Recidivism and mortality after in-jail buprenorphine treatment for opioid use disorder

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Recidivism and mortality after in-jail buprenorphine treatment for opioid use disorder

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ABSTRACT

Background: Buprenorphine is an effective medication for opioid use disorder (MOUD) when offered in community-based settings, but evidence is limited for incarcerated populations, particularly in relation to recidivism. In Massachusetts, Franklin County jail (FCSO) was among the first to provide buprenorphine; adjacent Hampshire County jail (HHC) offered it more recently. These jails present a natural experiment to determine whether outcomes are different between individuals who did and did not have the opportunity to receive buprenorphine in jail.

Methods: We examined outcomes of all incarcerated adults with opioid use disorder (n = 469) who did (FCSO n = 197) and did not (HHC n = 272) have the opportunity to receive buprenorphine. The primary outcome was post-release recidivism, defined as time from jail exit to a recidivism event (incarceration, probation violation, arraignment). Using Cox proportional hazards models, we investigated site as a predictor, controlling for covariates. We also examined post-release deaths.

Results: Fewer FCOSO than HHC individuals recidivated (48.2% vs. 62.5%; p = 0.001); fewer FCOSO individuals were re-arraigned (36.0% vs. 47.1%; p = 0.046) or reincarcerated (21.3% vs. 39.0%; p < 0.0001). Recidivism risk was lower in the FCOSO group (hazard ratio 0.71, 95% confidence interval 0.56, 0.99; p = 0.033), net of covariates (adjusted hazard ratio 0.66, 95% confidence interval 0.53, 0.86; p = 0.001). At each site, 3% of participants died.

Conclusions: Among incarcerated adults with opioid use disorder, risk of recidivism after jail exit is lower among those who were offered buprenorphine during incarceration. Findings support the growing movement in jails nationwide to offer buprenorphine and other agonist medications for opioid use disorder.
Natural experiment

- Two Houses of Corrections in Western Massachusetts (HOC, jail), mostly rural.
  - In 2015, Franklin County HOC began providing buprenorphine, in addition to naltrexone.
    - Buprenorphine induction and continuation at jail entry.
    - Initially focused on sentenced individuals, later included pre-trial individuals.
  - At the same time, Hampshire HOC was providing naltrexone, mostly at HOC exit, and no buprenorphine.
Franklin County House of Corrections (HOC)

- Population ~73,000
- Franklin County is the only Federally Designated Rural County in Massachusetts
- Jail average daily population of 210 pre-COVID and 160 currently
- County Sheriff & District Attorney are elected; Appointed Judges
- 2 District Courts and 1 Superior Court
- Economically depressed area with extensive opioid use
Healthcare capacity – Franklin HOC

Medical Exam Room

Pharmacy and Methadone Safe
Buprenorphine dispensing protocols

Photo credit Elise Amendola, Associated Press 2018
Our study

- Research questions
  - What are the post-release outcomes of individuals who
    - received MOUD while incarcerated (pre-release MOUD condition) versus
    - did not receive MOUD while incarcerated (controls)?
  
  - Which individual characteristics and treatment factors are associated with post-release MOUD access, utilization, and outcomes among study participants who did and did not receive MOUD while incarcerated?

1-4 year follow-up of 500 adults with OUD, exited jail Jan 2015 - Apr 2019:
  - n=250 received MOUD while at Franklin HOC
  - n=250 did not receive MOUD while at Hampshire HOC

- Master list & initial contact
  - Contracted jail staff will identify sample, locate (deceased, incarcerated, alive), conduct initial contact

- Securing administrative data
  - If available and accessible, obtain electronic records on all prospective participants (n=500)
    - National Death Index
      - Date & cause of death (ICD-10)
    - Jail records
      - MOUD and other addiction treatment
      - Criminal justice system
      - Health records

- Biological samples
  - Research staff will collect saliva/blood from sub-sample (n=50) and test for substance use and infectious disease (HIV/HCV/syphilis)

