

CHOOSING SURGERY: SHARED DECISION MAKING WITHIN THE HIGH VALUE HEALTHCARE COLLABORATIVE (HVHC)

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SHARED DECISION MAKING

- SDM has been demonstrated to help patients make collaborative, informed treatment decisions aligned with their personal values (Elwyn 2012)
- Decision Aids (DAs): tools to facilitate conversations about treatment tradeoffs with clinicians



SDM FOR HIP AND KNEE OSTEOARTHRITIS

1. Important trade-offs associated with pursuing surgery vs. medical management (Hamel 2008)
2. Hip and knee osteoarthritis are highly prevalent (~30 million Americans)
3. Medicare spent \$7 billion on arthroplasties in 2014 (Bert 2017)



SDM AND SURGICAL CHOICE

- Exposure to DAs as part of SDM is associated with patients choosing more conservative treatment modalities (on average) across a range of preference-sensitive conditions
 - Much of this data drawn from single sites or RCTs (Arterburn 2012; Veroff 2013)
 - Research gap: Association between DAs in *routine* clinical practice and patient treatment choices

THE HIGH VALUE HEALTHCARE COLLABORATIVE



10 health systems collectively pursuing a range of quality improvement initiatives and sharing data in an effort to foster the adoption of evidence-based best practices

SHARED DECISION MAKING WITHIN HVHC

- HVHC implemented SDM into routine clinical practice in 2012 as part of a Centers for Medicare and Medicaid Innovation (CMMI) grant (Weeks 2016)
- Health Dialog DAs for hip and knee osteoarthritis patients – viewed in-office or at home
- Project Aims:
 - Improve health status;
 - Increase number of patients engaged in SDM;
 - Reduce total costs of care across member sites

RESEARCH QUESTION

- **Are hip and knee osteoarthritis patients exposed to SDM within HVHC less likely to receive surgery (arthroplasty) compared with a propensity-score matched control group of hip and knee patients drawn from the same systems?**
 - Outcome: Arthroplasty (dichotomous)
 - Primary Independent Variable: Exposure to SDM via DAs (dichotomous)
 - Covariates: age, sex, race, marital status, co-morbidity (depression, diabetes, congestive heart failure), health insurance payer

