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THE HIDDEN HEALTH CARE CRISIS BEHIND BARS: A RANDOMIZED TRIAL TO ACCREDIT U.S. JAILS

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ABSTRACT

The U.S. has one of the highest incarceration rates in the world, with over seven million admissions to jails each year. Incarcerated individuals are the only group in the U.S. that have a constitutional right to receiving "reasonably adequate" health care. Yet, there is little oversight and funding for health care in jails, where illness and mortality are rampant. In this study, we randomize the offer of health care accreditation to 44 jails across the U.S. Surveys of staff indicate that accreditation improves coordination between health and custody staff. We also find that accreditation improves quality standards and reduces mortality among the incarcerated, which is three times higher among control facilities than official estimates suggest. These health gains are realized alongside suggestive reductions in six-month recidivism, such that accreditation is highly cost effective.

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I Introduction

Serving as the point of entry into the criminal justice system, U.S. jails have over seven million admissions per year, with over 600,000 individuals held in jails on any given day, the vast majority of whom are unconvicted (Zeng 2023). Jails are typically considered short-term detention facilities, but mortality in jails has increased in the last decade, often occurring within hours or days of admission (Adler and Chen 2023). Drug- or alcohol-related deaths in jail have increased by a factor of four over the same time period, and the official suicide death rate remains at two times the national average (Wang 2021; Carson 2021). Our own data reveal a mortality problem that is much more severe, with death rates *three times higher* than those reported to federal authorities, reflecting longstanding difficulties with accurate reporting and transparency of deaths in custody (Mitchell Jr and Aronson 2023).[1] Thus, improving the quality of health care provided in jails is of utmost policy importance.

One commonly used method to ascertain quality in settings of information frictions is accreditation. Broadly defined, accreditation is a process during which an agency assesses a product's compliance with industry quality standards. However, whether and to what extent accreditation is effective is unsettled: models of accreditation often deliver multiple equilibria depending on whether a certifying agency behaves opportunistically – colluding or shirking – or as an honest broker (Strausz 2005). As a practical matter, accreditation is widespread in the U.S. health care system. Typically, the accreditation process involves the development of standards and an independent, on-site audit of the health care provider (Sechrest 1976). In the U.S. civilian health care system, for example, such accreditation is typically done by the Joint Commission (TJC), and attaining "deemed status" through the TJC allows health care facilities to charge Medicare and Medicaid for reimbursement. As a result, nearly all U.S. civilian patients receive care from TJC-accredited hospitals (The Joint Commission 2024).

This is not true for incarcerated patients, however, as only 17% of correctional facilities have sought voluntary accreditation by a third-party agency (McCann 2022). This low rate of accreditation is due in part to the lack of financial incentives, as medical care during incarceration is not covered by federal funds.[2] Yet the need for quality care is critical for the incarcerated population, who not only suffer from a dual burden of communicable and non-communicable disease, but are also the only U.S. population constitutionally guaranteed a right to adequate health care since the landmark Supreme Court decision in *Estelle v. Gamble (1976)* (Alsan et al. 2023). Correctional facilities are thus legally required to provide adequate care, but are led by individuals with limited medical knowledge who often contract with for-profit vendors in the face of rising medical costs, further heightening concerns about access and quality (Bedard and Frech III 2009; Henrichson, Rinaldi and Delaney 2015; Berwick, Beckman and Gondi 2021). Correctional leaders also face a principal with multiple-agents problem as they depend on custody and medical staff, two agents whose cooperation is essential to ensure delivery of health care (Alchian and Demsetz 1972; Holmstrom 1982).

In this study, we evaluate whether accreditation affects the quality of care, mortality, and staff outcomes in U.S. jails. In theory, the effects of accreditation are ambiguous. If standards focus on items that do not improve health or if accreditation serves merely as a "rubber stamp," accreditation could have an inconclusive or negative effect on health care quality and outcomes by diverting attention and resources to less

[1] Reuters data on deaths in custody also show a much higher mortality rate than the Bureau of Justice Statistics (BJS) data collected by the Department of Justice (DOJ).

[2] The Social Security Act (Sec. 1905(a)(A)) prohibits use of federal funds and services...for medical care provided to inmates of a public institution (Social Security Amendments 1965; Edmonds 2020).

useful activities or by fostering complacency with poor care.[3] If, on the other hand, accreditation provides information to improve coordination between agents and allows the principal to observe individual agent effort, it may have a positive and measurable effect on health outcomes.

To estimate the causal effect of accreditation, we conducted a randomized controlled trial with 44 U.S. jails across the U.S. spanning four years. The participating jails are representative of small to medium-sized jails in the country. Stratifying jails by size and enrollment timing, we randomized jails to undergo an accreditation process administered by the National Commission on Correctional Health Care (NCCHC), a non-profit correctional health care accrediting agency founded in 1983 (National Commission on Correctional Health Care 2018; Gibson and Phillips 2016). NCCHC accreditation is based on quality standards that comprise seven core categories ranging from governance and administration to patient care and treatment. To measure compliance, NCCHC performs on-site audits to assess whether a facility is meeting such standards and a committee of experts blind to facility identity decides on the accreditation status. NCCHC's accreditation process is regarded as a "gold standard" among many practitioners and policymakers and obtaining NCCHC accreditation is often regarded as a signal of constitutionally adequate health care by courts, although critics also allege that it is ineffective.

