



Integrated Health Care and Criminal Justice Data — Viewing the Intersection of Public Safety, Public Health, and Public Policy Through a New Lens: Lessons from Camden, New Jersey

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Executive Session on Community Corrections

This is one in a series of papers that are being published as a result of the Executive Session on Community Corrections (2013-2017).

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Introduction

At the intersection of public safety and public health lies the potential to view crime prevention through a new lens: the lens provided by analyzing integrated data from the many agencies that serve vulnerable populations. This study involved the integration of health care and criminal justice data for people who cycle in and out of hospitals and police precincts in Camden, New Jersey. Working pursuant to a grant from the Laura and John Arnold Foundation, researchers from the Camden Coalition of Healthcare Providers (the Coalition) integrated existing data sets to break down traditional information silos, identifying and analyzing the experiences of people who showed an extreme number of contacts with both systems.

By analyzing these cross-sector data, Coalition researchers found that a small number of Camden residents have an enormous and disproportionate impact on the health care and criminal justice sectors, neither of which is designed to address the underlying problems they face: housing instability, inconsistent or insufficient income, trauma, inadequate nutrition, lack of supportive social networks,

mental illness, and substance abuse disorders. These unaddressed social determinants of behavior appear to drive a cycle of repeated arrests and hospitalizations.

But the study's potential impact goes well beyond the identification of a population that frequently cycles through the health care and criminal justice systems. Cross-sector data offer a more holistic view of the challenges these individuals face, telling a different story than the one we typically hear — a story with far-reaching public policy implications. When we overlay data to view the trajectories of lives through consecutive cross-sector contacts, we begin to see that crime most often happens after, and not before, contacts with hospitals and other government agencies. During these earlier encounters, we could find potential markers that would allow us to identify individuals at risk of future criminal justice involvement. In large part because agencies are not sharing data in the collaborative ways needed to gain a holistic understanding of individuals, opportunities to intervene earlier in their trajectories are lost.

Most interventions to prevent recidivism currently occur during the community corrections and re-entry phases, well after a crime has happened and the individual's case has ended. The study suggests that we should shift from a mindset of reacting to immediate health and crime crises as distinct

events to focusing on holistic approaches that result in better individual outcomes, increased public safety, and reduced system costs. The holistic view provided by integrated data will allow researchers, policymakers, and practitioners to design earlier interventions to prevent crime and the avoidable use of jails and emergency departments. The Coalition's researchers plan to design and test such interventions in the next phase of this study.

This paper is organized in two parts.

Part I sets out the Camden study's key findings from the analysis of integrated hospital and police data:

- A small percentage of arrestees account for a disproportionate share of total arrests.
- There is a relationship between high use of hospital emergency departments (EDs) and frequent arrests.
- A small subset of 226 individuals had extreme numbers of contacts with both hospital EDs and police.

Part II outlines the potential impact of integrated data analysis on public safety, public health, and public policy:

- Cross-sector data that look beyond the criminal justice system, including data on health, housing, employment, and other socio-economic characteristics, provide a holistic view of individuals and their contacts with multiple systems over time.

Integrated data reveal that, even within groups of individuals who have frequent contacts with multiple systems, there is significant variety in their experiences and behaviors, suggesting that interventions will need to be tailored to meet their unique needs.

Integrated data analysis is possible only through cross-sector collaboration, which breaks down data silos between agencies that serve vulnerable populations. The information gleaned by analyzing integrated data will provide policymakers and practitioners with tools and ideas to address the root causes of crime by finding earlier intervention points and designing strategies that can go beyond the criminal justice system to include social services, health care, and other community partners to stop system cycling and prevent criminal justice involvement in the first place.

Study Overview

The Coalition, which comprises more than 25 members that include hospitals, primary care providers, and community organizations working to deliver high-quality health care to vulnerable residents of Camden, began its work in the health care sector. By many measures, Camden (a city of approximately 77,000 people) is one of the most challenged cities in America. According to the American Community Survey (U.S. Census Bureau, 2010–2014), the median household income in Camden was estimated to be \$26,201, with approximately 39 percent of the population living below the poverty line, including more than half

of the residents younger than age 18. Although Camden has seen deep drops in violent crime over the past decade, the city continues to struggle with violence and other types of crime.

Since the Coalition's founding by Dr. Jeffrey Brenner in 2002, the use of integrated data has been one of its core strategies for observing failures in the health care system and driving system change. By linking hospital claims data from multiple health systems to create the Camden Health Database, the Coalition sought to better understand and address health trends in the city.

In 2011, a team of Coalition researchers, data scientists, and programmers working with integrated data sets from the city's three hospitals found that 10 percent of patients accounted for 75 percent of the more than \$130 million in annual hospital costs — nearly \$100 million — which is primarily paid for by Medicare and Medicaid. These high-cost, high-need patients tended to be older, to suffer from multiple chronic conditions, and to face social challenges such as addiction, mental illness, and housing instability, all of which posed barriers to consistent medical care. In addition, they were functioning within a highly fragmented and uncoordinated health care delivery system, where information was not shared across hospitals, EDs, and primary care offices. Faced with such barriers, these individuals cycled through multiple hospitals, relying on expensive, hospital-based services to treat medical problems as well as advanced illnesses that could be better managed with greater social supports and stronger relationships to primary care.

The Camden Coalition’s “Health Care Hotspotting”

Identifying the outsized effect of these “super-utilizers” on health care system costs was the first step. Thus, the Coalition employed a form of “health care hotspotting,” which is the strategic use of data to identify individual patients who are heavy users of the health care system, engage and assess them in real time guided by an authentic healing relationship (Grinberg et al., 2016), and deploy tailored evidence-based strategies to holistically address their constellation of needs. The term was inspired by the hotspotting data strategy used in policing to identify geographic locations where high levels of crime occur. Although health care hotspotting is based on a premise similar to police hotspotting, the Camden Coalition has most often used the methodology to focus on individuals going through the system rather than on places.