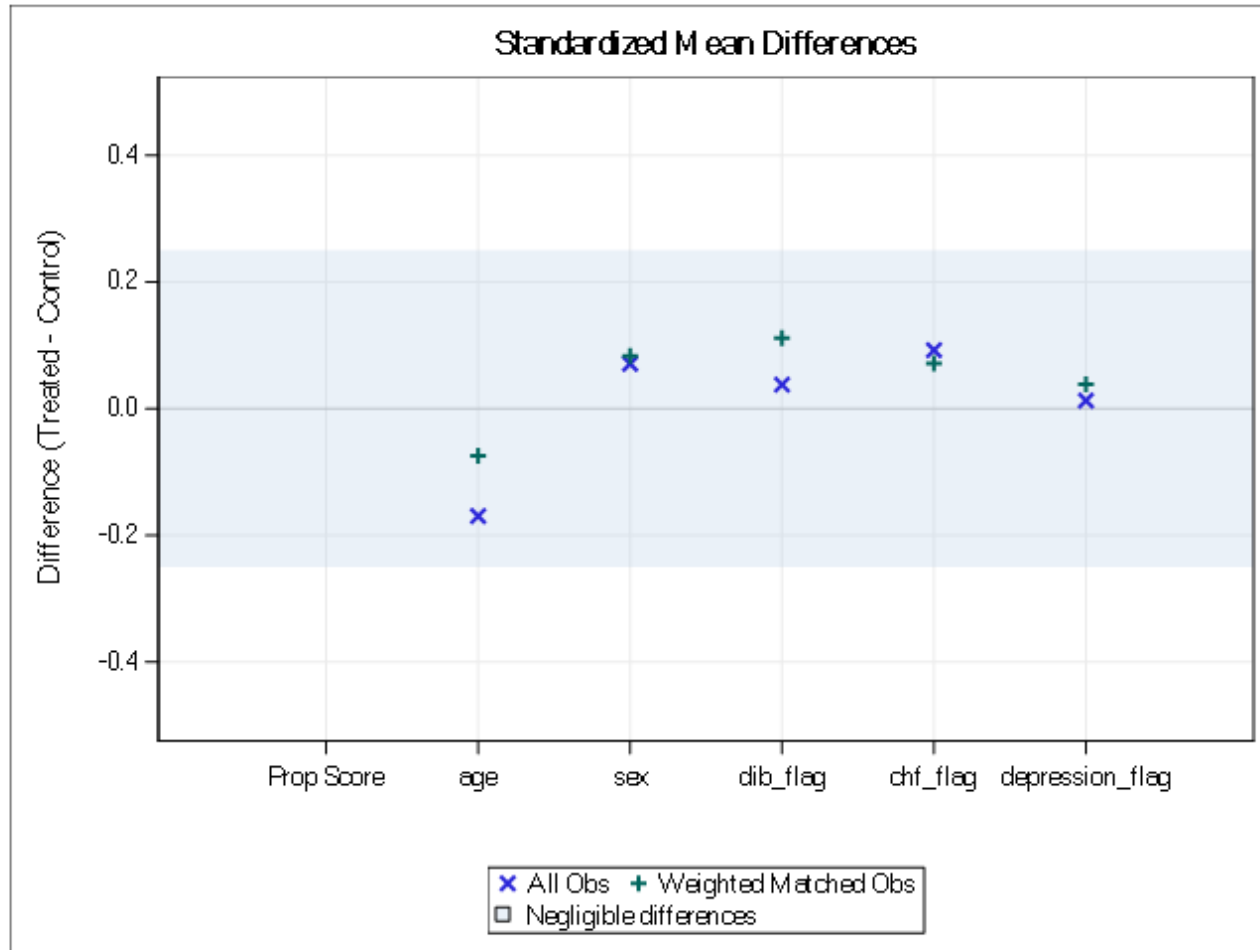
DATA SOURCES

- Clinical and administrative data drawn from HVHC systems between the dates of the CMMI grant (July 2012 – June 2015)
- Study population: Hip and knee OA patients 18 years and older with ICD-9 diagnoses who completed pre- and post-DA surveys (n = 1,670)
- Control population: Hip and knee OA patients 18 years and older with orthopedic consultations within HVHC systems during the CMMI grant period (n = 4,108)