In our study, 22 treatment facilities received a generous subsidy towards the accreditation fee and 22 control facilities were offered a more modest subsidy to commence accreditation at the end of the study period approximately 24 months after enrollment. We developed and administered several novel survey instruments at both baseline and endline, including questionnaires for facility leadership, custody and medical staff, and independent audits of medical records and death logs. At endline, we conducted qualitative interviews with jail leadership and incarcerated individuals. These survey instruments were created and coded by dozens of undergraduate, medical, and law students to ensure expertise in interpreting clinical and legal data. Lastly, we conducted a survey with experts comprising jail administrators and health care providers, policy experts and academics, and the formerly incarcerated. Respondents were asked to weight the importance of different standards and predict the outcome of our experiment and heterogeneity.

Using these survey instruments, we find that accreditation has statistically significant and economically meaningful effects on a range of outcomes. At the end of our study, 13 of 22 treatment facilities will have successfully received NCCHC accreditation.[4] Instrumenting with treatment assignment for completion of the accreditation process in a two-stage-least-squares specification, we find that completing the accreditation process improves measures of horizontal coordination (between custody and medical staff) and staff preparation, with null effects for staff perceptions of respect for incarcerated individuals. In addition, accreditation improves compliance with meta-indices of quality standards, driven by improvements on standards governing "personnel training" and "patient care and treatment." Notably, outcomes such as additional staff and large capital investments do not change with accreditation, as county budgets are relatively constrained and standards focus mainly on improving processes and procedures.

In terms of health outcomes, we find that completion of the NCCHC accreditation process substantially decreases mortality as measured by average deaths per month, with a reduction of about 90% in the half-year following the expected time of the NCCHC on-site visit. Our mortality effects are considerable and robust to a range of different estimators (*e.g.*, non-linear) samples and specifications. Specifically, we

[3] With respect to an investigation into the accreditation process conducted by the American Correctional Association (ACA), Senator Elizabeth Warren reported that "it appears the ACA is a conflicted party with twisted incentives, a lack of transparency, and lax inspection policies that appear to have turned accreditation into a rubber-stamp process that does little to hold facilities accountable."

[4] One of these thirteen is in the final stages of finalizing its status.

find similar effects using reduced form estimates or the *fraction of process completed* as measured by either NCCHC or by the research team at Harvard as the endogenous variable. This latter specification admits the possibility that completing *some* of the process has salubrious effects. In practice, the point estimates are indistinguishable as most who exited the process did so without making any improvements, but the standard errors are smaller using a process versus completion measure. We also confirm that our mortality effects are unlikely to be driven by reporting bias, as our findings can be replicated using only media reports of deaths. Rather, it seems the magnitude of our effects are due to the fact that there is considerable scope for improvement among U.S. jails, where information frictions and coordination problems are severe and where health outcomes are much worse than widely believed. Such an interpretation is supported by our in-depth qualitative work, which shows that the accreditation process helped align custody and medical staff, and provided important information on how to process and screen inmates, particularly in the very first days of incarceration where mortality tends to be the highest.

To assess heterogeneity, we rely on the predictions from our expert survey. The three factors selected by experts as most likely to affect the impact of NCCHC accreditation were the number of medical staff (FTE), the health care quality, and the quality of jail management. Yet, we find modest evidence that such factors predict heterogeneity. If anything, we find that lower medical FTE per ADP and lower variety in FTE composition (type of medical staff) at baseline results in greater reductions in mortality and larger improvements in compliance with quality standards following treatment assignment. We also find suggestive evidence that accreditation reduces the probability of six-month recidivism but there is no detectable effect on litigation.

Broadly, our study shows that accreditation can improve health care and save lives in U.S. jails. These findings contribute to a growing literature in both economics and public health studying health care and health conditions in U.S. jails.[5] For example, the public health literature generally reports harmful effects of jails, including higher rates of overdose deaths immediately upon release (Binswanger et al. 2007) and higher rates of deaths due to carceral exposure over the life course (NASEM 2019; Daza, Palloni and Jones 2020). More recently, Norris, Pecenco and Weaver (2024), using an event study framework, find detrimental effects of release from incarceration in Ohio on mortality. The authors interpret this as evidence of high mortality risk among community-dwelling men that is lowered by the incapacitation effects of incarceration. Similar effects on prison improving health outcomes among some groups of inmates were found in the context of Sweden, where healthcare was described by the authors as "high quality" and time in prison increases interaction with psychologists, doctors, and addiction treatment (Hjalmarsson and Lindquist 2022).

Economists have also explored the link between conditions of confinement and crime, with studies by Katz, Levitt and Shustorovich (2003) and Bedard and Helland (2004) finding that higher mortality rate in prison and prison punitiveness as measured by distance from residence reduces crime due to a deterrence effect. On the other hand, since over 95% of those incarcerated in jail return to their communities, providing services while incarcerated could improve community health and reduce the cycle of violence, with growing evidence of the effectiveness of rehabilitative programming (Doleac 2023; Alsan et al. 2024). For instance, improving health care in jails may mitigate community spread of HIV/AIDS and COVID-19 and prevent the widening of disparities across communities (Johnson and Raphael 2009; Reinhart and Chen 2021).