Once a high-needs, high-cost individual is identified, the Coalition proactively engages them with an intervention designed to address their needs and change their patterns. Using new care coordination and care management models to work with this high-cost subset of the population, the Coalition directs community-based support teams of nurses, social workers, behavioral health specialists, and community health workers to identify and engage individuals in real time when they are readmitted to the hospital — a catalytic moment for behavior change — to mitigate many of the underlying barriers contributing to hospital readmissions. The work begins in the hospital, but the team’s efforts extend into the community, where they visit individuals in their

homes and accompany them to appointments with primary care providers and social service agencies, providing assistance in navigating the fragmented and complicated health and social service landscape that surrounds them.

Early attempts to quantify the impact of the Coalition’s Care Management Intervention on reductions in hospital use and health care spending have shown promise. In a 2010 nonrandomized evaluation, the intervention was found to improve health outcomes, decrease the use of emergency and inpatient services, and decrease charges for a cohort of 36 high-cost members from \$1.2 million per month to \$534,000 per month, a savings of 56 percent over five years (Green, Singh, and O’Byrne, 2009). In 2012 and 2013, the Coalition partnered with one of New Jersey’s managed care organizations (MCOs) to test the model on a subset of its most complex patients. Consistent with the earlier study, the MCO found cost savings of more than \$10,000 per patient per year from reduced hospitalizations and ED visits.¹

Camden ARISE: Integrating Hospital and Police Data

Despite the success of the health care hotspotting work, Coalition researchers realized that health care data only tell one small piece of an individual’s story. Taken alone, health care data are woefully inadequate for understanding the broader circumstances determining individuals’ heavy use of the hospital system. Therefore, the researchers began to pursue administrative data from a variety of other sources to gain a deeper

understanding of their patients and to better comprehend the drivers of repeated, avoidable hospitalizations and poor health outcomes. Camden ARISE (Administrative Records Integrated for Service Excellence) was launched in January 2015 to supplement the Coalition's health care data with information from other human service domains.

The Camden County Police Department provided the first non-health-care data in the form of individual-level arrest information (Camden Coalition of Healthcare Providers and Camden County Police Department, 2014), which was integrated into the Camden Health Database (the citywide hospital claims data). Since the launch of this study, Coalition researchers have entered into further data-sharing agreements with two additional health systems, the Camden City School District, CamConnect (a local nonprofit that conducted a citywide vacancy survey), and the Southern New Jersey Perinatal Cooperative. It also received data from the Camden County jails. This paper focuses on findings with respect to integrated police and hospital claims data.

Part I: Findings

Working with J. Scott Thomson, Chief of Police for Camden County, and the team from the Arnold Foundation, the Coalition's researchers developed a hypothesis: There is a relationship between the factors that contribute to both negative public safety outcomes and negative public health outcomes. The researchers believed that many of the same households and individuals who

had a disproportionate number of contacts with Camden's EDs would also have a higher number of interactions with the criminal justice system. If such individuals and households could be identified, interventions could be designed and tested to help reduce crime, improve health care, and reduce system costs. In other words, the team recognized that health care hotspotting could play a dual role in both advancing public health and preventing crime.

The study's integrated data analysis revealed just such a relationship. Several significant patterns have been identified in arrests, hospital use, and the experiences of individuals who are involved in dual-system cycling:

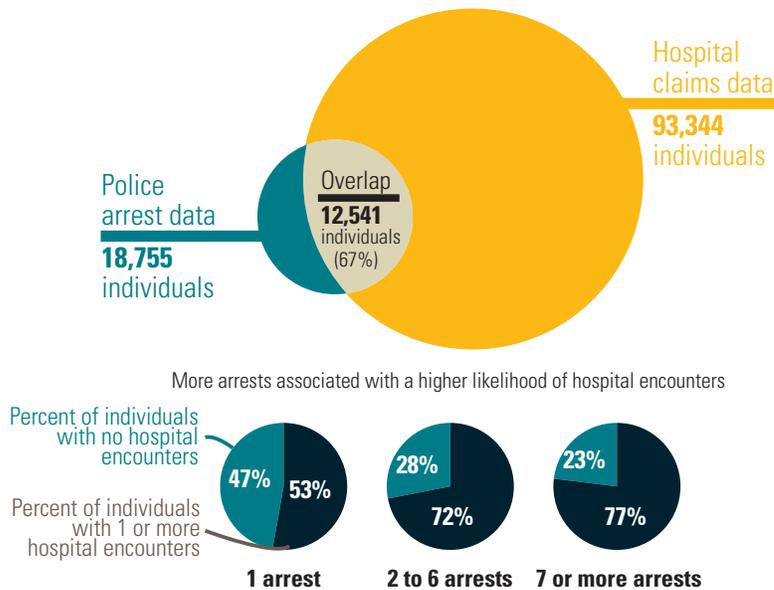
1. A small percentage of arrestees account for a disproportionate share of arrests.

Health care hotspotting showed that individuals who were frequently cycling through the health care system accounted for a disproportionate share of costs; crime hotspotting showed that frequent recidivists accounted for a disproportionate number of arrests. In Camden, 5 percent of adults arrested by the police accounted for 25 percent of all arrests over the data period.

2. There is a relationship between frequent use of the hospitals and arrest.

The study found that many of the factors that correlate with frequent hospital use also correlate with a high risk for crime and criminal justice involvement. Figure 1 shows the overlap between those who had contacts with both systems. Of the

Figure 1. Individuals overlapping across police and hospital data, 2010-2014



18,755 individuals who were arrested, 12,541 (67 percent) also overlapped with the hospital's claims data set.

The study found that:

- A majority of all Camden arrestees (67 percent) made a trip to the ED at least once during the study's timeframe (2010 to 2014), with more than one-half (54 percent) of this group making five or more visits.

