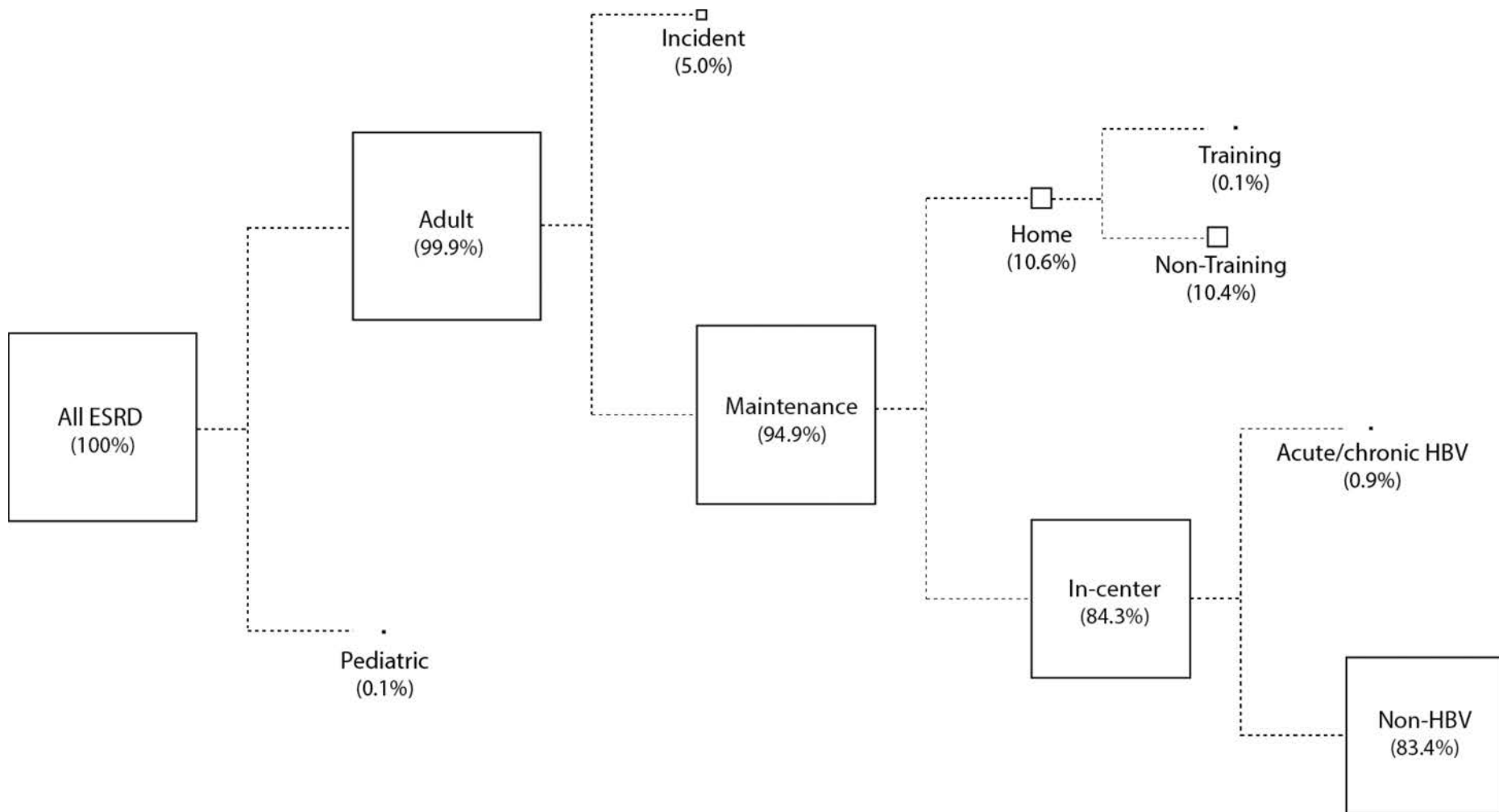
Changes to Claims Offer an Approach to Improve Reporting of Costs

- Report costs associated with CR items and services on claim lines
 - Method: Use CR costs per treatment directly from claims
 - Particularly salient given evidence that improved reporting of labor allocations may yield significant information regarding treatment-level variation unrelated to duration
 - Challenge: Accurate and reliable reporting is difficult; e.g., interview respondents report that facilities do not track direct care labor hours associated with each patient
- Can staffing be reported at a level disaggregated from current Cost Report reporting?
 - How can facilities accurately report treatment-level staffing?

Changes to Cost Reports Offer an Alternative Approach to Improve Reporting of Costs

- Apportion the costs associated with CR items and services across all patients of a given type on cost reports
 - Method: Calculate CR costs per treatment for a patient type and use this in a regression model
 - Administrative/ claims data must also be used to identify and link to patient groups for apportioning costs
 - Challenge: Cost reports must use small set of mutually exclusive and exhaustive patient groups to make cost apportionment feasible; cost variation should ideally be relatively small within each patient group
- Proposed solutions for each patient group focus on this approach

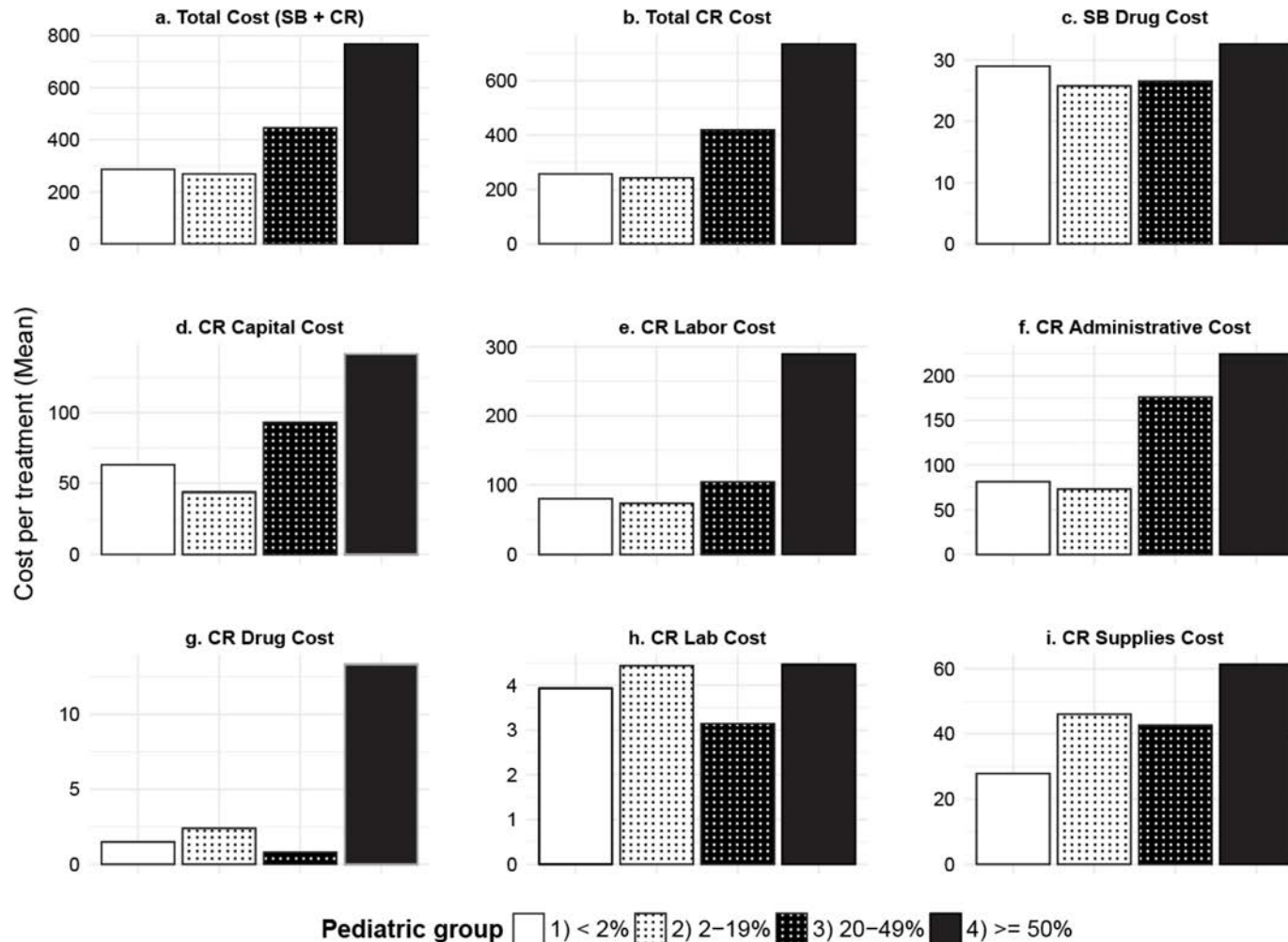
Patient Groups Classified Into Six Mutually Exclusive and Exhaustive Resource Use Groups for Discussion