Our paper also contributes to an important theoretical and empirical literature on quality improvements

[5]See Batistich, Evans and Phillips (2021); Patterson (2010); Spaulding et al. (2011); Wildeman et al. (2016); Norris, Pecenco and Weaver (2024); Binswanger et al. (2007); Smith (2013); Bovell-Ammon et al. (2021); Ruch et al. (2021)

in healthcare, and the impact of quality assurance mechanisms (Bloom et al. 2015, 2020; Dranove and Jin 2010). Theoretically, the effect of quality disclosure is ambiguous and the limited empirical evidence is mixed, but some studies find that quality disclosure can improve welfare. Jin and Leslie (2003), for example, find that restaurant hygiene grade cards reduced hospitalizations from food-borne diseases. Chen (2008) studies the effect of the Nursing Home Quality Initiative, finding that lower quality nursing homes improved relative to high quality homes, with larger improvements in more competitive markets. We contribute to this literature by studying the effects of quality assurance via accreditation for health care in jails.

Finally, we build on a literature identifying effects of health care accreditation specifically. A review by TJC found that 80% of the 189 published research studies on accreditation showed a positive impact on quality, although all are observational in nature and were not conducted within correctional settings (The Joint Commission 2021), and a recent systemic review of 21 higher quality studies on hospital accreditation noted that findings were inconsistent (Alhawajreh, Paterson and Jackson 2023). Another study evaluating Denmark's mandatory national accreditation program found that accreditation improved quality of care overall, particularly in low-performing areas, with gains leveling off after accreditation (Bogh et al. 2017). Additionally, a study which randomized accreditation of 20 hospitals in South Africa found that accreditation improved quality metrics (Shaw 2003). We contribute to this existing work by conducting, to the best of our knowledge, the first randomized controlled trial across U.S. jails, and the first randomized trial of accreditation in any medical context in the U.S.

The remainder of the paper is organized as follows. Section II provides legal and medical background. Section III presents a conceptual framework of accreditation. Section IV provides details on intervention and experimental design and Section V describes the data we used. Section VI describes our findings, Section VII describes heterogeneity analyses based on an original expert survey, and Section VIII provides qualitative evidence. Section IX concludes.

II Background

II.1 Medical Context

The U.S. incarcerates more individuals per capita than many other countries in the world (Fair and Walmsley 2024). In 2022, U.S. jails had 7.3 million admissions (compared to approximately 34 million hospital admissions in the same year (Health Forum 2024)), with over 600,000 individuals held in jails on any given day (Zeng 2023). Jails represent a critical juncture because they are the point of entry for the criminal justice system and where many individuals are first screened and triaged upon booking.

Individuals who enter the jail system suffer from a dual burden of chronic and infectious disease (Wang 2021). The incarcerated population generally comes from lower-income households, with substantially greater physical and mental health needs than the general population; they have higher rates of tuberculosis, HIV, hepatitis, diabetes, and psychiatric illness (Maner et al. 2022; Curran et al. 2023). More than half of incarcerated individuals have a mental health problem, a substance use disorder, or both, and they experience higher rates of geriatric conditions than the age-matched general population (Puglisi and Wang 2021; Greene et al. 2018).

As a result, the occurrence of adverse events is commonplace and rising in jails. For example, mortality rates have increased by 11% from 2000 to 2019, with a *reported* average mortality rate in U.S. jails of 1.5 deaths

per 1,000 and a mortality rate of almost 2 deaths per 1,000 among the unconvicted jail population in 2019, approximately half the mortality rate for the adjusted general population (Carson 2021; Adler and Chen 2023). During the same time period, drug- or alcohol-related deaths in jail increased by a factor of four, and the suicide death rate remained high at two times the national average (Wang 2021; Carson 2021).

Accurate reporting on deaths in jails, however, is problematic. Despite reauthorization of the Deaths in Custody Reporting Act (DCRA) in 2013, disclosure has been seriously flawed for several reasons (McCann 2024; Congressional Research Service 2023). First, the penalty for noncompliance (up to a 10% reduction in the Edward Byrne Memorial Justice Association Grant - JAG) is relatively weak and enforced at the state not local level. Second, the Department of Justice (DOJ) moved responsibility for collecting DCRA data from the Bureau of Justice Statistics to its Bureau of Justice Assistance, which is less well-equipped for such activity, citing concerns a that a federal statistical agency could not be involved with policymaking. Third, the DOJ has been slow to release data, yet even when it does there are serious flaws: three federal agencies including the General Accounting Office (GAO) found substantial underreporting of deaths-in-custody to the Bureau of Justice Assistance.[6] Indeed, among our own data, the death rate based on death logs (4.5 per 1,000) and Reuters-reported deaths is substantially higher than official statistics published by the DOJ.