- In addition to significant overlap across populations, the study also found a relationship between high use of EDs and frequent arrests; only 11 percent of the individuals with one visit to an ED over the period had an arrest,

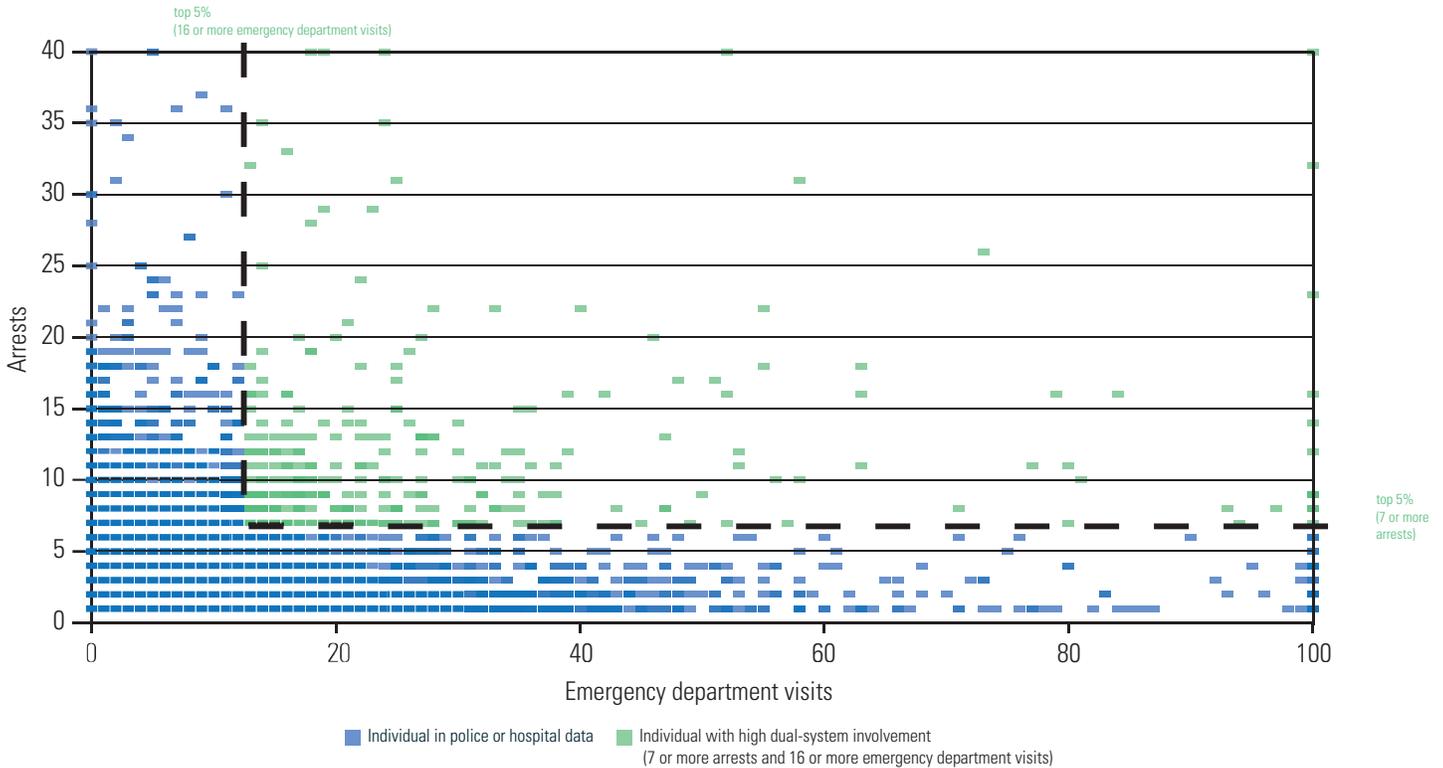
compared with 20 percent of individuals with two to five ED visits and 32 percent of individuals with six or more ED visits.

3. A small subset of individuals have high levels of involvement with both hospitals and the criminal justice sector.

When hospital claims data were overlaid with police data, another trend became clear: A small subset of individuals includes those who are both criminal justice recidivists and super-utilizers of the hospital system. These 226 individuals had high contacts with both systems, falling into the top 5 percent for both the number of arrests and ED visits, with 16 or more ED visits and seven or more arrests over the five-year study period. The researchers chose this top 5 percent parameter for the subset because they wanted to capture a sample that would be large enough to identify meaningful profiles of individuals who would potentially be eligible for and benefit from prearrest diversion into an intensive case management program, without overestimating the size of this population or complicating the interpretation of the subgroups that emerged through data analysis. The 5 percent cutoff point generated a sample of individuals who had extremely high contacts with both systems to serve these exploratory purposes.

Figure 2 shows the distribution of individuals' contacts with each system; those in the top 5 percent are indicated in green.

Figure 2. Distribution of arrests and emergency department visits, 2010-2014



Note: Individual arrest totals were truncated at 40 and emergency department visit totals were truncated at 100 to suppress extreme outlier values.

High levels of police involvement. The individuals in the top 5 percent for both ED visits and arrests were arrested primarily for nonviolent, low-level offenses such as disorderly conduct, drug possession, drinking in public, and loitering. Most arrests in this group were for disorderly conduct (42 percent of arrests) or for technical violations (34 percent of arrests), which include arrests for unspecified outstanding warrants. Over the five years, the 226 individuals with high dual-system use were arrested a total of 3,686 times. Of these

arrests, only 176, or 5 percent, were for a violent offense. Table 1 breaks down arrests in this group by offense type.²

Table 2 shows the number and percentage of the 226 individuals with extreme dual-system cycling who had at least one arrest in each of the specified offense categories. Over a five-year period, nearly all 226 individuals (96 percent) had at least one arrest for disorderly conduct. A majority (65 percent) had at least one drug-related arrest, and

Table 1. Arrests by offense type for individuals with high dual-system involvement, 2010-2014

	Number of arrests	Percent of arrests
Disorderly conduct	1,577	42%
Technical violation (includes unspecified warrants)	1,281	34%
Drug related	536	14%
Violent	176	5%
Property	116	3%
Total arrests	3,686	100%

Table 2. Number and percent of 226 individuals with high dual-system involvement arrested (1 or more times) by offense type, 2010-2014

	Number and percent of individuals arrested at least once
Disorderly conduct	217 (96%)
Technical violation (includes unspecified warrants)	221 (98%)
Drug related	147 (65%)
Violent	79 (35%)
Property	64 (30%)

a minority (35 percent) were arrested at any point for a violent crime, which includes weapons-related offenses (35 percent, or 79 individuals) and property crime (30 percent, or 64 individuals).