Interviews Indicate Pediatric Patients Require Higher Resource Use

- Facilities must maintain stocks of more types/ sizes of supplies and special equipment
- One-on-one staffing required for patients less than 2 years of age
- Require additional, specialized direct care support staff
 - Including several labor categories not used by adult population
 - School liaison, creative art therapist, child-life specialist, developmental psychologist
- These items and services currently not reflected in cost reports or in charges on claims

Existing Data Supports Pre-TEP Interview Findings



Note: Pediatric percentage breakdowns are consistent with reporting in the ESRD PPS Final Rule

Solutions for Improved Reporting of Pediatric Treatment Costs

- Worksheets B/B-1 already include rows for each type of pediatric dialysis patient and columns corresponding to each cost component
 - Clarify instructions to ensure that costs of treating pediatric patients are reported/apportioned accurately
- Add specific instructions to cost report Worksheets A/A-1 that facilitate the identification of cost centers related to items and services specific to pediatric patients, e.g. child-life specialist and specialized supplies
- Add instructions for Worksheet S-1 regarding itemization of direct patient care labor types specific to the pediatric population

Facilities Report Incident Dialysis Patients Require Increased Resource Use

- Increased hospitalizations correlate with more missed treatments
- Additional staff time to establish a dry weight
- Additional social worker/nutritionist time for ESRD patient education
- Higher doses of injectable drugs
- More likely to have a catheter
 - Citrate, antibiotic, or heparin to lock
 - Drugs to break up clots intermittently, e.g. TPA
 - Dressing changes
 - Some states require RN to administer treatment

Cost Report Data Show Increased Cost per Treatment for Incident Patients

Time Since Onset of Renal Dialysis < 4 Months	# of Provider-Beneficiary-Months	Mean	SD	P1	P25	P50	P75	P99
No	2,956,772	252.28	69.39	146.11	213.41	241.89	275.98	493.16
Yes	157,104	260.19	75.65	143.50	220.60	248.90	282.68	535.41

Note: Distributions are calculated based on an imputed cost per treatment. See background packet for additional details on imputation methodology.

Solutions for Improved Reporting on Incident Dialysis Patients

- Add specific instructions to Worksheet S-1 to identify direct patient labor FTE used for patient education
- Worksheets B/B-1 contain lines for reporting CR costs for various cost centers
 - Add cost center for incident patients

Facilities Report Increased Costs Associated with Home Hemodialysis

- Home machines are more expensive and costs cannot be distributed across patients
- Requires more highly skilled/ highly paid nurses who treat fewer patients
- Nursing time required for each training treatment
- Added costs for water testing and treatment

Home Treatments Represent 10% Total Dialysis Treatments and 23% of them are HD

Type	Hemodialysis		Peritoneal Dialysis		All Dialysis	
	# Treatment	%	# Treatment	%	# Treatment	%
In-center	40,462,547	97%	232,714	6%	40,695,261	89%
Home	1,133,909	2.7%	3,892,547	92.6%	5,026,456	11.0%
Training	36,168	0.1%	78,761	1.9%	114,929	0.3%
All	41,632,624	100.0%	4,204,022	100.0%	45,836,646	100.0%

Note: Treatment counts are calculated using 72x claims

For non-training CAPD and non-training CCPD, HD equivalent treatment counts (3/7) were applied

Assuming Facilities Accurately Allocate Costs to Home vs In-Center, In-Center Appears More Costly than Home HD

- Providers in pre-TEP interviews maintained home hemodialysis is more costly than in-center hemodialysis

Facility-Type	Dialysis Type	Number of Providers	Mean	P5	P10	P25	P50	P75	P90	P95
All (Freestanding + Hospital-based)	Cost per dialysis session	6,631	303.0	198.0	209.4	227.5	252.5	292.5	383.7	541.5
	Cost per in-center dialysis session	6,273	381.6	200.3	210.6	229.7	255.4	297.2	401.9	586.6
	Cost per home HD dialysis session	1,485	296.6	151.6	174.7	198.8	226.7	282.4	368.5	493.4
	Cost per home PD dialysis session	3,089	251.8	149.4	171.1	188.5	214.3	246.8	325.0	448.6
	Cost per training dialysis session	3,002	738.0	254.9	322.9	422.3	541.1	750.7	1,173.6	1,656.4

Note: Home CAPD and home CCPD, patient-weeks were multiplied by 3 to calculate hemodialysis equivalent treatment counts
 Cost per treatment is calculated directly from the cost report as total cost divided by total treatment count.

Relaxing this Assumption, Differences in HD Cost for Home vs. In-Center are Inconclusive

Provider type	% Home Dialysis	Hemodialysis		Peritoneal Dialysis		All Dialysis	
		# Providers	Cost per Treatment	# Providers	Cost per Treatment	# Providers	Cost per Treatment
All (Freestanding + Hospital- based)	0%	3,393	251.7	11	344.9	3,394	251.9
	>0%-<10%	841	258.2	777	229.9	841	256.9
	10%-<25%	1,324	259.4	1,291	205.7	1,324	251.7
	25%-<50%	585	272.9	573	187.5	585	250.3
	50%-<100%	124	339.4	127	121.7	129	213.6
	100%	230	273.9	340	235.4	358	243.8

Note: Home CAPD and home CCPD, patient-weeks were multiplied by 3 to calculate hemodialysis equivalent treatment counts

Cost per treatment is calculated directly from the cost report as total cost divided by total treatment count

- When is home dialysis more expensive than in-center dialysis?
- How can reporting of costs by modality be improved to address discrepancies or inconsistencies across facilities in existing reporting?

Solutions for Improved Reporting of Home Dialysis

- CR costs (total and by component) for home program are reported on Worksheet B, rows 14-17.02
 - Responses obtained from provider interviews suggest that home program costs may be apportioned by number of treatments, not reflecting actual costs
 - Clarify instructions to ensure that facilities accurately apportion costs to each relevant cost center
- Add lines corresponding to home program staff by labor category in Worksheet S-1
- Add lines to Worksheet B-1 to include dialysis machines and water treatment equipment purchased or rented for home program patients

HBV Patients Entail Unique Costs

- HBV patients must be treated in an isolation room or isolation area
 - Isolation rooms are dedicated to HBV patient care
 - Can only return to treating non-HBV patients in the isolation room after all HBV patients have been discharged
- HBV dedicated equipment and supplies cannot be used to treat other patients
- Dedicated nurse with documented HBV immunity;
 - Cannot simultaneously treat non-HBV patients
- These costs are not captured anywhere in claims or cost reports

Facilities that Maintain Isolation Rooms Have Higher Costs on Average

Volume Quintile	Number of Facilities		Mean Composite Rate Cost per Treatment		Difference	Difference as % of Avg of Means	
	No	Yes	No	Yes			
Rural	1	148	77	\$ 344.1	\$ 375.3	\$ 31.2	8.7%
	2	126	100	\$ 232.1	\$ 255.0	\$ 22.9	9.4%
	3	131	94	\$ 214.2	\$ 227.3	\$ 13.1	5.9%
	4	116	110	\$ 206.2	\$ 215.4	\$ 9.2	4.4%
	5	80	145	\$ 199.9	\$ 199.9	\$ 0.0	0.0%
Urban	1	673	386	\$ 431.5	\$ 455.0	\$ 23.5	5.3%
	2	622	438	\$ 245.6	\$ 250.1	\$ 4.5	1.8%
	3	603	457	\$ 219.2	\$ 225.1	\$ 5.9	2.6%
	4	523	537	\$ 210.9	\$ 213.1	\$ 2.3	1.1%
	5	436	623	\$ 204.4	\$ 210.4	\$ 6.0	2.9%

- Additional cost of isolation room can be distributed across HBV patients. If all HBV patients are discharged, isolation room can be used for routine treatment.