II.2 Legal Context

Constitutional Standards and Relevant Statutes: The legal community, in conjunction with the medical community, has played an important role in shaping the delivery of health care in U.S. jails through the development of constitutional and statutory requirements.[7] In the 1976 landmark decision *Estelle v. Gamble*, the Supreme Court held that deliberate indifference to the serious medical needs of incarcerated people violates the Eighth Amendment's prohibition against cruel and unusual punishment (American Medical Association 1979; Greifinger 2007; Alsan et al. 2023). In *Estelle*, the Court construed the Eighth Amendment as embodying "broad and idealistic concepts of dignity, civilized standards, humanity, and decency," leading the Court to conclude that the "deliberate indifference to the serious medical needs of prisoners constitute[d] the 'unnecessary and wanton infliction of pain' prohibited by the amendment."[8] In *Helling v. McKinney* (1993), the Court expanded on the *Estelle* decision, finding that the Eighth Amendment also "protect[ed] against future harm to inmates," laying the groundwork for prevention in addition to treatment for existing conditions. Moreover, the Court in *West v. Atkins* (1988) extended liability to privately contracted medical staff, holding that private physicians contracted to work at state prisons act under the color of state law, and thus can be sued for providing inadequate medical treatment (Pew Charitable Trusts 2014).

While this constitutional right exists, the *Estelle* standard for establishing an Eighth Amendment violation is a very high bar to meet. For instance, federal courts interpreting deliberate indifference to mean treatment that "must be so grossly incompetent, inadequate, or excessive as to shock the conscience or to be intolerable to fundamental fairness."[9] Negligent medical treatment and even medical malpractice does not meet the deliberate indifference requirement. In addition, incarcerated individuals face numerous barriers to filing suit in the first place, ranging from statutory hurdles imposed by the Prison Litigation Reform Act to difficulties with obtaining counsel (Alsan et al. 2023).

[6] The GAO report found 1,000 unreported deaths in 2021 compared to other sources and noted 70% of records submitted to the Department of Justice were missing key information (GAO 2022).

[7] See Appendix Section L.2 for further details.

[8] *Estelle v. Gamble*, 429 U.S. 97 (1976).

[9] See *Miltier v. Beorn*, 896 F.2d 848 (4th Cir. 1990).

Statutory barriers to the financing of health care in correctional facilities further hamper the ability of jails to fulfill these constitutional obligations. Specifically, the 1965 Medicaid Inmate Exclusion Policy prohibits Medicaid from reimbursing most health care delivered to the incarcerated (Edmonds 2020).[10] As a result, the cost of medical care in corrections continues to rise, with corrections representing the largest expenditure for state budgets after Medicaid and with one-sixth of prison budgets dedicated to health care (Pew Charitable Trusts 2014). These costs are only expected to rise given medical inflation, aging of the incarcerated population and increasing mental health disorders (Williams, DiTomas and Pachynski 2021). Aiming to contain costs and limit liability, sheriffs and jails officials with limited medical knowledge increasingly contract with private for-profit vendors to provide health care whose quality is difficult to observe.[11] In addition to these information frictions, there are coordination problems since both custody and medical staff must work together to ensure delivery of health care as a team despite having different objectives. In such a circumstance: what, if any, is the role of health care accreditation?

II.3 Accreditation

Accreditation in health care: Accreditation is a process designed to ensure quality of organizations in settings of limited information.[12] Typically, the accreditation process involves the development of standards and an independent, on-site audit by a third-party (Sechrest 1976). The theoretical effects of accreditation on quality and associated outcomes are ambiguous and depend on whether the third-party is an honest broker (Dranove and Jin 2010). Empirical findings on the effects of accreditation on quality in health care, where it is incredibly common, are mixed and causal evidence is lacking.

Accreditation is prevalent in the civilian healthcare system despite the lack of compelling evidence on effectiveness because it is a prerequisite for receipt of reimbursement from Medicare (Jha 2018; The Joint Commission 2024). As the incarcerated population is stripped of federal benefits through the Medicaid Inmate Exclusion Policy, there is no such high-powered incentive for those operating U.S. jails. Nor is there a legal mandate for U.S. jails to obtain accreditation.

Another striking difference specific to delivery of health care in jails is the "paradox of having the same institution meting out punishment and providing care for health problems" (Prout and Ross 1988). As experts noted when first developing standards in the wake of *Estelle*, the correctional setting means that "general schedules that strictly regulate work, exercise, and diet necessarily collide with individual medical orders for treatment" (Neisser 1977). Wishart and Dubler (1983), for example, state that "in delivering care to inmates, prison health care staff are responsible to their patients while simultaneously being constrained by the setting designed to separate, confine, and punish. They must accommodate the different and often conflicting norms that govern health care providers on the one hand and correctional staff on the other." Indeed, our own qualitative interviews reveal this problem, with incarcerated individuals noting that custody staff do not always implement the medical recommendations of medical staff because "the officers are more concerned about the disciplinary and correctional aspects than whether they are receiving the proper care."

[10] In recent years, several states have received Section 1115 Waivers which allow Medicaid funds to be used for a limited set of health care delivered to the incarcerated prior to release (Saloner 2023; Howell et al. 2023).

[11] Data on the privatization of health and other services in U.S. jails are difficult to find, but estimates suggest that approximately 70% of jails contract with a for-profit health care vendor, such as Wellpath or Corizon, with these vendors often backed by private equity firms (McLeod 2019; Coll 2019).

[12] Compared to other quality assurance mechanisms such as warranties or licensing, quality disclosure systematically measures and disseminates information about product quality, is typically conducted by a third-party certifier, and relies on standardized quality standards so that results are comparable across producers (Dranove and Jin 2010).