High numbers of hospital encounters. Among the 226 individuals, the median number of ED visits over the five-year period was 25. This group was also far more likely to be admitted to the hospital than the average arrestee: 67 percent of individuals with high dual-system involvement were admitted to the hospital during the study period, compared with 17 percent of all arrestees.

High levels of socio-behavioral complexity. These individuals presented higher levels of overall physical, mental, and social challenges than others in the data set:

They were 50 percent more likely than those with as many ED visits but fewer arrests to have mental health or substance use-related illnesses.

Seventy-five percent received at least one mental health-related diagnosis at the hospital.

Forty-two percent experienced homelessness at least once during the study period.³

The multifaceted issues facing this population are shown in figure 3, which compares the prevalence of socio-behavioral complications of all individuals who overlapped both hospital and police data against those 226 individuals in the top 5 percent of ED visits and arrests. The data show significantly higher occurrences of substance use diagnoses, mental health diagnoses, hospitalization as a result of violence or assault, and homelessness among those with extreme multisystem involvement.

Part II: Lessons From Camden

1. Data integration provides a new and more holistic lens through which to view and improve individuals' lives.

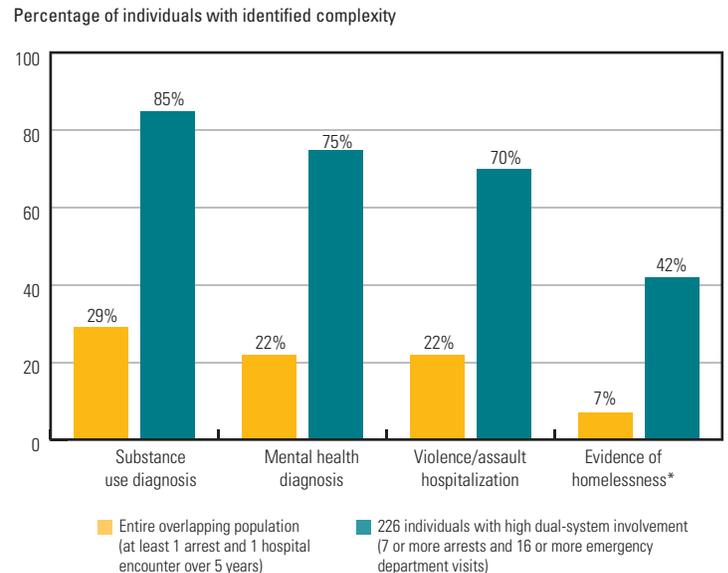
Integrated data systems that link individual information across sectors using common identifiers provide a more complete look at an individual's life and thus a more meaningful and complete understanding of the challenges he or she faces. Abe⁴ is one such individual who is caught in this cycle; he has been arrested many times and made repeated trips to Camden's EDs. Abe's experience is typical of those identified

by the Camden researchers as outliers who have a disproportionate number of contacts with both hospitals and the police. An excerpt from the case history taken by researchers tells Abe's story (Camden Coalition of Healthcare Providers, 2016):

Abe, a forty-year-old-man, was living on the streets when he arrived at a Camden, New Jersey emergency department. Earlier that day, he had been involved in a minor altercation with a friend. At the hospital, Abe was treated for his injuries — a number of lacerations and contusions — and was also diagnosed with major depressive disorder. A few weeks later, he showed up again at the emergency department. Because of his unstable situation, he never completed the six-week course of antibiotics that he had been prescribed and his wounds had become infected. Two months following these episodes, Abe was walking across the street when he was hit by a car. He was transported by ambulance to the hospital where he remained for three days with a fractured ankle and concussion. Over the course of the hospitalization, he presented with suicidal ideations and received treatment for alcohol dependency.

Over five years, Abe was seen in every one of Camden's three emergency departments for a total of more than two dozen times. Because of his complex medical history — hypertension, diabetes, and other chronic conditions; addictions that escalated from alcohol dependency to heroin use with sporadic overdoses; and mental illness — a number of these hospital visits resulted in admission. In total, Abe spent more than 45 days in the hospital, accumulating over \$400,000 in bills. The hospitals were able to recoup \$27,000 through his occasional Medicaid coverage, but the vast majority of these costs were passed on to the system as charity care.

Figure 3. Prevalence of socio-behavioral complexity among individuals with dual-system involvement, 2010-2014



Total overlapping police/hospital population individuals with high dual-system involvement (7 or more arrests and 16 or more emergency department visits).

*Evidence of homelessness is defined as having a homeless or shelter address at least once in either data set.

But Abe's hospitalizations tell only one part of the story. During the same five years, Abe was arrested more than fifteen times, mostly for low-level offenses. He was picked up several times by police for repeatedly shoplifting from a store outside the hospital, just moments after he had walked out of the emergency department. In between these run-ins, Abe was also commonly booked for being severely intoxicated in front of the same handful of corner liquor stores. Each time, he was booked by police, given a summons to appear in court, and then released. After failing to show up in court and pay his fees, a warrant was put out for his arrest, and the next time Abe was picked up he spent a month in the Camden County Jail. Over the five-year period, Camden police officers spent over 120 hours either directly with Abe or writing up encounter

notes. He spent about as much time in jail as he did in the hospital, to say nothing of the as yet untallied cost of courts, fees, and fines, and the devastating human cost to Abe and those around him.