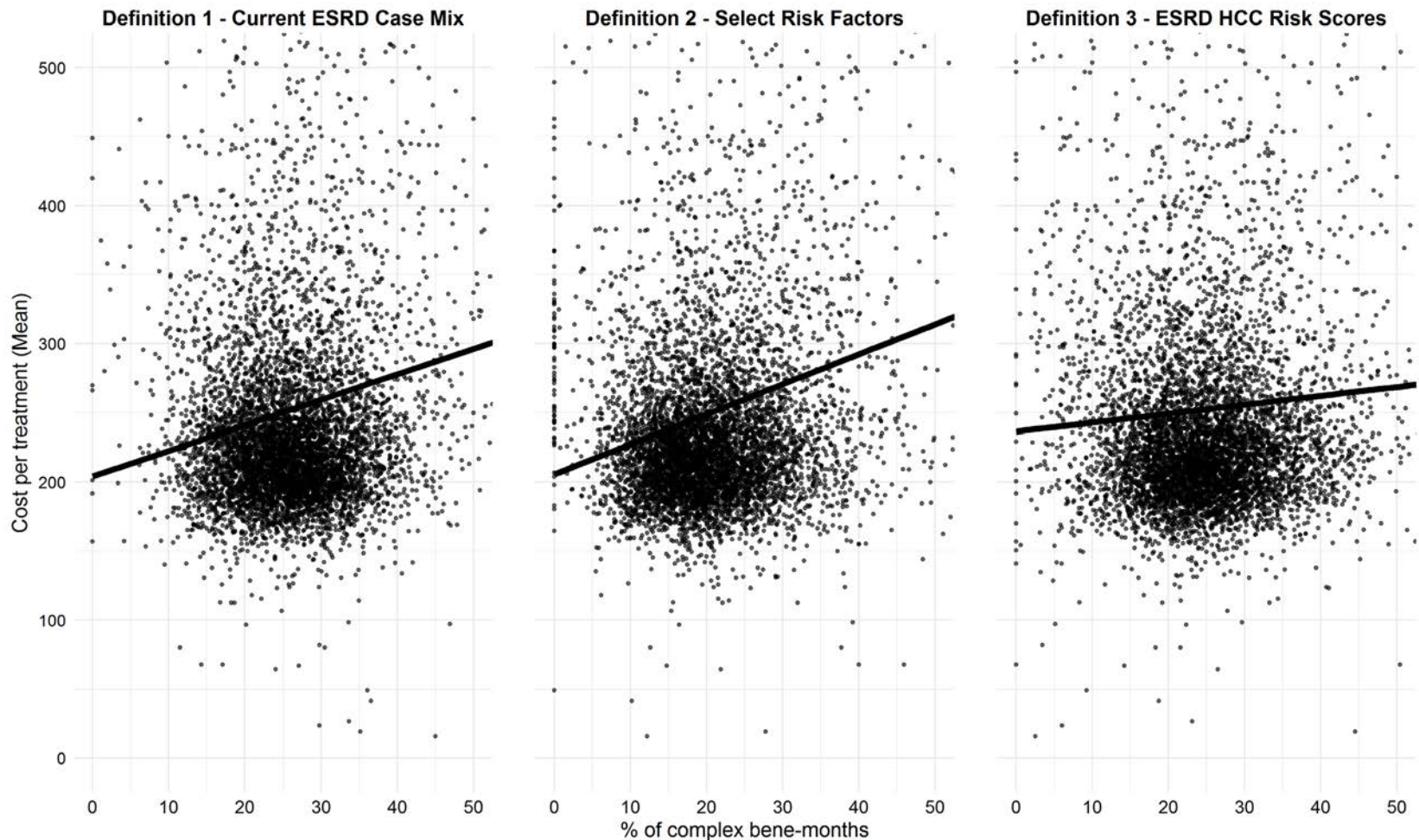
Solutions for Reporting HBV Patients

- Add a row to worksheet B/B-1 corresponding to a new cost center for HBsAg+ patients
- Add a row to Worksheet A/A-1 corresponding to a new cost center for isolation room operation and maintenance
 - Add non-physician salaries in column 2
 - Add expenses other than salaries in column 3

In-Facility Maintenance Patients Can be Categorized for Improved Reporting

- 83% of patients categorized as in-facility maintenance dialysis
- Cost reporting can be augmented if this group is further specified into complex/ routine
- Assuming little variation exists in the complex group, reporting could be improved by adding a cost center for “complex” patients using one of the following definitions:
 - Definition 1: Stratify by distribution of current ESRD case mix scores
 - Definition 2: Stratify by distribution of beneficiaries with at least one select risk factor – catheterized, substance abuse, or paraplegia/ quadriplegia
 - Definition 3: Stratify by distribution of ESRD HCC composite scores
- Are there natural patient group classifications for this in-facility maintenance dialysis population?
 - Can these groups be identified through existing reporting?

Patient Complexity is Associated with Larger Treatment Costs



Note: Excludes facilities with less than 500 treatments and facilities with cost per treatment above the 99th percentile

Discussion Questions

- Is labor the dominant source of variation in treatment-level CR costs?
 - Would an approach focusing solely on improved collection of labor costs capture most significant variation?
- Are there other unmentioned dimensions along which CR costs per treatment vary in a way that is unrelated to treatment duration?
- Are there high cost CR items and services that vary at the patient level and that could be feasibly itemized on claims?

Discussion Questions

- How, if at all, should the set of mutually exclusive, exhaustive patient groups be expanded/ revised to incorporate patients with common patterns of resource use?
 - Specifically the largest group: maintenance/adult/in-center/no-HBV
- Are there barriers to implementing the proposed reporting solutions on cost reports?
- Are pediatric and home dialysis costs currently apportioned in a way that represents the true cost of treatments for every cost component?

Outline

Sessions	
1	Introductions and Purpose of TEP
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3	Costs Associated with Length of Dialysis Treatment
4	Variation in Costs Associated with Complex Patients
5	Facility-Level Drivers of Cost
6	Additional Individual Patient Attributes Necessary for Developing a Revised ESRD Payment Model
7	Open Discussion

Session 5 Outline

Session Objective

- Discuss improvements to data collection for costs common to all patients within a facility

Session Topics

- Define facility-level CR costs
- List potential drivers of facility-level cost variation
- Examine CR cost per treatment by facility characteristics
- Discuss additional or revised data collection

Session Time

- 75 minutes

Revising the ESRD PPS Requires Consideration of Facility Costs

- Sessions 3 and 4 focused on CR costs that vary across patients/treatments within a facility
- CR costs per treatment can also vary across facilities due to facility-level factors
 - Fixed costs and other portions of facility-level costs depend on factors such as facility structure, location, and types of offered care
- Payment system can account for facility-level costs that are outside the control of a facility to ensure payment accuracy and access to care
 - Current ESRD PPS includes a low-volume (LVPA) adjustment, rural adjustment, and wage index adjustment

Example of Facility-Level Cost Variation Conditional on Patient Case Mix

- Imagine two ESRD patients, Patient A and Patient B, who receive hemodialysis from two different outpatient dialysis facilities
 - Both Patient A and Patient B have treatment durations of 3.5 hours and are routine in-center patients
 - Patient A's facility is an urban LDO in Chicago that furnishes 10,000 treatments per year
 - Patient B's facility is a rural independent chain in Montana that furnishes 2,000 treatments per year
- Consider the facility-level portion of CR costs for treating Patient A vs. Patient B

Implications for CR Costs per Treatment in Each Facility

Patient A (Chicago)

- Higher treatment count leverages economies of scale
 - Overhead costs (capital, administrative) distributed over more treatments
- Organizational efficiencies
 - Centralization of administrative and accounting functions
 - More efficient data management
 - Integrated supply chain
- Higher prices
 - Wages for direct and non-direct care labor
 - Rent, insurance, administrative services

Patient B (Montana)

- Smaller treatment count leads to higher average cost per treatment
 - Overhead costs (capital, administrative) distributed over fewer treatments
- No organizational efficiencies
 - May use paper charts instead of EHR
 - Dedicated staff must have administrative and accounting functions
 - Decentralized supply chain
- Lower prices
 - Wages for direct and non-direct care labor
 - Rent, insurance, administrative services

Potential Drivers of Facility-Level Cost Variation

- Economies of scale based on treatment volume
- Input price differences and other factors related to rurality
- Wage differences
- Missed treatments
- Hospital-based vs. freestanding facilities
- Ownership type
- Administration of pediatric care unit
- Administration of home dialysis unit

