Cost-effectiveness of Buprenorphine Medication Assisted Therapy among Opioid-Dependent Patients: Results from a Retrospective Analysis of Health Plan Membership Claims Data

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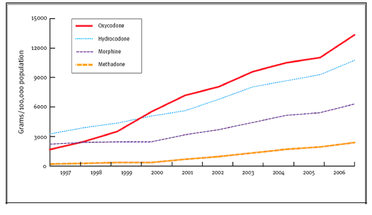
Background

- There has been a steady increase in both the number of people who abuse and become dependent upon opioids - though not causally related, the amount of prescription opioids sold in the U.S., per capita, has increased many fold over the past 10 years (US DEA)



- Opioid dependence imposes a significant economic burden on society—substantial costs arise from:
  - -increased health services utilization
  - -neglect of personal responsibilities
  - -greater criminal activity, justice and corrections
  - -other welfare expenditures (Doran, 2008)
- Treatment options include psychotherapy, drug counseling, abstinence treatment, and replacement therapy
- The most commonly used medications in opioid replacement therapy are methadone and buprenorphine
  - -methadone is a long-acting, full opioid agonist, that has abuse and diversion potential (Drake et al., 2002)
  - -buprenorphine is a newer form of replacement therapy designed to minimize abuse and diversion while retaining all positive aspects of methadone treatment
- Buprenorphine treatment is likely cost-beneficial to payers (Kaur, 2008), but whether it is more cost-effective than alternative treatments, remains in question
- The objective of this study is to compare the health services utilization and costs of opioid dependent patients' treated with and without buprenorphine
- It is hypothesized that treating opioid dependence with buprenorphine will be lead to higher pharmacy and physician utilization, yet lower use of expensive health services, resulting in a net economic benefit to the payer

Methods

Sample

- N = 7,065 United Health Group HMO members with integrated pharmacy and medical claims data were accessed for this study
- Inclusion criteria included

  -16+ years of age
  -continuously eligible in 2007
  -one claim with a diagnosis of opioid dependence using relevant ICD-9-CM codes(International Classification of Diseases, 9th Revision, Clinical Modification)
- Patients were categorized into 2 groups

  -Buprenorphine group (n=2,026): must have filled at least one prescription for buprenorphine (Suboxone® or Subutex®) during the study period

  -Non-buprenorphine group (n=5,039): the remaining, non-buprenorphine cohort, which included individuals diagnosed with opioid dependence, but were either untreated or treated with another modality

Measures

- Four health services utilization measures:

  1. number of prescription fills
  2. number of inpatient hospital days
  3. number of emergency department visits
  4. number of physician and outpatient visits
- Five health services costs variables:

  1. prescription costs
  2. inpatient hospital costs
  3. emergency department costs
  4. physician and outpatient costs
  5. total healthcare costs

Data Analysis

- Descriptive and bivariate analyses, and ordinary least squares multivariate models of the nine dependent variables were estimated
- To remove the influence of cost-sharing, allowed amounts were used for medical cost measures, and pharmacy costs were gross
- No outliers were trimmed from the dataset, and claim reversals were retained
- Finally, in addition to the main between groups variable, buprenorphine treatment group, all regression models included the same vector of covariates:

-age
-gender
-geographic region indicators
-medicaid enrollment flag
-health status as measured by the weighted Charlson Comorbidity Index (Charlson, et al., 1987)

Buprenorphine—Suboxone

- Intoxication from opioids results when the opioid (heroin, prescription analgesics, etc.) binds to the mu receptors in the brain, producing euphoria

- When Suboxone is taken, it binds to the same mu receptors, but produces a mild euphoria, while simultaneously preventing other opioids from binding

Results

Demographics

- Buprenorphine vs. non-buprenorphine on demographics:
- 63% vs. 50% male
- 37 years vs. 40 years of age
- 5% vs. 10% Medicaid Beneficiaries (p's < .01)
- Patients receiving buprenorphine were in better physical health as measured by the Charlson Comorbidity Index (0.48 vs. 0.74, p < .001)