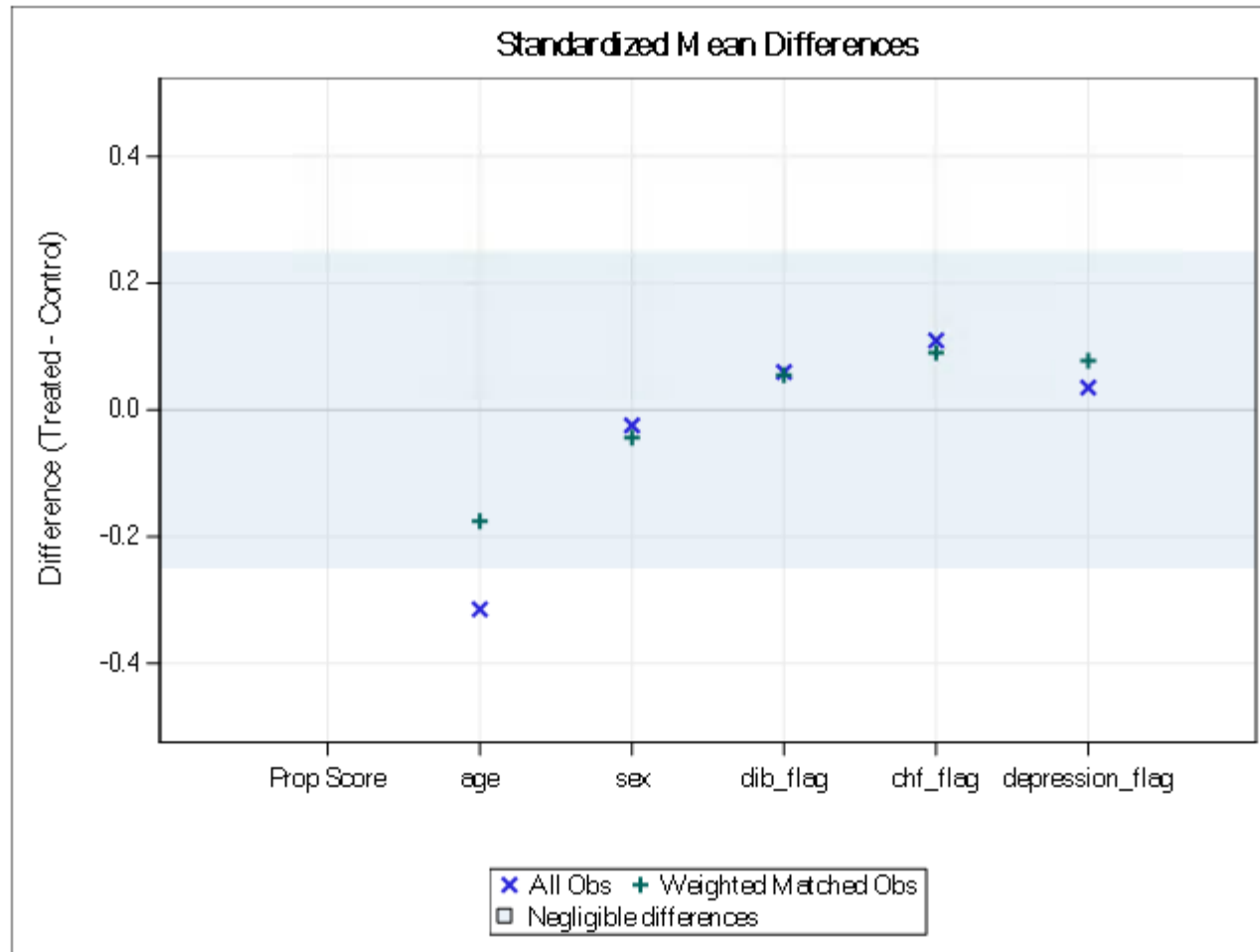
METHODS: PROPENSITY SCORE MATCHING

- Matched patients first by health system
 - Stratified control patients by appointment date & matched to study patients with post-DA survey completion dates within corresponding 6 month timeframe
 - Optimal variable propensity score matching: age, sex, comorbidity (diagnoses of CHF, depression, diabetes)
- Multivariate logistic regression
 - System level fixed effects (patient clustering within systems)

STANDARDIZED MEAN DIFFERENCES: HVHC KNEE COHORT



STANDARDIZED MEAN DIFFERENCES: HVHC HIP COHORT



RESULTS

- Knee and hip patients exposed to SDM had higher odds of undergoing arthroplasty compared with unexposed patients (OR = 1.24 and OR = 2.59, respectively; $p < 0.001$ for both)
- African American and Hispanic patients had lower odds of having arthroplasty compared with white patients in both hip and knee cohorts
- Knee and hip patients with depression had higher odds of arthroplasty (OR = 1.59, $p < 0.001$ and OR = 1.28, $p > 0.05$, respectively)

ADJUSTED RESULTS: SDM INTERVENTION VS. CONTROL

| | Surgical Intervention - Hip | Surgical Intervention - Knee |
|--|-----------------------------|------------------------------|
| SDM Intervention vs. Comparison | 2.59*** | 1.77*** |
| Age | 1.01 | 1.03*** |
| Female | 0.97 | 0.99 |
| Co-Morbidities | | |
| Congestive Heart Failure | 0.74 | 0.84 |
| Depression | 1.28 | 1.54*** |
| Diabetes | 0.70 | 0.84* |
| Race | | |
| White (reference) | | |
| Hispanic | 0.26*** | 0.60** |
| Black/African American | 0.40** | 0.48*** |
| Non-white/Other | 0.59** | 0.85 |
| Married/Life Partner | 1.26 | 1.46*** |
| Payer | | |
| Commercial/Private (reference) | | |
| Medicare | 0.77 | 0.66** |
| Medicaid | 0.81 | 0.66* |
| Medicare/Medicaid | 0.70 | 0.61 |
| Other | 2.45*** | 1.30* |
| Intercept | 0.29*** | 0.05*** |
| AIC | 4530.7 | 1971.4 |

