Analyzing Data for Specialty Conditions Such as Hepatitis-C

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Background

- Many researchers believe a large N is needed to detect differences in health and absence outcomes in health economics studies. Specialty pharmacy conditions, such as Hepatitis-C (HCV), often have smaller populations available.
- Increasing the types of information captured, measured, and then modeled for each study participant (e.g., patient salary and work-related factors) enable researchers to build more precise models with higher powered results at smaller sample sizes.
- Power can be increased further by using models that better estimate the true distribution of costs and utilization (i.e., skewed and zero-value), such as two-stage regression methods, and identification of optimal error distributions.

Study Population

- US employees in the Workpartners Research Reference Database (RRDb) from 2001 to present.
- Workpartners RRDb contains:
  - Medical and pharmaceutical claims for over 3.9 million employees (and 2.0 million spouses and dependents) from multiple US private sector employers in the medical, retail, service, manufacturing, transportation, energy, technology, financial, and utility industries.
  - Enhanced employee demographics (including self-reported race).
  - Job-related employee information (salary, job type, full- / part-time status, exempt / non-exempt status).
  - Employees in all states.
  - Payments made, and time lost, due to:
    - Sick Leave (SL).
    - Short- and Long-term Disability (STD and LTD, respectively) for non-work-related injuries / illnesses.
    - Workers' Compensation (WC) for work-related injuries / illnesses.
  - Claims with absence durations and payments for employee populations eligible for STD=1.3 million, LTD=1.2 million, WC=2.8 million, SL=747,000.
- The Workpartners RRDb has been used for research in specialty pharmacy-managed conditions such as hepatitis-C,[2,3] rheumatoid arthritis,[4,5] acromegaly,[6,7] multiple sclerosis,[8-10] and various other conditions.[11]

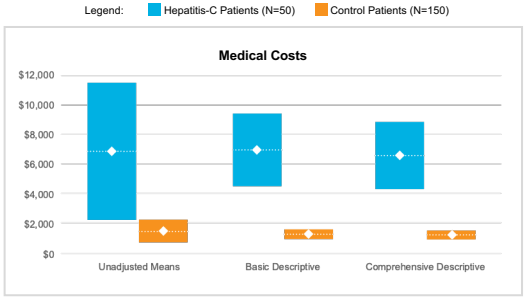
Methods

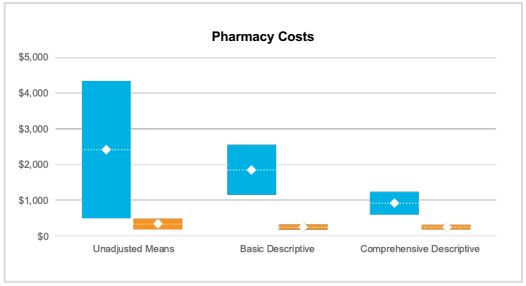
- Retrospective analysis of US employees with Hepatitis-C and controls (non-HCV Employees) from the Workpartners RRDb (2001 – 2013).
- Random sampling of HCV employee patients and 3X employee controls.
- All subjects had ≥ 1-year continuous eligibility.
- Cost data were adjusted to September 2013.
- The analysis compared three measures:
  - Unadjusted means (*t*-tests).
  - Two stage (logistic followed by generalized linear models) stepwise regression controlling for:
    - Basic descriptive regressors (age, gender, region, Charlson Comorbidity Index [CCI] scores[12]).
    - Comprehensive descriptive regressors (basic descriptive metrics plus self-reported race, job-related data [salary, full- / part-time status, exempt / non-exempt status]).

Methods (continued)

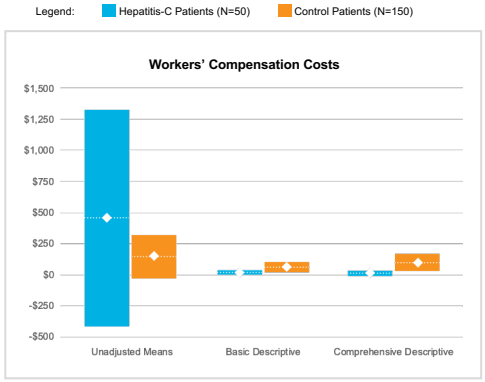
- Outcomes included:
  - Direct (medical, prescription) costs.
  - Indirect absence costs (from payroll records) due to SL, STD, LTD, WC.
  - Lost time (from employer records) due to SL, STD, LTD, WC.
  - All employees' absences were aggregated based on the initiation year.
- Means, standard errors (SEs), and confidence intervals [CIs] were compared using sensitivity analysis to identify sample sizes needed between the three methods.

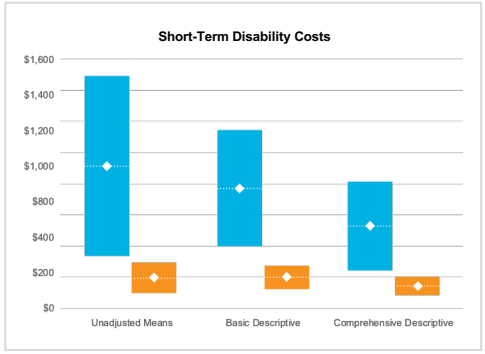
Results





Results (continued)





Conclusions

- Comprehensive descriptive information used in regression models consistently outperformed basic descriptive regression models and non-adjusted methods.
- While larger sample sizes are desirable, results are achievable with smaller sample sizes using comprehensive descriptive data and two stage regression techniques.
- Two stage regression techniques better controlled for outliers and had a 50x reduction in standard errors.

Implications for Policy or Practice

- Databases, such as the Workpartners RRDb, with comprehensive descriptive information can yield significantly more precise results compared to databases that have limited descriptive information.
- Selection of data for real world research programs should be based on sample size, methodology, and components.

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