- Outcomes
  - Primary: opioid use trajectories 1-4 years post-release from jail
  - Secondary: mortality, MOUD access and utilization in the community, recidivism, infectious disease

MOUD: medications for opioid use disorder
Defining the sample

- **Goal:** all adults with OUD who exited the two participating jails Jan 2015 – April 2019.
- **Record review August 2018 – Sept 2020.**
- **Analyzed administrative data to identify all adults with OUD who exited in time frame.**
- **Verified information by hand, cross-checking on EMR with other criminal justice records:**
  - has OUD
  - whether received MOUD while in jail
  - date of jail exit
  - other information
- **Extracted indicators of recidivism by hand from criminal justice records:**
  - Covers events occurring in Massachusetts.
- **Total n=469; all have ≥1 year of observation after jail exit.**
### Demographics at baseline (jail exit)

<table>
<thead>
<tr>
<th></th>
<th>Total (n=469)</th>
<th>Franklin (n=197; 42%)</th>
<th>Hampshire (n=272, 58%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male, %***</td>
<td>91.9</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Race/ethnicity, %</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>96.0</td>
<td>96.0</td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>4.0</td>
<td>4.0</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>&lt;1</td>
<td>&lt;1</td>
<td></td>
</tr>
<tr>
<td>Age, mean</td>
<td>34.5</td>
<td>35.1</td>
<td></td>
</tr>
</tbody>
</table>

* p<0.05, ** p<0.01, ***p<0.001; t-test for continuous variables and chi square for categorical variables.
Interactions with the criminal justice system before jail entry on index episode

First arraigned as juvenile*

Franklin (n=197)   Hampshire (n=272)

41.1%   51.1%

* p<0.05, ** p<0.01, ***p<0.001; t-test for continuous variables and chi square for categorical variables.
Interactions with the criminal justice system before jail entry on index episode

* p<0.05, ** p<0.01, ***p<0.001; t-test for continuous variables and chi square for categorical variables.
Criminal justice system status on index jail episode

- * p<0.05, ** p<0.01, ***p<0.001; t-test for continuous variables and chi square for categorical variables.

### Sentenced***

<table>
<thead>
<tr>
<th></th>
<th>Franklin (n=197)</th>
<th>Hampshire (n=272)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sentenced</td>
<td>19</td>
<td>42</td>
</tr>
</tbody>
</table>

### No. days incarcerated

<table>
<thead>
<tr>
<th></th>
<th>Franklin (n=197)</th>
<th>Hampshire (n=272)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. days</td>
<td>78.1</td>
<td>85.1</td>
</tr>
</tbody>
</table>
Medications for opioid use disorder while in jail

- ** p<0.05, *** p<0.001

- t-test for continuous variables and chi square for categorical variables.

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**Franklin (n=197)**

- Buprenorphine: 86.2%
- Naltrexone: 7.1%
- Undocumented: 6.1%
- None: <1%

**Hampshire (n=272)**

- Buprenorphine: 100%
- Naltrexone: 0%
- Undocumented: 0%
- None: <1%
Recidivism after exit from index jail episode

<table>
<thead>
<tr>
<th>Event</th>
<th>Franklin (n=197)</th>
<th>Hampshire (n=272)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incarcerations***</td>
<td>21.3</td>
<td>39</td>
</tr>
<tr>
<td>Probation violations</td>
<td>17.3</td>
<td>16.2</td>
</tr>
<tr>
<td>Arraignments*</td>
<td>36</td>
<td>47.1</td>
</tr>
<tr>
<td>Any event***</td>
<td>48.2</td>
<td>62.5</td>
</tr>
</tbody>
</table>

* p<0.05, ** p<0.01, *** p<0.001; t-test for continuous variables and chi square for categorical variables.
Charge on arraignment (first 3 events)

- *p<0.05, **p<0.01, ***p<0.001; t-test for continuous variables and chi square for categorical variables.