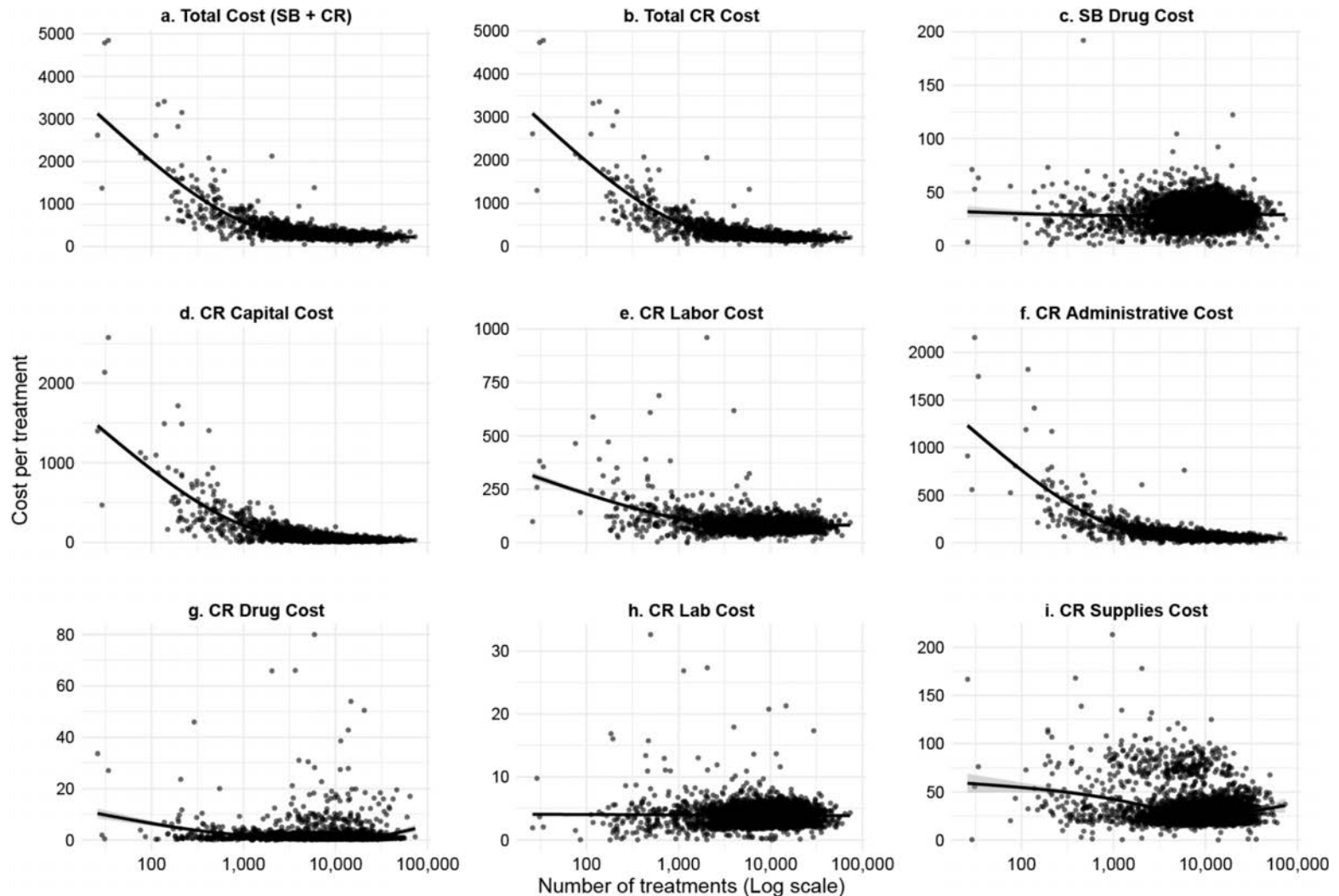
Key Questions to Consider in Remaining Slides for Each Cost Driver

- Which CR cost components likely vary with the facility cost driver?
- To what extent are these CR costs outside the facility's control?
- Do existing CR cost data reflect the expected patterns?
- If not, what additional data could be collected through cost reports or other sources to better reflect reality?

Volume Drives Costs through Number of Treatments and Utilization Capacity

- Capturing costs related to volume is important to ensure viability of facilities that, if closed, would restrict access to care
- Fixed costs are distributed across fewer treatments
- Two important considerations related to volume:
 - Number of treatments
 - Expect that lower treatment counts are associated with higher CR cost per treatment
 - Utilization Capacity
 - Expect that operating at capacity is associated with lower CR cost per treatment

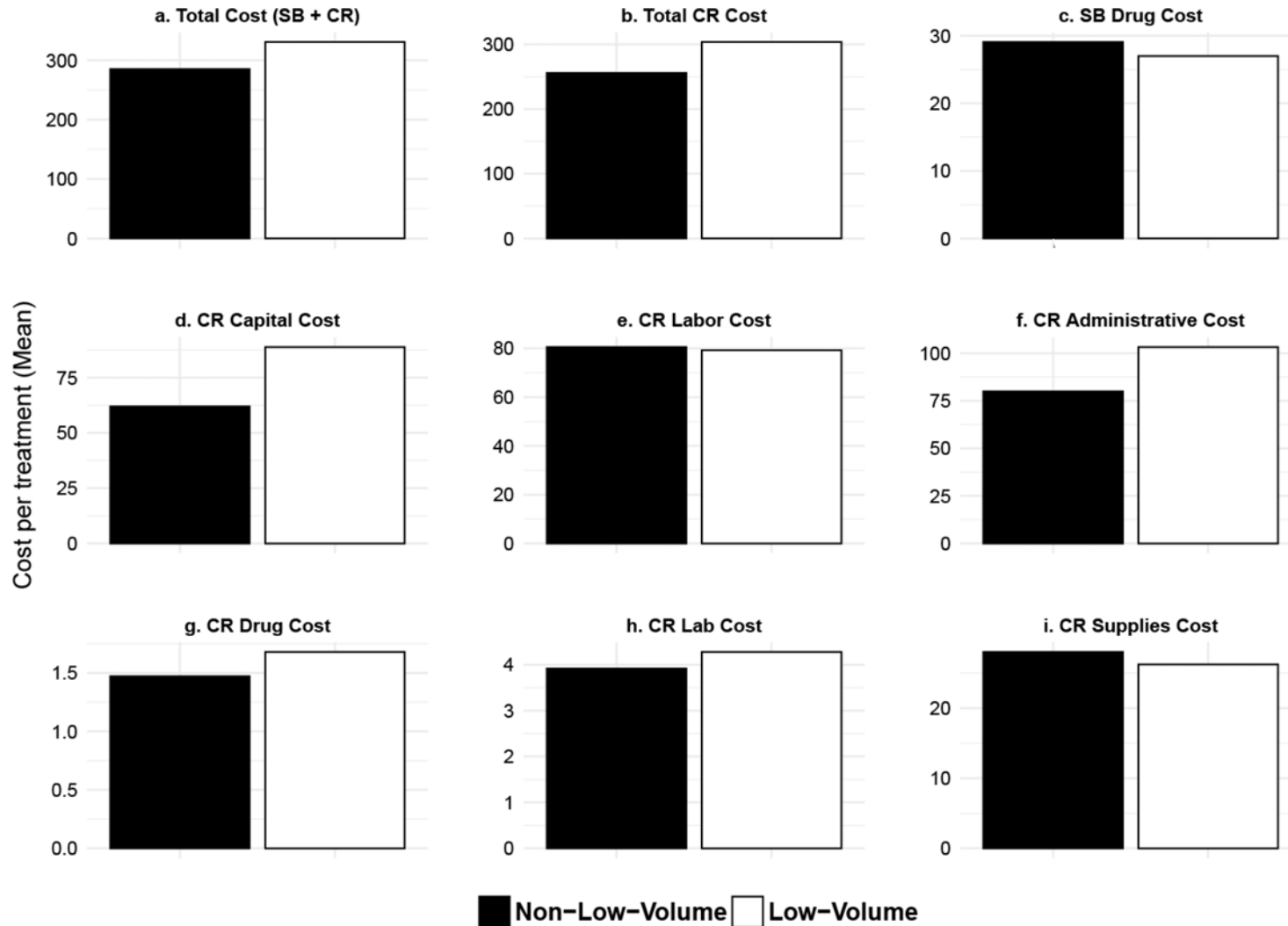
Cost Reports indicate Cost per Treatment is Negatively Associated with Scale