Abe's living situation remained unstable over this entire period. He moved back and forth between living with family members or friends to homeless shelters and the streets. Each time he left the care of the hospital or was released from criminal justice custody, Abe returned to the unstable environment that contributed to his hospitalization or arrest, no better prepared to deal with the challenges he would face. Each successive interaction with the healthcare or criminal justice system likely exacerbated his volatile state, making the next hospitalization or arrest even more likely.

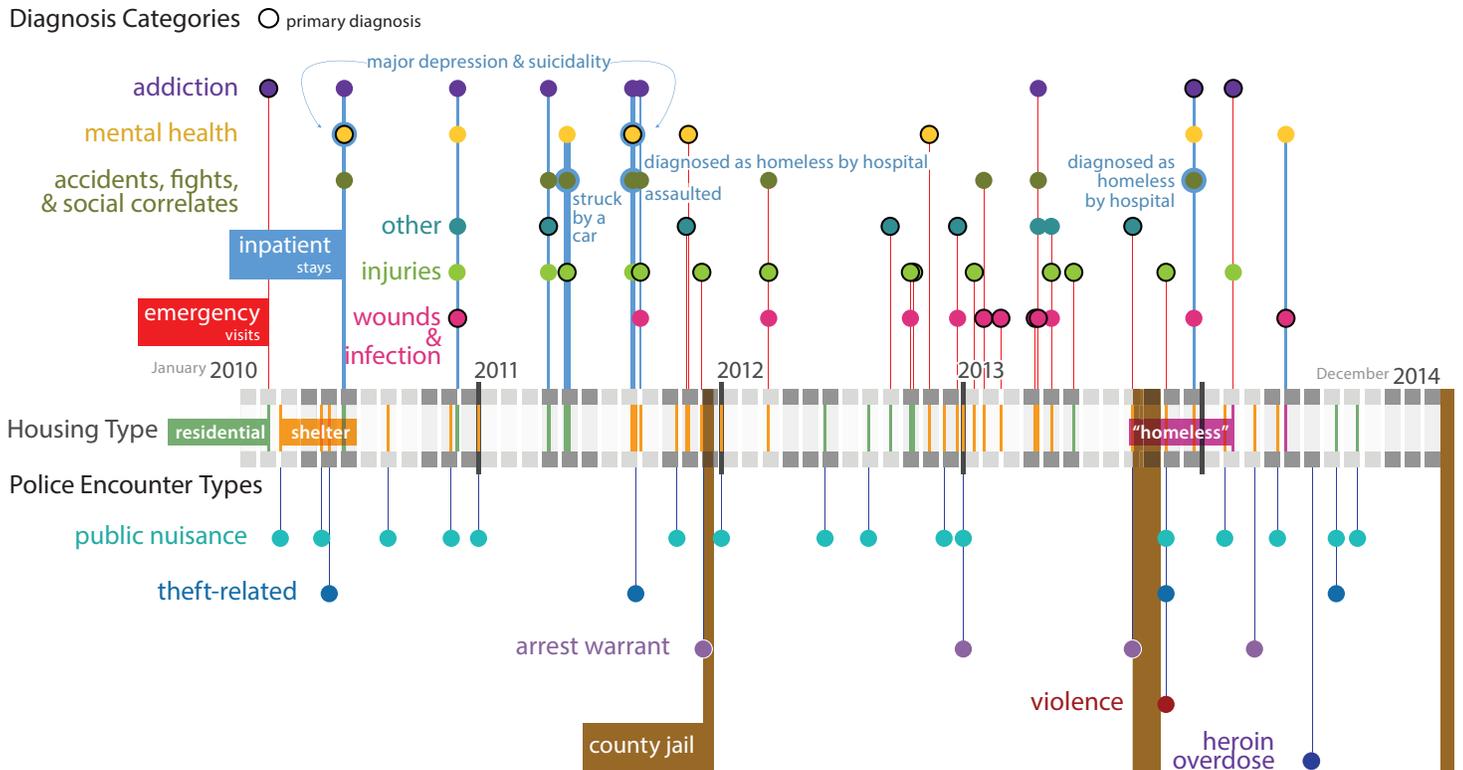
Figure 4 illustrates Abe's cycles through the criminal justice and hospital systems. It is a map of system contacts and missed opportunities to intervene in ways that might have changed his trajectory. Contacts with the health care system are reflected above the gray bar in figure 4, with blue lines denoting the times that Abe's ED visits resulted in a hospital admission. Housing issues are noted in the center of the gray bar. Interactions with the criminal justice system are shown below the gray bar, with each thin line marking contact with law enforcement and each thicker line representing a period of incarceration.

As Abe's story and figure 4 demonstrate, the criminal justice and health care systems tend to function on an event-by-event basis: An incident occurs, the system responds, and the person is released into the same setting that prompted the criminal act or health crisis in the first place. Both

systems treat the immediate trigger event — an illness or injury that requires medical treatment or an arrest for a violation of the law — as the focus of their efforts. To hospitals, the illness is the problem; to the criminal justice system, the crime is the problem. Both systems also typically operate in information silos, recording and maintaining data separate not only from each other, but also in isolation from other agencies that monitor the larger economic and social circumstances that exacerbate both crime and poor health. This lack of cross-sector collaboration shown by the data is not unique to Camden, but represents the typical siloed nature of agency information about vulnerable populations in the United States. Camden is among the first cities in the nation to do this type of integrated data work,⁵ and the possibilities for cross-sector collaboration on solutions are just beginning to become apparent.

2. The individuals who have an extremely high number of contacts with both hospitals and the criminal justice system exhibit significant variation in their experiences and behaviors.