Thus, accreditation for U.S. jails is not handled by the TJC given these unique features; rather organizations like the American Correctional Association (ACA) and National Commission on Correctional Health Care (NCCHC) serving as leading accrediting bodies.[13]

A natural question is why jails would voluntarily undergo an accreditation process when it is neither mandated nor financially incentivized. In an original survey we conducted in 2020 (prior to the current study), we asked nearly 200 jails to provide reasons for why they either chose or were interested in undergoing accreditation. Reducing liability, obtaining feedback from experts, and improving health outcomes were all common rationales – with the most frequent reason (59%) being signaling a constitutionally acceptable level of care.[14] Responses were similar among the set of jails not yet accredited, although 32% of the non-accredited facilities indicated that they could see no reason to becoming accredited in the future. Other non-accredited jails noted that the cost of accreditation and lack of staff were binding constraints.

III Conceptual Framework

Appendix Section B formalizes the potential effects of accreditation. The setup is a principal (the sheriff) who seeks to minimize excess (greater than expected) inmate mortality. There are two agents – custody and medical staff who must work together to reduce the "aggregate output" of inmate deaths (Alchian and Demsetz 1972; Holmstrom 1982). Agents simultaneously choose one of two effort levels (high vs. low) and are one of two types (t^1 and t^2), with type t^1 agent using a state-dependent strategy and t^2 agent choosing low effort. Effort across agents exhibits perfect complementarity. Each agent knows his own type but is uncertain about the other agent's type and, in the baseline case, the sheriff is unable to observe individual effort. This static Bayesian game of incomplete information has a unique equilibrium prior to accreditation where both agents of both types choose low effort (*i.e.*, shirk) and death rates are excessively high.

Given this setup, the accreditation process could lead to the following scenarios:

1. **Coordination**: Accreditation could enable agents to coordinate on the Pareto-efficient equilibrium, where both agents choose high effort. This can occur through two channels:
a. Horizontal Coordination: Accreditation could serve as a perfect signal informing the agent of the other agent's type. Since the game is symmetric, this introduces a second pure strategy equilibrium where both agents exert high effort.

b. Vertical Coordination: Accreditation could also serve as a contracting device, allowing the principal to perfectly observe each agents' actions. In this scenario, the sheriff could levy agent-specific penalties for exerting low effort, resulting in a unique Pareto-efficient high-effort equilibrium (Crémer and McLean 1988).

2. **Rubber Stamp**: If accreditation is merely a rubber stamp, no penalty is levied for whichever effort level an agent chooses. In such a scenario, both agents continue to put in low effort. In a richer model of social welfare, firm profits (for the accrediting agency) might rise and the risk of legal action (against the sheriff) may fall at the cost of taxpayer subsidies for accreditation.

3. **Distraction**: Accreditation improves outcomes only if the high effort dictated by standards meaningfully

[13] TJC briefly attempted to do correctional health care accreditation before abandoning the idea (Chassin, Mark R. 2021).

[14] Specifically, among 75 already accredited jails, 59% indicated that accreditation "signals a constitutionally acceptable level of care," 43% indicated "fewer grievances and lawsuits," and 47% stated that the accreditation process would "provide feedback from knowledgeable authorities." With respect to health outcomes, 55% of jails stated that accreditation would "improve health status of current inmates" and 44% said it would "reduce health risk to the community when inmates are released."

improves health outcomes. In the distraction scenario, this is not the case as the accreditation process is just a distraction. Each agent is perfectly informed about the other's type but are induced to choose low effort since high effort is orthogonal to inmate mortality.

This straightforward framework generates testable predictions. For example, the rubber stamp scenario implies that one might not observe any changes in compliance with health care standards. Under the distraction scenario, compliance with health care standards could increase, but mortality may exhibit no change. But if accreditation results in better horizontal and/or vertical coordination, one would anticipate improvements in both compliance with health care standards and mortality. We provide evidence on mechanisms via staff surveys below.

IV Intervention and Experimental Design

In this section, we provide a brief background of our intervention, experimental design, and implementation. Further details are available in Appendix Sections C, D, E, and F.

IV.1 Intervention

In this study, we randomize jails to undergo the NCCHC accreditation process. NCCHC grew out of the advocacy efforts of the AMA and ABA and is one of the oldest existing health care accrediting agencies in the U.S.[15] NCCHC standards are often referred to as the "gold standard" in correctional health care and leading policymakers have advocated for mandating accreditation, such as the NCCHC process, for all correctional facilities (Berwick, Beckman and Gondi 2021; Fiscella, Beletsky and Wakeman 2017). Courts also rely on NCCHC accreditation as a signal of adequate health care that complies with the Eighth Amendment. For example in *Balla, et al. v. Idaho State Board of Correction*, a federal judge noted that "The NCCHC accreditation..., while not determinative, constitute substantial evidence of adequate medical care."

Today, NCCHC administers consensus-driven standards covering seven major categories: (1) governance and administration; (2) health promotion, safety, and disease prevention; (3) personnel and training; (4) ancillary health care services; (5) patient care and treatment; (6) special needs and services; and (7) medical-legal issues. For example, governance and administration standards address the establishment of a health care system that ensures access to care, professional administration of all aspects of health care, and monitoring and quality improvement policies that effectively process health care issues from identification through resolution. As another example, patient care and treatment standards are designed to ensure the delivery of health care from arrival through discharge in a timely and appropriate manner. Specific examples of standards within each category can be found in Table 1. Each standard is also classified as either "essential" and "important" (see Appendix Table A1 for examples).