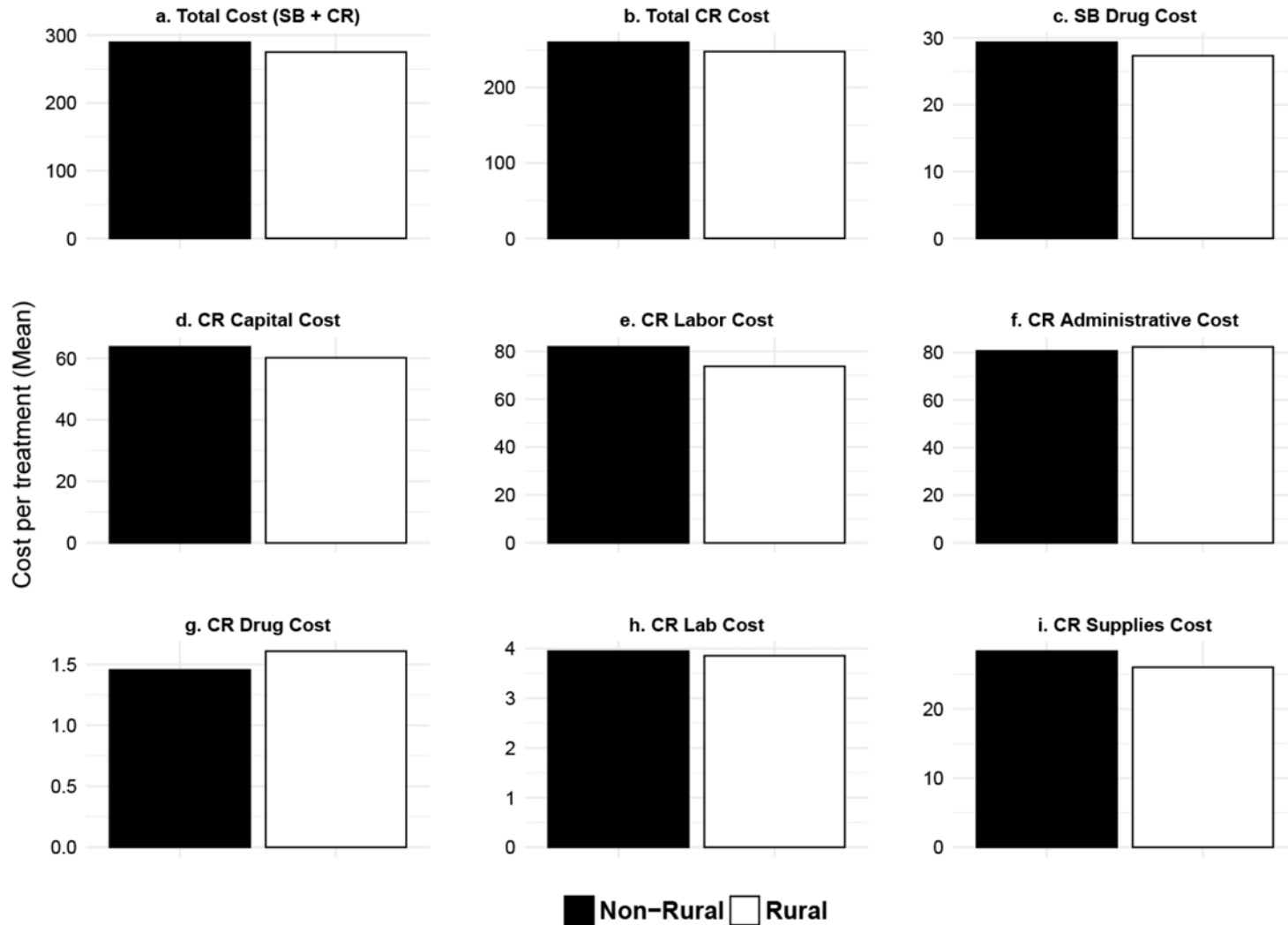
Existing Adjustments Focus on Treatment Count and Rural Status

- CMS adjusts the base rate by 23.9% to account for additional costs that low-volume facilities incur
- Facility must meet criteria:
 - Furnished less than 4,000 treatments in each of the three years before the payment year
 - Cannot have opened, closed, or received a new CCN due to a change in ownership during three-year period
 - Cannot be located within 5 mile radius of a facility with same ownership, otherwise treatment counts pooled
- CMS provides a 0.8% payment adjustment for ESRD facilities located in a rural CBSA
 - Stakeholders have suggested redundancies between rural adjustment and LVPA
- Does not consider utilization capacity

The LVPA Captures Differences in Administrative and Capital Costs Related to Treatment Count



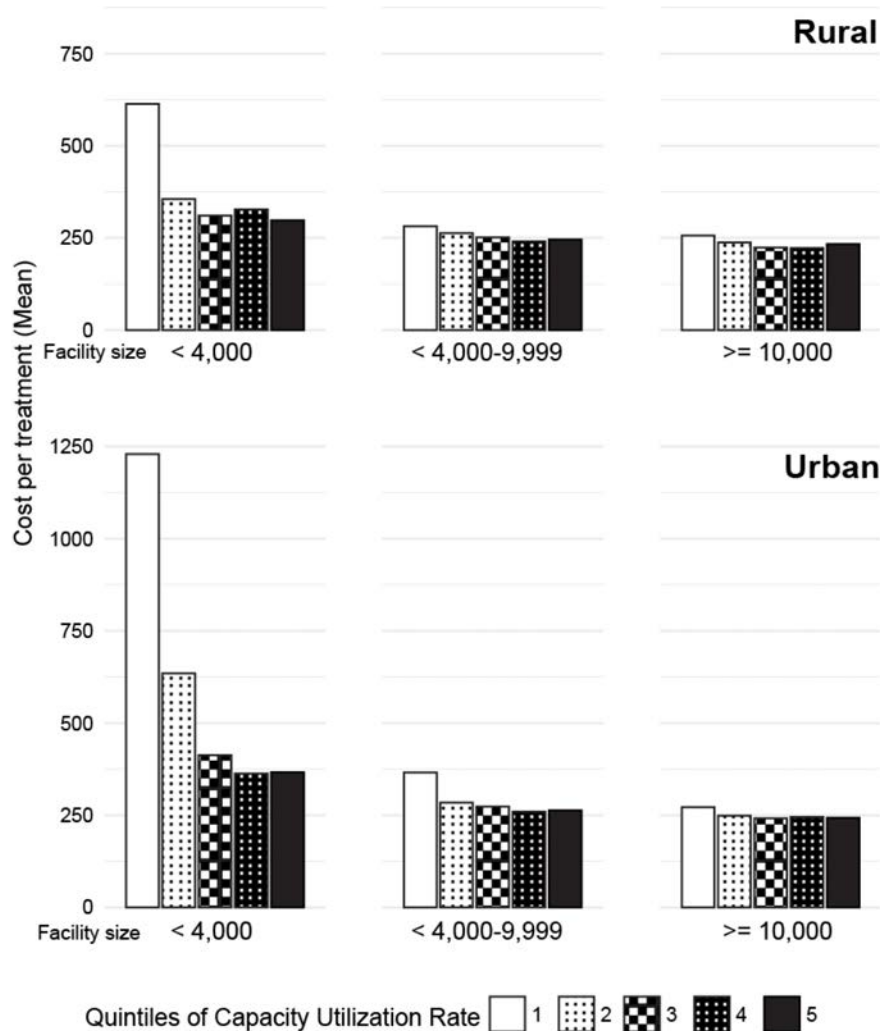
Evidence on Relationship Between Rural Adjustment and Cost per Treatment is Inconclusive



Capacity Utilization Rate Can be Defined from the Cost Report

- Capacity Utilization Numerator:
 - Count of non-training and non-home dialysis sessions during the cost report period
- Capacity Utilization Denominator:
 - Number of outpatient non-training stations * 2 shifts per day * number of days during cost report period (excluding Sunday)
- Key Questions:
 - Is this similar to how facilities define capacity?
 - Are there changes that could be made to cost reports to define capacity more accurately?