<table>
<thead>
<tr>
<th>Category</th>
<th>Franklin (n=197)</th>
<th>Hampshire (n=272)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Property***</td>
<td>9.6</td>
<td>23.2</td>
</tr>
<tr>
<td>Drug-related</td>
<td>14.2</td>
<td>18</td>
</tr>
<tr>
<td>Violent</td>
<td>9.6</td>
<td>13.6</td>
</tr>
<tr>
<td>Other</td>
<td>10.2</td>
<td>12.9</td>
</tr>
</tbody>
</table>
Days to recidivism event after exit from index jail episode

- * p<0.05, ** p<0.01, *** p<0.001;
- t-test for continuous variables and chi square for categorical variables.

Days to first event, mean

- Franklin (n=197)
- Hampshire (n=272)
Mortality after exit from index jail episode

- *p<0.05, **p<0.01, ***p<0.001; t-test for continuous variables and chi square for categorical variables.

Died

<table>
<thead>
<tr>
<th></th>
<th>Franklin (n=197)</th>
<th>Hampshire (n=272)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.1%</td>
<td>2.9%</td>
</tr>
</tbody>
</table>

No. of days to death

<table>
<thead>
<tr>
<th></th>
<th>Franklin (n=197)</th>
<th>Hampshire (n=272)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>242.3</td>
<td>160.5</td>
</tr>
</tbody>
</table>
Recidivism is defined as any incarceration, probation violation, or arraignment that occurred after exit from jail on index episode.

### Predictors of recidivism
(adjusted logistic regression results)

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Recidivism (any)</th>
<th>Incarceration</th>
<th>Probation violation</th>
<th>Arraignment (any)</th>
<th>Arraigned: Drug</th>
<th>Arraigned: Property</th>
<th>Arraigned: Violent</th>
<th>Arraigned: Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>County: Franklin (ref = Hampshire)</td>
<td>0.51</td>
<td>0.37</td>
<td>0.91</td>
<td>0.67</td>
<td>0.76</td>
<td>0.39</td>
<td>0.70</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td>(0.35, 0.76)</td>
<td>(0.24, 0.58)</td>
<td>(0.55, 1.52)</td>
<td>(0.45, 0.99)</td>
<td>(0.45, 1.28)</td>
<td>(0.22, 0.69)</td>
<td>(0.38, 1.28)</td>
<td>(0.43, 1.44)</td>
</tr>
<tr>
<td># of prior incarcerations</td>
<td>1.06</td>
<td>1.03</td>
<td>0.99</td>
<td>1.06</td>
<td>1.05</td>
<td>1.05</td>
<td>1.04</td>
<td>1.02</td>
</tr>
<tr>
<td></td>
<td>(1.02, 1.10)</td>
<td>(0.99, 1.07)</td>
<td>(0.95, 1.04)</td>
<td>(1.02, 1.10)</td>
<td>(1.00, 1.09)</td>
<td>(1.01, 1.09)</td>
<td>(0.99, 1.09)</td>
<td>(0.97, 1.07)</td>
</tr>
<tr>
<td>Jail status: pre-trial (index, ref = sentenced)</td>
<td>2.05</td>
<td>2.24</td>
<td>2.27</td>
<td>1.26</td>
<td>1.52</td>
<td>0.96</td>
<td>1.27</td>
<td>1.06</td>
</tr>
<tr>
<td></td>
<td>(1.35, 3.12)</td>
<td>(1.41, 3.56)</td>
<td>(1.23, 4.21)</td>
<td>(0.83, 1.90)</td>
<td>(0.87, 2.67)</td>
<td>(0.58, 1.62)</td>
<td>(0.68, 2.38)</td>
<td>(0.57, 1.97)</td>
</tr>
</tbody>
</table>
**Time from jail exit to first recidivism event**

We found a 29% reduction in risk of recidivism, which reduced to 32% after adjusting for baseline history of interactions with the criminal justice system and index jail status.