These NCCHC standards reflect the centrality of collaboration between correctional and medical staff. As NCCHC notes, "the primary mission of custody staff is to maintain order and secure the environment. The primary mission of health care staff is to identify, assess, and treat individuals' health needs" (National Commission on Correctional Health Care 2021*b*). As a result, "the relationship between custody and health staff can at times seem almost adversarial. All too often, it's 'us vs. them.' But health and custody staff are on the same team, and 'playing well together' benefits everyone – most importantly, the incarcerated patient

[15] See Appendix Sections L.3 and L.2 for further history.

population" (National Commission on Correctional Health Care 2021*a*). Collaboration is directly addressed in various NCCHC standards. For example, the NCCHC standard on medical autonomy states that "delivery of health care in a correctional facility is a joint effort of custody and health staff and is best achieved through trust and cooperation." Another NCCHC standard requires health training for correctional officers so that they can "recognize the need to refer an inmate to a qualified health care professional."

Figure 1 depicts the timeline of the NCCHC accreditation process, with further details provided in Appendix Section L.3. After a facility applies for accreditation, the NCCHC sends the facility the standards with a self-survey questionnaire that the facility can use to determine compliance with the existing standards. NCCHC then conducts an on-site visit, during which time NCCHC staff and physician surveyors review medical records and speak with facility staff and patients to assess compliance. The findings from this on-site visit are then presented to the Accreditation Committee. This Committee consists of physicians, nurses who are affiliated with professional societies (*e.g.,* American Medical Association, American College of Physicians), industry (*e.g.,* Naphcare, health care Executives) and government (*e.g.,* local county jails). The Committee is blinded to the facility's identity and determines compliance based on the report.

To receive accreditation, a facility must be compliant with 100% of applicable essential standards and at least 85% of applicable important standards. If a facility is compliant with more than 90% but less than 100% of applicable essential standards and at least 85% of applicable important standards, the facility receives a status of "continuing accreditation with verification (CAV)." CAV status requires a facility to undergo corrective action. If corrective action is completed within the required four month time frame and verified by the Committee, the facility then receives full accreditation. Other facilities who are farther from the compliance thresholds are placed on "provisional accreditation" or "probation," which automatically requires another on-site visit (*i.e.*, focus survey). Facilities who require these visits are then re-reviewed by the Committee. Facilities that do not submit corrective action in a timely manner, or fail to resolve compliance findings, are placed on probation and those that remain non-compliant are ultimately denied accreditation. As we will discuss below, 41% of our treated facilities did not attain accreditation. Thus, we use an instrumental variables approach that either captures whether or not accreditation was completed or the fraction of the accreditation process completed (measured either by NCCHC or the research team at Harvard) as described in further detail below.

IV.2 Study Timeline and Randomization

Figure 2 shows our study timeline, with the study commencing in early 2020 and ending in Fall 2024.

Recruitment and Enrollment: The study began with the recruitment of jails at national meetings and conferences targeting sheriffs and jail administrators (*e.g.,* Committee of State Sheriffs, the National Sheriffs' Association (NSA), the American Jail Association (AJA), and NCCHC). A member of our research team would attend either in person or virtually. For in-person meetings, team members set up vendor booths with informational flyers and business cards for our project coordinators.

Sixty interested facilities expressed initial interest in the study and we conducted an informational session with custody and/or medical leadership from each interested jail. During the informational session, we shared additional details about the study and information on our Certificate of Confidentiality from the National Institutes of Health (NIH) which we obtained to further protect the information provided by participants. See Appendix Figure A1 and Appendix Section C for material and further information.

Jails were eligible for our study if they had an average daily population (ADP) of between 100 and 3,000 (midsized jails) and had not previously received accreditation by the NCCHC. Privately operated jails, ICE facilities, and juvenile detention facilities were excluded from the study. Out of the 60 interested facilities, 12 declined to move forward following the informational session, one did not meet our study eligibility criteria, and one was not eligible for accreditation based on existing NCCHC standards.

To formally enroll in the study, we required written and informed consent signed by a representative of both custody and medical staff. Following enrollment, eligible jails were provided our baseline facility and staff survey. Completion of the facility survey was incentivized by $500, which could be used towards the cost of accreditation. Staff surveys were incentivized by a lottery of winning a $100 e-gift card.

All enrolled facilities were given the opportunity to become accredited at a highly subsidized rate, with the control facilities beginning the NCCHC accreditation process at the end of the study. Accreditation fees are based on jail ADP. The subsidy for the treated group was much larger and available immediately compared to the control group, with a difference of about $5000 (Appendix Table A2).

Randomization: Once jails completed both baseline surveys, they were randomized into the treatment ("Accredit Now") or control ("Accredit Later") arm and informed of their assignment. Stratified randomization was conducted based on ADP and timing of enrollment ("batch"). Given that larger facilities might have more resources and/or more health challenges, we stratified on high versus low ADP to improve statistical power (Athey and Imbens 2017; Bruhn and McKenzie 2009). Because there were capacity constraints in the accreditation process, we also randomized in three batches, thus yielding six total strata.