Capacity Utilization Captures Additional Cost Variation, After Accounting for Treatment Count



- Lowest quintile highly correlated with higher cost per treatment, especially among urban low volume facilities

Geographic Price Variation Drives Facility-Level CR Costs

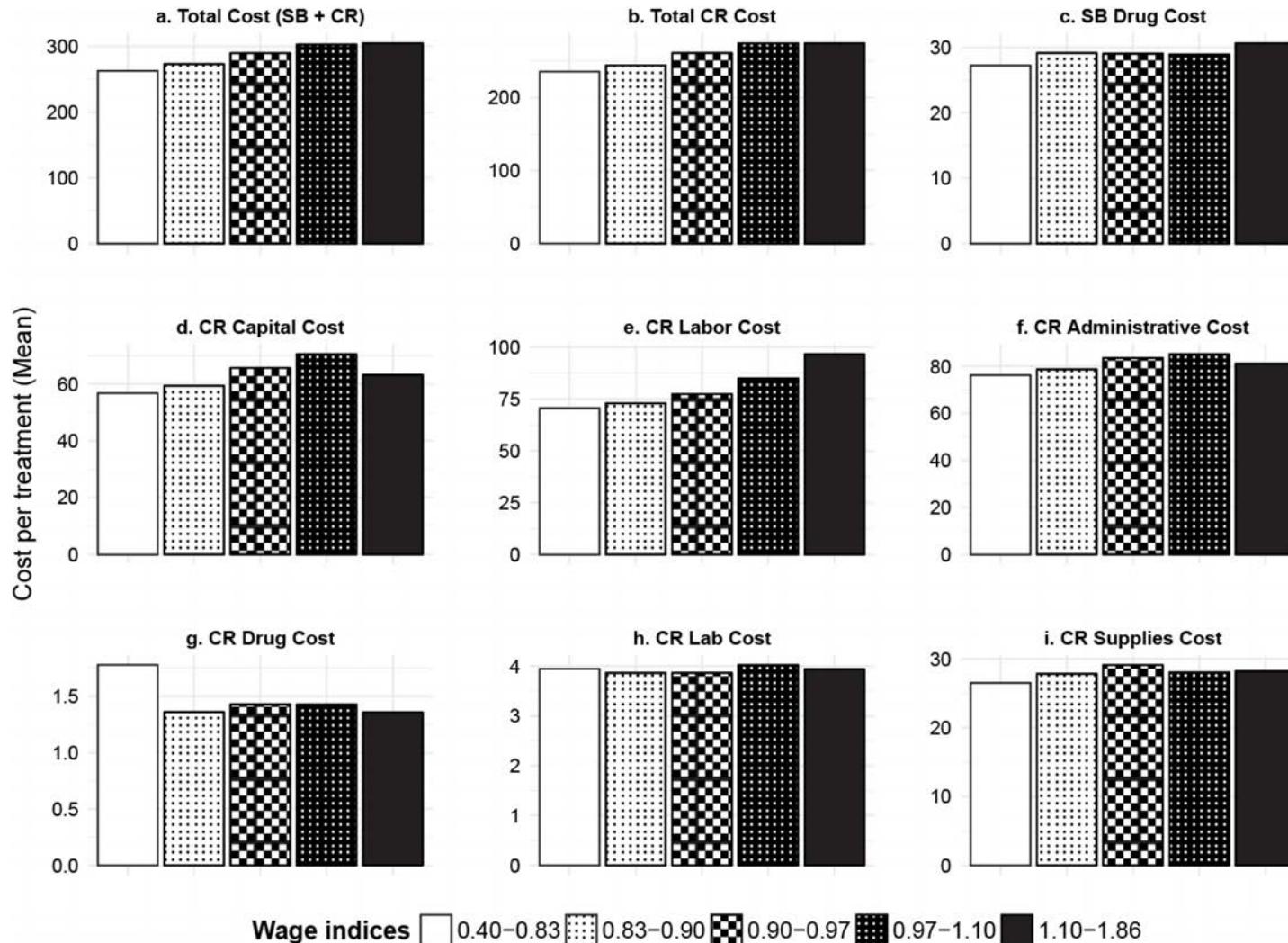
- Geographic price variation drives facility-level costs related to capital, administrative, and labor items and services

Capital	Administrative	Labor
<ul style="list-style-type: none"> • Building and fixtures insurance, rent, property taxes • Operations and maintenance of facility and equipment, including repairs and utilities • Housekeeping costs 	<ul style="list-style-type: none"> • Fiscal services • Legal services • Accounting • Recordkeeping • Malpractice costs (including premiums) • Services rendered by physicians • Laundry and linen 	<ul style="list-style-type: none"> • Salaries for direct patient care staff • Employee health and wellness benefits

The Wage Index Accounts for Geographic Price Differences

- The labor-related share of the ESRD PPS base rate adjusts for wage-level differences due to geographic location
 - Adjusts the base rate for differences in local wage prices using CBSAs
 - Adjusts self-dialysis training add-on payment amount for geographic differences
- The wage index is based on the Inpatient Prospective Payment System (IPPS)
 - Derived from wage and employment data from hospital cost reports (Form CMS 2552-10)
 - Unadjusted for occupational mix

The Accuracy of the Wage Index is Critical Given High Correlation with Treatment Cost



Stakeholders have Expressed Concerns with Existing Wage Index

- Hospital wage data inaccurately estimates dialysis facility wages
- ESRD facilities have a unique occupational mix that differs from hospitals and other healthcare facilities
 - Hospital cost reports only include wage and occupational mix data for select hospital settings and occupations
- Since most dialysis treatment takes places in freestanding facilities, wages for dialysis workers do not match wages for hospital workers

Annual Mean Wage	General Medical and Surgical Hospitals	Outpatient Care Centers
Licensed Vocational Nurses	\$44,150	\$48,120
Social Workers	\$61,280	\$57,730
Dieticians and Nutritionists	\$61,280	\$66,250

Source: BLS OES wage data (May 2017)

A Dialysis-Facility Specific Wage Index Could be Calculated with Additional Data

- To create a more accurate dialysis-specific wage index, data must be collected on
 - Wages for each occupation in each geographic area
 - Quantity of labor used by occupation in each geographic area
- The existing cost report does not adequately differentiate labor costs across categories
- Proposed changes to cost report labor categories would enable a more accurate calculation. For example:
 - Differentiate between administrative and managerial staff
 - Define new labor categories corresponding to current dialysis facility practice, including
 - Technical support staff such as equipment technician, security
 - Advanced practitioners such as NP, PA, CNS

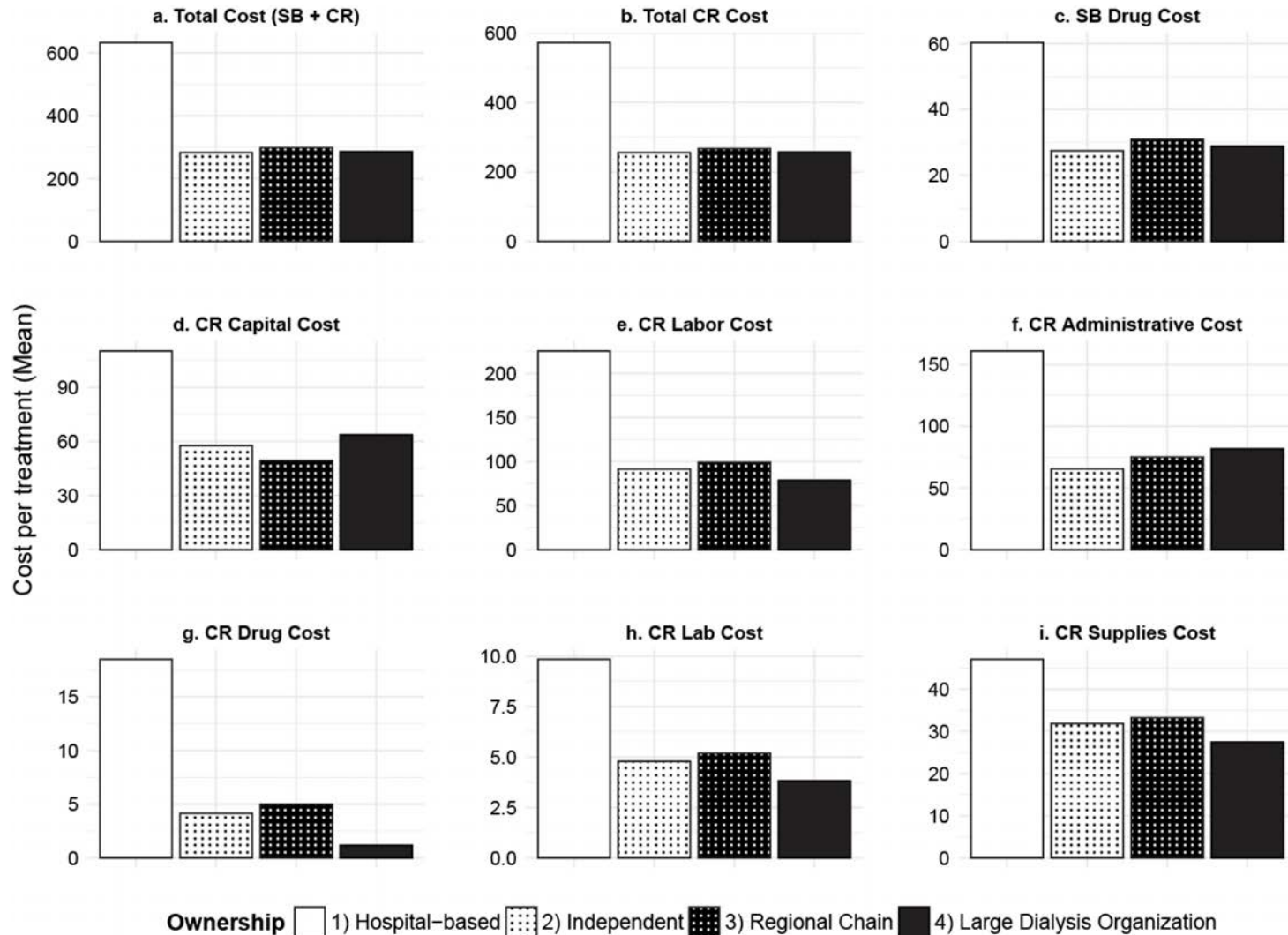
Key Considerations for Other Sources of Facility Variation

- Potential sources of additional variation:
 - Ownership type
 - Freestanding vs. hospital-based
 - Percentage of missed treatments
- Key Considerations:
 - Do these factors contribute significantly to facility-level costs?
 - Are these costs accurately reflected in the data?
 - Does additional data need to be collected to better capture cost differences?