Even within the small subset of 226 people in the top 5 percent of dual-system users, researchers identified four distinct profiles based on the nature of their medical, behavioral, and social needs. Although they share some characteristics in common, the following subgroups reflect different experiences and behaviors that suggest they will require different strategies for engagement, whether they are encountered in an ED, by a police officer on the street, or through some type of newly designed intervention:

Figure 4. Case study of a cross-sector complex-care patient

Nonviolent, medically complex drug offenders. These individuals are most likely to be males between the ages of 18 and 29. In addition to a history of arrest for drug possession, they have been arrested many times in the past for disorderly conduct, but never for a violent offense. They have a high degree of medical complexity, including a markedly higher prevalence of HIV compared to the other subgroups, and are often admitted to the hospital. There is a 50/50 chance that they have been seen at the hospital with a drug overdose. They also have a history of behavioral health struggles and most likely have been diagnosed with a serious mental illness or a severe drug abuse-related condition.

Nonviolent individuals with behavioral health complexity who are arrested predominantly for petty crimes. These individuals are typically male, age 40 or older. Although they frequently visit the city's EDs, they are less likely to be admitted to the hospital than those in other subgroups. They are often arrested, predominantly for petty crimes (rarely for drug possession or trafficking). They are the most likely of individuals in any subgroup to experience housing instability, with a 50-percent likelihood of having been homeless at least once during the study period.

Assault victims with mental health challenges and addictions who commit crimes against

other persons. Individuals in this subgroup are typically women age 40 or younger. They are the most likely of individuals in any subgroup to be arrested for a violent crime, predominantly simple assault, and are rarely arrested for drug offenses. They are frequently admitted to the hospital, often for assault-related injuries, suggesting that while they may perpetrate violence in some instances, they may also be heavily victimized.⁶

Male drug offenders, some with violent crime arrests, who have few hospitalizations and a comparatively low prevalence of serious mental illness. These individuals are most often young males. They have frequent contact with the police and have been arrested for a wide array of offenses, including drug trafficking, property crime, and violent crime. However, they are less likely than those in the other subgroups to suffer from mental illness or alcohol or substance abuse disorder. They are also less likely to visit the ED or be admitted to the hospital.

These subgroups illustrate that the forces underlying cycling behavior can differ from individual to individual, even as some characteristics and experiences are similar. No “one size fits all” approach will be sufficient in serving this population. Instead, an understanding of the different constellations of factors that place these individuals at risk for prolonged entanglement in crisis systems, coupled with an enhanced ability to assess individuals more robustly, could lead to more effective policies and strategies.

3. Only by breaking down data silos among agencies that serve vulnerable populations can we begin to address the root causes of behavior and prevent individuals from cycling through multiple systems.

The potential that integrated data holds to shift both policy and practice is possible only through collaboration and data sharing among the agencies that serve individuals and families that overlap multiple systems. The study’s findings raise the question of whether we treat the symptoms of conditions such as substance abuse, mental illness, and homelessness — frequent emergency medical problems and repeat commission of low-level, nonviolent crimes — as short-term problems to be solved by hospitals and jails and not as needs to be met through deeper treatment of underlying diseases and problems. In other words, have we chosen a seemingly quick fix, where we repeatedly funnel people who need treatment into our jails and hospitals, over solutions that foster the long-term safety and well-being of communities? The result is seen in stories like Abe’s — a seemingly unbreakable cycle of hospital stays and arrests and incarceration, punctuated by periods of housing instability and homelessness, all of which appear to be driven largely by untreated substance abuse and lack of social supports.

The United States makes enormous expenditures after a crime has been committed, but makes a much lower comparative investment in working to prevent crime and recidivism by addressing the underlying needs of at-risk populations. Yet, recidivism rates in the United States remain high. Fully 77 percent of all individuals released from

jail or prison are rearrested for a new crime within five years of release (Durose, Snyder, and Cooper, 2015). The focus of most interventions to prevent future crime has been at the prisoner re-entry and community corrections phases, targeting individuals released into the community under parole or probation supervision.⁷ Interventions at this post-disposition phase have been evolving in recent decades. Research and practice are now moving away from a sole focus on criminogenic risk to a growing emphasis on services and interventions tailored to an individual's crime-producing risk factors and responsivity to treatment. The Camden study makes a compelling case for moving such interventions earlier. Applying cross-sector methods to support individuals sooner may address the determinants that propelled the criminal behavior in the first place, such as mental illness, substance abuse disorder, or homelessness.⁸

If we care about public safety, fairness, and cost effectiveness, we need to better understand the lived realities of the people in the criminal justice system by gathering and analyzing data from the various agencies that serve vulnerable populations. It is not that the well-being of communities will be improved by the development of multisector data systems alone; it is that integrated data offer the potential for integrated solutions. At present, the health care and criminal justice systems react piecemeal to each ED visit or arrest, because neither system was developed to deal with the underlying societal problems that drive recidivism and repeat hospital visits.⁹ Yet, each arrest or hospitalization offers an opportunity to intervene. Each moment of contact provides an opportunity for change and

a chance to stabilize someone caught in this cycle, and the failure to do so effectively has enormous individual and societal costs.

The information provided by integrated data, for example, could allow for earlier engagement of at-risk youth, potentially changing their paths so they never come in contact with the criminal justice system in the first place (Sampson and Laub, 1990).¹⁰ Such data also have value as a police tool that allows agencies to craft a means of law enforcement-led diversion. This is happening already on a small scale in Seattle as part of its Law Enforcement Assisted Diversion (LEAD) program, a prebooking diversion pilot program developed with the community to address low-level drug and prostitution crimes in several King County neighborhoods.¹¹ LEAD has been successful in reducing recidivism in this group by 60 percent (Collins, Lonczak, and Clifasefi, 2015). The LEAD program relies on selecting individuals by geographic location and offense type, without having access to integrated data. By making law-enforcement diversion more data driven and tailored to the underlying needs of individuals, the Camden project has identified a larger, broader group of nonviolent offenders for possible diversion, giving it the potential to prevent more crime.