NCCHC Accreditation Starts: After randomization, NCCHC begin its accreditation process for the treatment facilities, with treatment compliers (*i.e.*, treated facilities that took up treatment) undergoing the NCCHC accreditation process depicted in Figure 1. NCCHC did not deviate from its usual process for the purposes of our study. Once the treatment facilities received an initial accreditation decision from NCCHC, both control and treatment groups completed incentivized endline facility and staff surveys, as well as medical audits and inmate and leadership interviews. Note that some facilities had still not received NCCHC accreditation by the time of our Harvard endline since they were still going through corrective action. These survey instruments are described in Section V.1 below.

IV.3 Sample

Our initial goal was to recruit 40 facilities with a wait list for additional interested facilities. We invoked randomization off the wait list after two facilities randomized to treatment were removed for reasons orthogonal to their assignment status: in one instance the consenting party suffered a heart attack and the other was put on leave for sexual assault. We included six additional facilities from the wait list in our sample, randomizing such that 22 facilities were allocated to treatment and 22 to control in our main analytical.[16] See Figure 3 for a diagram of the number of interested, enrolled, randomized, and treated facilities in the study.

[16]Appendix Table A3 shows that treatment assignment is not a statistically significant predictor of involuntary removal. Neither facility initiated accreditation, and one never connected with the NCCHC. We impute endline outcomes for the two non-initiating facilities using their baseline values and find similar results to those presented in Section VI.

IV.4 Representativeness

Our recruitment efforts yielded a sample of jails from all over the U.S., including regions where incarceration rates are highest (Zeng and Minton 2021). See Figure 4, which illustrates where the 44 facilities in our main analytical sample are located, with each circle representing the total ADP across all facilities in each state. We use data from the 2019 Bureau of Justice's Census of Jails (U.S. Department of Justice 2022) to assess the representativeness of our study sample. The Census is designed to capture all jails although reporting is not mandatory.

Comparing the 41 out of 44 jails in our sample who responded to the 2019 Census of Jails against 1,085 other medium-sized (ADP 100-3,000) county jails serving adult populations, we find that our sample is representative of these other jails in terms of jail characteristics (Table 2 Panel (A)) and characteristics of the incarcerated population (Panel (B)), although jails in our study had slightly higher yearly admissions and a lower share of White incarcerated individuals. Approximately 4% of our sample and similar out-of-sample U.S. jails were under a consent decree for conditions of confinement and about half of all in-sample and out-of-sample jails held felony offenders. Across all jail and incarcerated population characteristics, the overall F-stat is 1.334 with an associated p-value of 0.2.

While broadly representative of medium-sized jail in the U.S., the jails in our main sample are likely negatively selected relative to other jails that voluntarily seek NCCHC accreditation. Based on information provided by NCCHC, the vast majority of jails who apply for accreditation eventually receive accreditation although a small set of extremely negatively selected facilities may also be court-ordered to obtain accreditation as part of a consent decree or monitoring process (Douds and Ahlin 2016).

Our recruitment efforts revealed many jails had never heard of NCCHC. And among our sample of 22 treated facilities, only 13 successfully received accreditation. Anecdotally, the Accreditation Committee noted to the research team that they were surprised by the lower compliance and success rates of ''Harvard facilities" compared to the typical facilities that apply for accreditation. Although the "Harvard facilities" had little information about NCCHC prior to their recruitment, each of the 13 treatment facilities that received accreditation announced their status on jail websites or social media accounts.

V Data

This section describes our survey instruments, coding methodology, and construction of indices for analysis. We also discuss steps taken to ensure the accuracy and reliability of our measured outcomes.

V.1 Survey Instruments

We designed four primary survey instruments for the purposes of this study: (1) facility survey, (2) anonymous staff survey, (3) medical audit, and (4) qualitative interviews with incarcerated individuals and facility leadership. We also conducted an expert survey to obtain (a) weights on the importance of each quality standard and (b) baseline features of facilities predicted to impact the effect of accreditation. Details on the data, along with links to all survey instruments, are provided in Appendix G.

In designing the quantitative survey instruments, the research team analyzed the NCCHC quality standards to determine (a) whether and to what extent each standard could be objectively assessed and (b) to determine the best manner to obtain accurate information. For example, NCCHC's Privacy of Care standard

requires that health care encounters and exchanges of information are conducted in private (*e.g.* private area, privacy screen, curtain). To measure whether a facility complies with this standard, our facility survey required the facility to upload photo documentation. As another example, NCCHC's Receiving Screening standard requires medical personnel to inquire about illness histories, allergies, recent communicable symptoms, prescription medications, drug use, among other conditions shortly upon intake. In our medical audit, our physician surveyor visually inspected randomly selected medical documentation of receiving screenings in order to assess compliance. Our anonymous staff survey, which is not part of NCCHC's accreditation process, also enabled us to collect systematic information on staff sentiment and cross-validate the other metrics.

(*1*) *Facility Survey*: The facility survey was administered at both baseline and endline via a secure Qualtrics link for each facility. The facility survey had two major components: a questionnaire that was answered by the facility administrator, and document uploads of requested procedures, protocols, and minutes from specified meetings. In the questionnaire component which included 67 question items, facilities were asked about a range of topics spanning the quality standards, such as the availability of specific physical equipment and medical supplies, the availability of mental health and dental services, the FTE of each type of medical staff, and how incarcerated individuals were screened upon booking and for specific conditions. The upload component of the survey required facilities to provide a copy of their official polices and procedures manual, along with 43 other requested documents. These included documentation on management of COVID-19 and protocols for Medication Assisted Treatment (MAT), treatment protocols for patients with conditions such as hypertension, diabetes, and HIV, as well as CPR and other health certification for all personnel. In addition, we requested blank copies of health assessment forms, mental health screenings, sick call forms, and death logs, among others. Finally, we requested health staff meeting and administrative meeting minutes and attendance records from the past 12 months.