*p<0.10,
**p<0.05,
***p<0.01

SENSITIVITY ANALYSIS

- Propensity score weighting (vs. matching)
- Optimal variable propensity score matching produced better adjusted model fit (as measured by AIC)
- Overall findings are consistent across techniques suggesting robustness to alternative specifications

LIMITATIONS

- HVHC membership not random – limits generalizability
- Heterogeneous implementation – 1. method of DA engagement (iPad, video, internet) and 2. timing relative to appointment with orthopedist (before/after); lack of documentation
- Missing data precluded calculation of Charlson Scores
- Matching doesn't account for unobserved/unmeasured differences – but we achieve good balance after PSM (all post-matching standardized mean differences < 0.25 across variables in final model) (Rubin 2001)

DISCUSSION

- Findings differ across this pragmatic implementation vs. idealized implementation in many RCTs
 - Protocol support/adherence vs. influence of culture and capacity
- Need for more “real-world” implementation of SDM
 - Track and understand influence of implementation heterogeneity
 - Attention to sustained implementation and long-term patient-reported outcomes

CONCLUSIONS

- Health care administrators (and payers) should not necessarily expect reduced surgical utilization when DAs for hip and knee osteoarthritis are routinely implemented in health care systems
- Future pragmatic SDM studies would benefit from documentation of implementation variables
 - Leadership support, capacity, feedback loops
 - Downstream vs. upstream implementation

RESEARCH IN PROGRESS

- Concordance between expressed treatment preference and treatment received among patients in our intervention sample
 - Preliminary findings suggest strong concordance between post-DA treatment choice and treatment received
 - 90% of hip and knee patients with **stable non-surgical** preferences did not receive surgery
 - 55% of knee patients and 65% of hip patients with **stable surgical** preferences actually received surgery

Better concordance when preference is for medical management....why?

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Sensitivity Analysis

| | Surgical Intervention- Hip (n=50,040) | | Surgical Intervention- Knee (n=153,455) | |
|--|--|----------|--|----------|
| | Model 1 | Model 2 | Model 1 | Model 2 |
| SDM Intervention vs. Comparison | 3.14*** | 2.86*** | 1.26*** | 1.68*** |
| Age | 1.00*** | 1.00*** | 1.02*** | 1.02*** |
| Female | 0.65*** | 0.65*** | 0.83*** | 1.01 |
| Co-Morbidities | | | | |
| Congestive Heart Failure | 0.80*** | 0.77*** | 0.88*** | 0.61*** |
| Depression | 2.40*** | 2.36*** | 2.00*** | 1.58*** |
| Diabetes | 0.80*** | 0.80*** | 0.87*** | 1.00 |
| Race | | | | |
| White (reference) | | | | |
| Hispanic | | 0.36*** | | 0.44*** |
| Black/African American | | 0.40*** | | 0.40*** |
| Non-white/Other | | 0.54*** | | 0.80*** |
| Married/Life Partner | | 1.00 | | 1.65*** |
| Payer | | | | |
| Commercial/Private (reference) | | | | |
| Medicare | | 1.13*** | | 0.92*** |
| Medicaid | | 0.64*** | | 0.68*** |
| Medicare/Medicaid | | 0.65*** | | 1.16 |
| Other | | 0.80*** | | 1.35*** |
| Intercept | 0.57*** | 0.94 | 0.11*** | 0.09*** |
| AIC | 120365.6 | 118749.7 | 330025.8 | 155710.9 |