Background

- In 2011, CMS implemented the ESRD prospective payment system (PPS, or "the bundle"), creating a single comprehensive payment for dialysis services, including injectable drugs, which were previously separately billable.
- It is unknown how the change in reimbursement for thrombolytic agents has affected the care of dialysis patients.
- We investigated the effect of the PPS on access management in chronic hemodialysis (HD) patients using a sunfused catheter.

Methods

- **Study design:** Retrospective quarterly period prevalent cohorts
- **Data source:** US Renal Data System (USRDS), 2006 to 2015
- **Index date:** First quarter of year (for those already using a catheter) or the first quarter of HD with a catheter in a quarter
- **Inclusion criteria:**
  - ESRD patient on chronic HD using a catheter
  - Covered by Medicare Parts A&B for 3 months prior to index date (or since ESRD date for incident ESRD patient)
- **Exclusion criteria:**
  - Less than 18 years old on index date
  - Previous kidney transplant
  - Follow-up: Until earliest of: kidney transplant, access/mobility change, loss of Medicare coverage, death, or end of quarter

Outcomes

- **Claims for Thrombolytic use, mechanical clot removal, and catheter replacement:** identified using HCPCS-10 and ICD codes
- **Missed/delayed HD sessions:** among patients on thrice-weekly HD
- **Coadjutant conditions:** identified from ESRD Medical Evidence Report and ICD-9-CM codes on claims in 3 months prior to index date.

- **Statistical analysis:**
  - Poisson regression used to estimate quarterly rates
  - Logistic regression used to examine association of location of thrombolytic use with missed/delayed HD and catheter replacement.
  - Logistic regression used to examine association of thrombolytic use with patient characteristics to account for shifts in patient case mix over time.

- All subsequent models adjust for patient characteristics to account for shifts in patient case mix over time.

- **Results:** Our analysis includes 31 quarterly cohorts of HD patients using a catheter as the vascular access.
- On average, there were 69,428 patients per quarter.
- Patient characteristics are summarized below (data is shown generally similar across the quarterly cohorts.

- **Conclusion:**

  - thrombolytic use outside (vs within) the HD unit was associated with:
    - Missed/delayed HD sessions
    - Catheter replacement (but only in the pre-PPS period)
  - It remains unclear whether these associations are explained by delays in care or with the HD patient. The pattern of miss/delayed HD sessions associated with thrombolytic use and mechanical clot retention have risen.
  - Future work should examine incident rates of missed/delayed HD and whether the trend rising trend continued beyond 2015.

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**Figures 1a-e:** Quarterly event rates and 95% confidence intervals (CI), per 100 patients per year, standardized for age, gender, race, dual eligibility, primary cause of ESRD, ESRD vintage, and Liu comorbidity index (using Q1-2011 as the reference).

**Table 1:** Location of thrombolytic use across the quarterly cohorts.

**Table 2:** Odds ratios (OR) and 95% confidence intervals (CI) for the association of location of first thrombolytic use with (a) missed/delayed HD and (b) catheter replacement.

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**Conclusion**

- Thrombolytic use outside (vs within) the HD unit was associated with:
  - Missed/delayed HD sessions
  - Catheter replacement (but only in the pre-PPS period)
- It remains unclear whether these associations are explained by delays in care or with the HD patient. Future work should examine incident rates of missed/delayed HD sessions and mechanical clot retention have risen.
- The trend rising trend continued beyond 2015.