Facility Survey Data from CROWNWeb Identifies Ownership Type

- LDOs include the three largest dialysis providers
 - Small chains acquired and subsequently owned by these companies are considered LDOs
- Regional chains indicate chain ownership that is not an LDO
- Independent facilities have no affiliation with an LDO or regional chain
- Unknown indicates that the chain name is missing
- Hospital-based facilities are those where the third and fourth digits of the CCN are between 25 and 29 but the facility is not an LDO or Regional Chain

Cost Reports Suggest Highest Costs Among Hospital-based Facilities Followed by Regional Chains



Freestanding and Hospital-based Facilities Use Different Cost Reports

Freestanding Facility

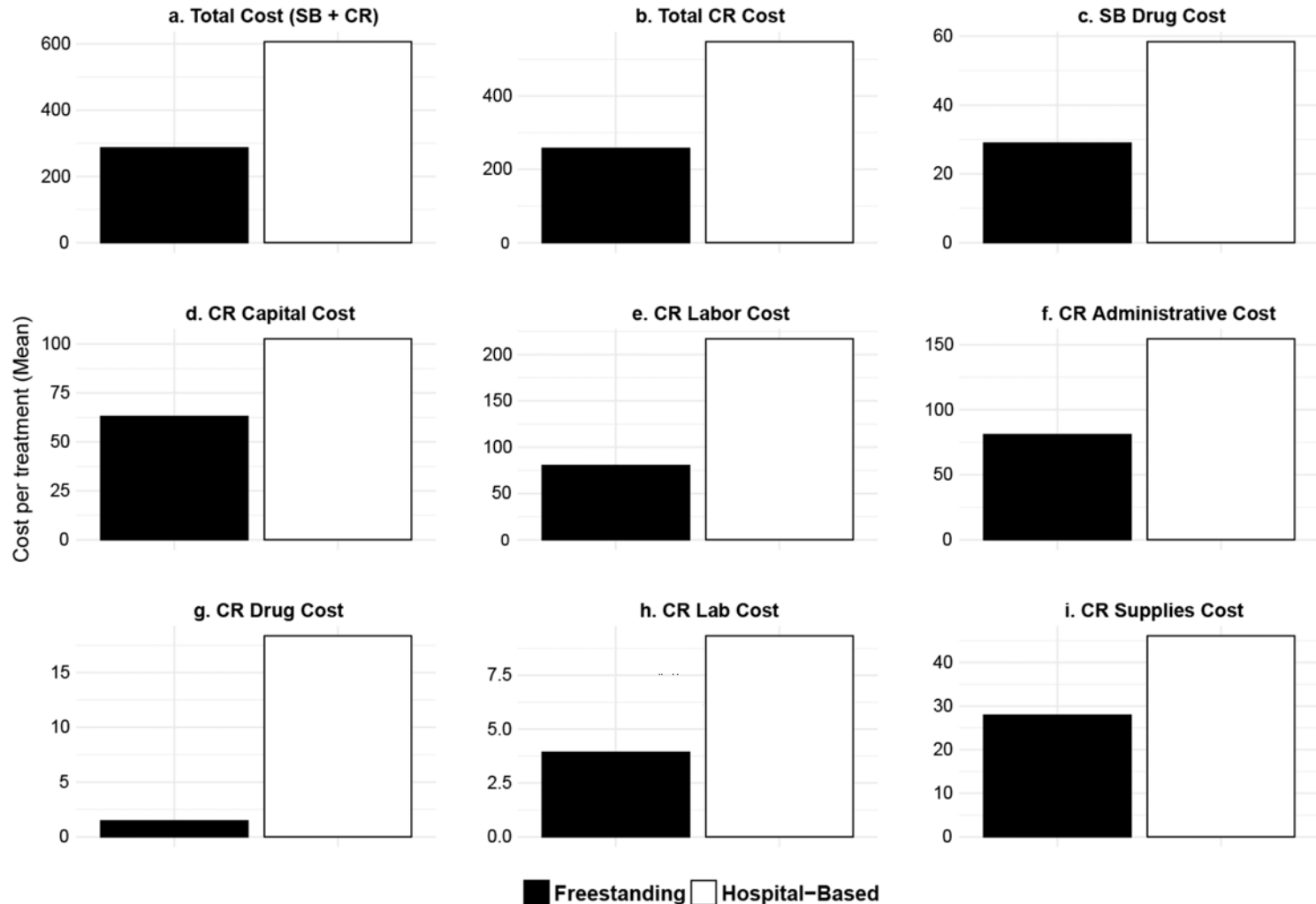
- Use CMS Form 265-11
- Allocation of component costs based on overall facility data
- In-facility, home dialysis and home training costs integrated into single worksheet by modality
- Pediatric dialysis costs identified on cost report
- Capital and administrative costs are dedicated to dialysis facility

Hospital-Based Facility

- Use CMS Form 2552-10
- Allocation of component costs derived separately from renal department and home program data
- Costs itemized in separate worksheets for in-facility versus home program dialysis
- Pediatric dialysis not separately itemized
- Capital and administrative costs not clearly delineated from inpatient dialysis and overall facility costs

- Are the two types of cost reports capturing the same information?
- In hospital-based cost reports, are CR costs sufficiently distinguished from the overall facility and inpatient dialysis costs?

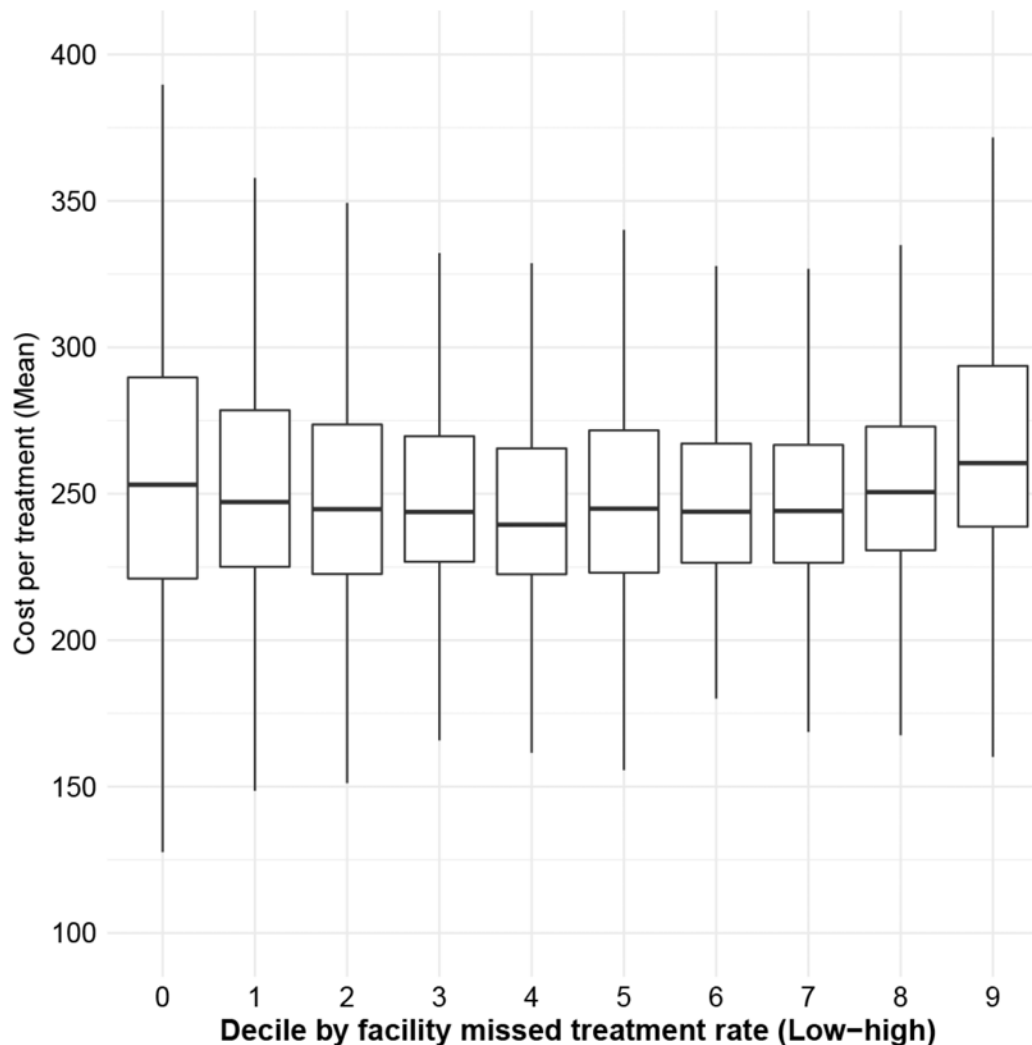
Cost Reports Suggest Hospital-based Facilities Have Significantly Higher Costs