Bivariate Analyses

- An average patient treated with buprenorphine filled 7.63 buprenorphine prescriptions in 2007, covering 162 days of therapy at a gross cost of $2,065 (i.e., $12.75 per day of supply)
- The buprenorphine group had significantly lower emergency department visits and inpatient hospital days (p's < .01; Figure 1)
- The buprenorphine group had higher pharmacy costs, but lower emergency department costs and lower inpatient hospital costs (p's < .05, Figure 2)
- Overall, buprenorphine patients cost significantly less money per patient during 2007 for the health plan (p < .01, Figure 3)

Multivariate Regression

- With just 5.21 more prescriptions filled ($1,208 costs), the use of other pharmaceuticals was lower (5.21 vs. 7.63) among buprenorphine patients, perhaps due to decreased use of prescription opioids
- Individuals in the buprenorphine group spent 1.46 less days as a hospital inpatient (-$1,986 costs, p<.01), presented in the emergency department 0.22 fewer times (-$301, not statistically significant), and visited their physicians 0.88 more times in 2007 ($160 costs, p<.01)
- Overall, after controlling for demographics, Medicaid, and health status, patients receiving buprenorphine for opioid dependence had total healthcare costs in 2007 that were $11,200 less (p<.01) than non-buprenorphine

Figure 1. Healthcare Utilization Means

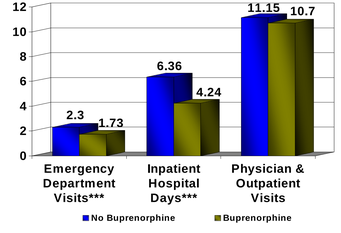


Figure 2. Healthcare Cost Means

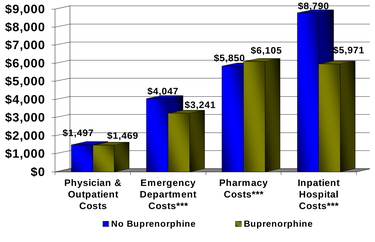
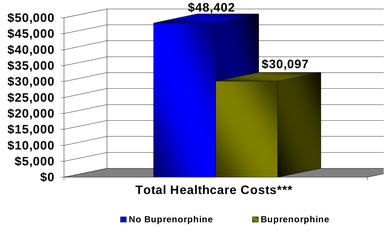


Figure 3. Total Cost of Care



Conclusions

- Though buprenorphine patients incur higher pharmacy and office visit costs, they use fewer expensive health care services, resulting in an overall positive cost-benefit conclusion for buprenorphine-replacement therapy
- These results support the primary hypothesis, and provide evidence that treatment of opioid dependence with buprenorphine is cost effective for health plans
- Assuming that the present results remain in direction and magnitude across other health plans, lines of business, and from year to year, health plans can experience considerable savings using buprenorphine as a first line of treatment for opioid dependence supported by outpatient services such as office based providers and counselors
- There are a few limitations to this study:

  -Buprenorphine treatment is potentially endogenous-identification of other factors that drive buprenorphine and service utilization is essential to understanding the relationship between buprenorphine and services utilization

  -Unmeasured characteristics correlated with both buprenorphine treatment and the dependent variables may lead to biased estimates

  -Cohorts displayed different demographic and comorbidity profiles; therefore selection bias may also be present
- Next step will be to identify "other uncategorized medical costs" as their contribution is greater than are those included in "typical services" indicator
- The proposed groups would be: those treated with pharmacotherapy, patients treated without pharmacotherapy, and those untreated
- Finally, alternative multivariate modeling approaches will be considered: negative binomial regression (with or without zero inflation) for count measures, and two-part, log-transformed, or Gamma/Log link models for costs measures

This study was funded by Reckitt Benckiser