With the information gleaned from integrated data, the criminal justice system can begin to develop targeted approaches to address the issues underlying crime. There remains much work to be done to build and test these interventions. Yet, at a time when crime ranks as the second largest spending item in most state budgets and as the

largest spending item in many American cities, we simply cannot afford to run our criminal justice system as it currently operates. The savings — both human and financial — that can be captured by using integrated data to understand when, where, and with whom to intervene to prevent crime, can be tremendous.

Building the frameworks necessary for cross-sector data sharing presents challenges. Individual agency data collection procedures rarely result in uniform identifiers that allow researchers to easily link a person's contacts with the system across sectors. Organizational culture may also inhibit the sharing of data. The public may have further concerns with privacy and data security. And some may argue that legal barriers exist to sharing this kind of information. But the Camden study shows that these challenges can be overcome and that the value of the resulting information is worth any difficulty. If we can begin to break down the silos between the systems that serve vulnerable populations, we can better focus on improving outcomes.

Next Steps: The Camden Coalition Model

While the administrative data that the Coalition's researchers gathered are useful, they still only tell a story about individuals once they enter the orbit of these institutions. We need even more information from other spheres of life to make the picture as complete and accurate as possible. To fill in these missing pieces, the Coalition is beginning to seek out qualitative data to supplement its quantitative database and to explore bright spots — people who

are absent from the data because of successes — in order to identify and learn from individuals who researchers would expect to have high dual-system overlap but don't.¹² Such data hold the potential to identify system contacts, assess warning signs, highlight redundancies and inefficiencies, and reveal more appropriate ways to engage this at-risk population.

Currently, the Camden study is focused on gathering and analyzing information. In the next phase, researchers will turn their attention to designing and testing interventions to prevent the cycling the data have shown. The Coalition is partnering with the Camden County Police Department, criminal justice agencies throughout the city, and community organizations to adapt its existing care management intervention to a more heavily criminally justice involved population. This "Camden Model" posits that "if we can identify and coordinate treatment and services around the risk factors contributing to repeat hospitalizations and arrests, we will not only improve outcomes for Camden's most at-risk and vulnerable citizens, we will reduce costs to both the healthcare and criminal justice systems, unleashing vital resources for investment in other critical areas" (Camden Coalition of Healthcare Providers, 2016). The Camden Model seeks to:

- Ascertain optimal intervention points by focusing on how and when at-risk individuals come in contact with various systems.
- Design optimal intervention strategies based on individual typologies that result in

better outcomes and reduced system costs, including, where appropriate, alternatives to arrest and jail.¹³

Ultimately, integrated data can lead to better individual outcomes, reduced crime and system cycling, and increased efficiency by directing resources where they will have the most impact.

Further Questions for Research

The integrated data research being done in Camden is only a starting point. At this time, no causal links have been found. Many correlations exist, but there is no proof of causation. Additional research analyzing cross-sector integrated data in Camden and beyond is needed to develop interventions to end cycling between hospitals and jails. Questions for future research include:

- What are the burdens of and barriers to data sharing across systems and sectors?
- What is causing the overlap between individuals who have frequent contacts with multiple systems serving vulnerable populations?
- What integrated solutions to the problems of multiple-system cycling can be piloted and evaluated?
- To what extent does this research integrate with research on juveniles, predicting dropout or the “school-to-prison pipeline”? How early should a pilot intervention start?
- What is the right unit to target as a means of efficiently allocating resources for such interventions? Is it a residential building? A

family? A neighborhood? Individuals within a particular subgroup? (See Desmond and An, 2015.)¹⁴

Conclusion

The Camden study provides a new high-level view of a public policy problem that plagues many cities: How to identify and treat vulnerable individuals who cycle frequently through multiple systems. It also raises the question of whether we can provide long-term solutions to the underlying problems that drive the frequent use of hospitals and repeat arrests for crime. In the end, the most important finding from this study may be that there is enormous value in fostering collaborative data sharing among agencies. By highlighting the power of cross-sector integrated data to unlock key insights into at-risk populations, this study showcases the potential of cross-sector collaboration to provide better outcomes in public safety and public health.

Endnotes

1. Both of these early evaluations are potentially vulnerable to regression to the mean, which in this case would be an individual’s hospital use decreasing on its own due to the natural course of the disease or another reason unrelated to the intervention. To combat this methodological challenge, the Coalition recently partnered with Massachusetts Institute of Technology’s Abdul Latif Jameel Poverty Action Lab (J-PAL) to conduct a randomized controlled trial — the gold standard for demonstrating causality — to evaluate its care management intervention. The Coalition is currently four-fifths of the way through its

anticipated enrollment projects, and the evaluation is expected to be completed in 2018.

2. Violent crime arrests for this subgroup broke down as follows: simple assault (38 percent), weapons charges (30 percent), aggravated assault (26 percent), and robbery (6 percent).

3. Housing status was determined through a combination of the patient's self-reported address and ICD9 V-Codes, which are known to be underdocumented and thus an underestimate of homelessness.

4. To protect privacy, the individual's name has been changed and other identifying details have been modified and/or removed.

5. While the Coalition's study is unique in integrating hospital claims data with police data, projects in several other geographical areas have integrated health and criminal justice or police data, including (but not limited to) Antioch, California Youth Intervention Network; Philadelphia CARES; Allegheny County Data Warehouse; Los Angeles Enterprise Linkage Project; Washington State Integrated Client Database; and Florida Policy and Services Research Center.

6. When researchers sorted out a cluster of 38 individuals in that group who did show arrests for violent behavior, they found that before their first arrest for a violent offense in the data, 75 percent had been seen at the hospital for violence directed at them. Thirty-seven percent (14 individuals) had been seen two or more times for this reason before the first arrest for a violent offense found

in the data. These individuals also showed socio-behavioral complexities before their first arrest for a violent offense; 68 percent had at least one previous substance use- or mental health-related hospitalization or ED visit. More than half of these individuals had two or more such substance use- or mental health-related hospital visits before their first arrest for a violent offense in the data set; five of the individuals had 10 or more. All of these contacts with the system before an arrest for a violent offense represent opportunities for intervention or chances to assess warning signs for future violence and suggest that violence must spring from somewhere; root causes of the behavior may show themselves years before violence erupts. In one study of 7,222 seriously mentally ill homeless adults, for example, the authors found that at least some proportion of the arrests of this sample were of those who had been exhibiting antisocial behavior since early adolescence, and that early antisocial behavior was a strong predictor of all types of recent arrests in this population (Desai, Lam, and Rosenheck, 2000).