<table>
<thead>
<tr>
<th>Recidivated, %</th>
<th>Franklin</th>
<th>Hampshire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 0</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>Day 33</td>
<td>91.1</td>
<td>8.8</td>
</tr>
<tr>
<td>Day 104</td>
<td>79.4</td>
<td>20.6</td>
</tr>
<tr>
<td>Day ~207</td>
<td>61.8</td>
<td>38.2</td>
</tr>
<tr>
<td>Day 365</td>
<td>51.8</td>
<td>48.2</td>
</tr>
</tbody>
</table>

**Product-Limit Survival Estimates**

*With Number of Subjects at Risk*

Cox proportional hazards model unadjusted hazard ratio (95% CI) 0.71 (0.56, 0.89), \( p = 0.003 \)

Adjusted for number of prior incarcerations, index jail status is pre-trial vs. sentence HR 0.68 (0.53, 0.86), \( p = 0.001 \)
Summary and current status

- Among incarcerated adults with opioid use disorder, the expected risk of recidivism one year after jail exit is lower among those that were offered MOUD during incarceration (Franklin) compared to those that were not (Hampshire).

- Associations remain after adjusting for prior incarcerations, current status (pre-trial vs. sentenced), and age.

- Due to a SAMHSA grant and Massachusetts Chapter 208, both jails expanded MOUD options and related services (starting in 2019).
  - All three FDA-approved types of MOUD; MOUD induction and continuation; community re-entry programming; Franklin County jail is a licensed OTP that provides methadone.

- Both jails are MassJCOIN sites – offers opportunity to examine recidivism and other outcomes among a larger and more diverse sample.
Legislatively mandated implementation of medications for opioid use disorders in jails: A qualitative study of clinical, correctional, and jail administrator perspectives

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Abstract

Background: Individuals with legal involvement and opioid use disorders (OUD) are at an increased risk of overdose and premature death. Yet, few correctional systems provide all FDA-approved medications for opioid use disorder (MOUD) to all eligible incarcerated individuals. We report on the implementation of MOUD in seven Massachusetts’ jails following state legislative mandate to provide access to all FDA-approved MOUD and to connect with treatment upon release.

Methods: Participants included the Jail Leaders, Participants detailed the outer context (i.e., legislative mandate) that drove acceptance of MOUD and learned with continuity of care. Various context factors included decisions making around administration of buprenorphine, medication and dosage changes, and daily routines. Leadership was critical in standardizing standard hierarchies and advocating for feasibility. System-based characteristics of incarcerated individuals, specifically those who were pre-contemplation, perceived changes with treatment initiation; intra- and inter-agency bridging factors reduced duplication of effort and led to quick, innovative solutions.

Results: Implementation of MOUD in jails requires collaboration with and reliance on external agencies. Preparation for implementation should involve systematic reviews of available resources and connections. Implementation requires flexibility from institutional systems that are inherently rigid. Accordinally, leaders and policymakers must recognize the cultural shift inherent in such programs and allow for resources and education to ensure program success.

Keywords: Opioids, Opioid use disorder, MOUD, Jail, Buprenorphine, Treatment, Implementation, Correctional settings, Qualitative design, Massachusetts Justice Community Opioid Innovation Network (MassJCON)
Limitations and strengths

• Observational study, not a RCT
• Measures from administrative data.
  o Limited set of measures.
  o Recidivism indicator does not encompass events outside of MA, or crime.
• Two sites in a mostly rural setting in one state.
• Did not examine potential differences by site.
  o Provision of non-MOUD services.
  o Policing practices, court processes, other contextual factors.
• Capitalized on natural experiment.
• Measured outcomes on all individuals with OUD who exited jail during our time period.
• Examined recidivism post-exit from jail in relation to provision of MOUD in jail.
Thank you!

Baystate Health & UMass Medical School
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- Calla Harrington, LCSW, MSW, MPH, Research Fellow

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- Ed Hayes, Assistant Superintendent
- Levin Schwartz, LICSW, Assistant Deputy Superintendent
- Ben Potee, Research Assistant

Hampshire County House of Corrections
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- Melinda Cady, Assistant Deputy Superintendent
- Kathryn Peverley, Clinician