Missed Treatment Rate Can Be Imputed using Claims Data

- Interview respondents suggested substantial costs associated with missed treatments
 - Unreimbursed chair time, unreimbursed labor time for set-up, potential need for another shift
- Missed treatments cannot be distributed at the patient level
- Construct a missed treatment metric to assess relationship with costs
 - Numerator: Number of times a gap greater than three days occurs between two successive hemodialysis sessions
 - Restricted to paid in-facility 72x claims with 0821 revenue center code
 - Denominator: Imputed number of hemodialysis sessions
 - Obtained by multiplying number of beneficiary weeks with at least one paid session by three
 - Note that this metric is a minimum estimate of missed treatments

The Highest Deciles of Missed Treatment Rate are Associated with Higher Cost per Treatment



Discussion Questions

- Do existing CR cost data reflect the expected patterns?
 - If not, what additional data could be collected through cost reports or other sources to better reflect reality?
- Do the facility adjusters in the existing model adequately capture drivers of facility-costs?
 - If not, what costs are not reflected?
 - How can un-reflected costs be adequately reported?
- Do pediatric units incur important costs that do not vary at the patient-level as described in Sessions 3 and 4?
 - If yes, how can these costs be reported in claims and/or Cost Reports?

Discussion Questions

- Do home dialysis units incur important costs that do not vary at the patient-level as described in Sessions 3 and 4?
 - If yes, how can these costs be reported in claims and/or Cost Reports?
- Which CR cost components likely vary with each facility cost driver?
- To what extent are these CR costs outside the facility's control?
- Are there any potential issues with reporting missed treatments on claims and/or cost reports?

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Session 6 Outline

Session Objective

- Discuss the identification and reporting of patient-level variables to facilitate analyses for potential inclusion in a revised case-mix adjustment model

Session Topics

- Distinguish this Session's focus on patient-level explanatory variables for the case-mix model from the direct reporting of patient- and facility-level costs discussed in Sessions 3-5
- Identify patient-level characteristics that could lead to higher CR and/or FSB costs
- Describe existing data sources for these patient characteristics and assess whether any new data collection is necessary

Session Time

- 45 minutes

Session 6 Focuses on Patient Factors That Are Potential Case Mix Adjusters

- Case mix adjustment model analyzes the relationship between costs and a series of patient/facility characteristics that affect those costs and hence should affect payment
- Two sides to a case mix adjustment model equation
 - *Left-hand side*: The cost of CR and SB items and services
 - *Right-hand side*: The patient- and facility-level case mix adjusters
- Sessions 3-5 examine improvements to the reporting of patient- and facility-level treatment costs (i.e. left-hand side)
- Session 6 focuses on the collection of patient characteristics that could be associated with variation in treatment costs (i.e. right-hand side)

Revisions to Case-Mix Model Require Accurate Data on Patient Characteristics

- Future analyses will identify patient characteristics associated with empirically and clinically relevant variation in total treatment costs
 - Characteristics must be outside the influence of facilities' patient care, to ensure incentives for high quality care
 - Adjusting for these characteristics aims to ensure beneficiaries' access to care
 - Such characteristics may enter the payment model
- Inaccurate data on patient characteristics would lead to payment variation inconsistent with true cost variation
- Today's discussion focuses on identifying data on patient characteristics that are adequate to support research

Expert Input Has Identified Initial Set of Patient Characteristics for Discussion

- Input acquired through pre-TEP interviews, reviews of stakeholder comments and CMS responses during rulemaking, and discussions with internal nephrology team
- Patient characteristics for consideration fall into four broad categories:
 - *Demographic factors*: Age, gender
 - *Environmental factors*: Institutional status, socioeconomic status
 - *Comorbidities*: Hereditary hemolytic or sickle cell anemia, myelodysplastic syndromes, pericarditis, gastrointestinal tract bleeding, cancer, HIV, chronic HBV, dementia, psychiatric conditions
 - *Other clinical factors*: BMI, BSA, ambulatory status, dialysis onset, morbid obesity, substance abuse

Many Patient-Level Characteristics Can Be Identified in Existing Medicare Data

Demographic Factors	
<ul style="list-style-type: none">• Age• Race/Ethnicity	<ul style="list-style-type: none">• Gender
Environmental Factors	
<ul style="list-style-type: none">• Institutionalized Status	<ul style="list-style-type: none">• Socioeconomic Status
Comorbidities	
<ul style="list-style-type: none">• Chronic Comorbidities	<ul style="list-style-type: none">• Acute Comorbidities
Other Clinical Factors	
<ul style="list-style-type: none">• Body Mass Index (BMI)• Body Surface Area (BSA)• Dialysis Onset• Catheterization	<ul style="list-style-type: none">• Ambulatory Status• Morbid Obesity• Substance Abuse

Bolded Characteristics are Payment Adjusters in the Current ESRD PPS

Demographic Factors	
• Age	• Gender
• Race/Ethnicity	
Environmental Factors	
• Institutionalized Status	• Socioeconomic Status
Comorbidities	
• Chronic Comorbidities	• Acute Comorbidities
Other Clinical Factors	
• Body Mass Index (BMI)	• Ambulatory Status
• Body Surface Area (BSA)	• Morbid Obesity
• Dialysis Onset	• Substance Abuse
• Catheterization	

- ESRD PPS adjusts for two chronic comorbidities (Hereditary hemolytic or sickle cell anemia, myelodysplastic syndromes) and two acute comorbidities (pericarditis, gastrointestinal tract bleeding)

Other Comorbidities Can Be Identified from Diagnoses in Medicare Claims

- Diagnoses from Inpatient, Outpatient, and Carrier claims in a patient's history can be used to identify comorbidities and other clinical factors listed above
- ESRD Hierarchical Condition Category (HCC) model provides a convenient grouping of these diagnoses to capture each characteristic of interest
 - Cancer
 - HIV
 - Dementia
 - Major depressive, bipolar, and paranoid disorders
 - Chronic HBV
 - Substance abuse (including alcohol dependence)
 - Morbid obesity

Other Patient Characteristics Can Be Identified from Existing Data Sources

- Demographic factors:
 - Gender is reported in the Medicare Enrollment Database (EDB)
- Environmental factors:
 - Institutional status can be identified using MDS assessments
 - Dual eligibility from the Common Medicare Environment (CME) can proxy for socioeconomic status
- Other clinical factors
 - Ambulatory status can be obtained using DME claims for wheelchairs and other devices, as well as HCCs for quadriplegia and paraplegia
 - Morbid obesity can be derived using BMI information
 - Catheterization can be identified from 72x claim access type modifiers

Discussion Questions

- Are the patient characteristics discussed in Session 6 likely to affect total treatment costs?
 - Can comorbidities for ESRD beneficiaries be adequately identified from other claim settings?
 - Are the HCCs useful groupings of these comorbidities?
 - What are important considerations to adequately investigate variation in treatment costs by patient characteristics when using data sources other than 72x claims?
 - Is new data collection necessary for any of these characteristics?
- Are there patient characteristics not discussed in Session 6 that should be identified for data analysis?
 - Can these characteristics be captured through existing data?
 - If not, how can these characteristics be best reported to facilitate future analysis?

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Session 7 Outline

Session Objective

- Allow TEP participants and observers to discuss the day's topics and provide additional insight

Session Topics

- Concluding comments
- Open discussion

Session Time

- 30 minutes

Thank You