7. The community corrections population is roughly double that of America's jails and prisons. At the end of 2013, approximately 2.2 million individuals were incarcerated in U.S. prisons and jails, and more than 3.9 million people were on probation (Glaze and Kaeble, 2014).

8. Previous research looking at specific populations has found linkages among these social determinants, crime, and health; see, for example, Tsai and Rosenheck (2012), who found that study participants with extremely long incarceration periods had worse substance use outcomes than

those with no history of incarceration. Greenberg and Rosenheck (2008) analyzed the 2002 national survey data on 6,963 inmates, concluding that homelessness increases the risk of incarceration and vice versa; mental illness, substance abuse, and disadvantageous socio-demographic characteristics amplify this risk. Western (2007) found a strong relationship between incarceration and severely dampened economic prospects among the formerly incarcerated, perpetuating a damaging cycle of broken families, poverty, and crime. Metraux and Culhane (2006) showed that 23.1 percent of individuals staying in a Department of Human Services single adult shelter in New York City on December 1, 1997, had been incarcerated within the previous two-year period. McNiel and Binder (2005) examined archival databases on the use of psychiatric emergency services in San Francisco, finding that homeless individuals with mental disorders accounted for a large proportion of users and further noting that “[t]he co-occurrence of homelessness, mental disorder, substance abuse, and violence represents a complicated issue that will likely require coordination of multiple service delivery systems for successful intervention. . . . Simply diverting individuals with these problems from the criminal justice system to the community mental health system may have limited impact unless a broader array of services can be brought to bear.” Kushel and colleagues (2005) found that while there are high levels of health risks among all homeless and marginally housed people, the levels among homeless former prisoners were higher. Martell, Rosner, and Harmon (1995) studied 254 defendants referred for psychiatric examination by Manhattan courts over a six-month period and

found that homeless, mentally ill persons appear to be grossly overrepresented among mentally disordered defendants entering the criminal justice and forensic mental health systems.

9. The inefficiencies created by such a piecemeal approach are highlighted by the work of Goerge and colleagues (2010). In an analysis of government program participation among Illinois families, Bob Goerge and his team of researchers found an overlap in five social programs: foster care, mental health services, substance abuse treatment, juvenile corrections, and adult corrections. He found that agencies “tend[ed] to treat all of the people they serve with their own services and programs, not with coordinated approaches across agencies and systems” and that “[s]tate and local agencies primarily respond to crises defined by single problems happening at a point in time” rather than focusing on early intervention to prevent future problems.

10. Childhood delinquency has been linked to “adult crime, alcohol abuse, general deviance, economic dependency, educational failure, unemployment, and divorce” (see Sampson and Laub, 1990).

11. According to its founders, the LEAD program “allows law enforcement officers to redirect low-level offenders engaged in drug or prostitution activity to community-based services, instead of jail and prosecution. By diverting eligible individuals to services, LEAD is committed to improving public safety and public order and reducing the criminal behavior of people who participate in the program.” LEAD: Law Enforcement Assisted Diversion, <http://leadkingcounty.org>.

12. While integrated data systems allow us to combat fragmentation of services and provide a more holistic understanding of an individual's well-being, it is also important to note the limitations of administrative data. Administrative data are fundamentally reactive; they only capture information about individuals who enter the orbit of an institution, not those who are unable or unwilling to do so or who are not in need at a given time. As integrated administrative data continue to gain traction, it is critical that we strive to fill in what is potentially missing, both through qualitative methods to supplement the quantitative data and through "bright spotting" — identifying and learning from individuals who we would expect to have poor outcomes but don't.

13. Some researchers and localities have been testing innovative solutions to problems of frequent recidivism and multisystem cycling. Housing First programs, for example, provide nonabstinence-based housing for the chronically homeless, even those with alcohol or substance abuse issues who are frequently ineligible for public shelter systems, as a way to enhance public safety and personal health and reduce costs. Clifasefi, Malone, and Collins (2013) found that participants' criminal histories reflected "symptoms" of homelessness rather than threats to public safety, and that exposure to Housing First was associated with decreased jail time for up to two years (Mackelprang, Collins, and Clifasefi, 2014). Perhaps the most well-known program is 1811 Eastlake in Seattle, a "wet" housing model that does not require sobriety from its residents. Researchers have found that 1811

Eastlake has saved taxpayers more than \$4 million in costs for publicly funded services, including jail, detox center use, hospital-based medical services, alcohol and drug programs, and emergency medical services (Larimer et al., 2009). Other intriguing interventions include assertive community treatment programs, which are designed to help individuals with severe mental illness who are at risk of homelessness and hospitalization to become integrated into their communities through the use of round-the-clock mobile services (Lamberti, Weisman, and Faden, 2004). ProjectLinks is a program designed to prevent individuals with severe mental illness from entering the criminal justice system by integrating criminal justice, health care, and community support services (see Weisman, Lamberti, and Price, 2004). The Frequent Users Service Enhancement or "FUSE" initiative in New York City, which provided supportive housing to 200 people with complex involvement in multiple public systems, resulted in reduced cycling in and out of jails and homeless shelters (see Aidala et al., 2013). The Transition Clinic, a health care program operated by physicians, community organizations, and representatives of the San Francisco Department of Public Health's safety-net health system, provides transitional and primary care, as well as case management, for prisoners returning to the community (see Wang et al., 2010).

14. Desmond and An's study of Milwaukee renters is instructive, examining the impact of neighborhoods versus social networks on various types of disadvantage.

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