(*2*) *Staff Survey*: The staff survey was also administered at both baseline and endline via a secure Qualtrics link for each respondent. The survey was sent to comprehensive staff email lists that included both custody and medical staff. We asked staff approximately 120 questions related to staff satisfaction, the relationship between custody and medical staff, and perceptions of care.

(*3*) *Medical Audit*: The medical audit was administered at endline with a retrospective look back to the study baseline period. The audits were performed on Zoom with a medical professional alongside a scribe and took approximately three hours per facility. For the audit, each facility was asked to pull a random set of medical records for patients with the following conditions: suicidality, opioid use disorder, diabetes, hypertension and HIV/AIDS, as well as additional randomly selected files, covering both endline and baseline periods. In addition, facilities provided death logs (which include date and cause of death for individuals who died while incarcerated), clinical death reviews, and psychological autopsy reviews for the past 12 months which were reviewed and documented by the research team. All records (whether electronic or paper) were shown to the research team virtually, with personally identifiable information redacted.

(*4*) *Interviews with Incarcerated and Leadership:* We also conducted qualitative interviews with incarcerated individuals and facility leadership at endline only. For each facility, we requested interviews with three incarcerated individuals (at least two of whom had used medical services) and with at least one senior facility administrator. These interviews were conducted on Zoom, took approximately 45 minutes each, and were conducted in private with the study coordinator and a scribe. Incarcerated individuals were asked questions in both multiple choice and open response format regarding their perceptions of the care they

received and administrators were asked questions about their perceptions of health care delivery. Unlike the other surveys, these interviews were not considered mandatory for the facility to complete and the coverage rate is accordingly lower.

(5) *Expert Survey:* From October 2022 to March 2024, we collected predictions on our study from experts across various domains, including jail administrators and health care providers, policy/academic experts, and the formerly incarcerated. Recruitment occurred at national subject matter conferences, through cold calls of expert lists, and using recruitment methods on Prolific. We use expert weights to construct an aggregate quality standards index, as described below. Respondents were asked to rank order from 1–7 a set of seven outcomes in terms of perceived importance. We also take a principled approach to assessing heterogeneity by relying on predictions from this survey: Respondents were asked to select five factors that they believed would most affect whether accreditation of jail health care services by NCCHC has an effect on outcomes. We use these predictions in our heterogeneity analysis as described below. See Appendix G.6 for further details on the expert survey.

V.2 Additional Data

We use additional data from the Census of Jails and also scraped data on mortality events in the media. In addition, we trained law students to code information on lawsuits, such as incident dates and whether the legal claim alleged inadequate health care, using case filings and decisions from LexisNexis, CourtListener and PacerMonitor. Each facility was coded by two independent law students who were blinded to the treatment assignment. If there was disagreement between two coders, a third independent law student would adjudicate. Finally, we obtained jail bookings records and scraped publicly-available jail rosters to measure recidivism (defined as rebooking in the same jail) three and six months post-release.

V.3 Coding and Construction of Main Outcomes

Our main outcomes are (1) staff sentiment, (2) quality standards compliance, and (3) mortality. Details on the coding and construction of these outcomes can be found in Appendix H and Appendix I.

(1) *Staff Sentiment:* We measure staff sentiment using individual-level responses in the staff survey. All questions utilized five point Likert scales, which we rescaled to fall in the unit interval. We then created several indices to measure staff sentiment. We obtained endline responses from 40 jails and we impute missing endline responses for the other 4 facilities in our analytical sample with baseline values. For example, our horizontal coordination index represents the arithmetic average of questions about custody supporting clinical decisions by medical staff, collaborative work between the two, and open communication. Our vertical communication index consists of questions on supervisors being open to concerns about the health or safety of inmates and staff and whether staff feel comfortable bringing up concerns to their supervisor. We also create an index of job satisfaction and assess staff views on respect for incarcerated individuals.

(2) *Quality Standards:* To measure compliance with quality standards, we use data collected from the facility survey and medical audit, which were mapped into each of the seven NCCHC quality standard categories. We used a specific coding process to independently and objectively measure compliance on the basis of the documents uploaded by facilities in the facility survey. Specifically, a Coding Committee consisting of Harvard students and chaired by the study coordinator developed a coding manual to map raw data elements into a dataset. The manual consists of 43 separate spreadsheet pages corresponding to the major

compliance indicators within each of the seven quality standards. Each sheet provides a step-by-step guide for coders to determine whether the facility is complying with the standard. As one example, the current NCCHC standards require facilities to have a grievance policy for incarcerated individuals that provides clear guidance on days to first response, formal documentation of grievances, and an appeals process. The coding manual instructed our coders to read uploaded protocols to determine whether such criteria was met, as can be shown in Figure 5.

For each facility, this coding process was done by two independent college or law students who were blinded to the treatment assignment. Students were only eligible for coding after undergoing an online training session and practice exam which included intentional errors to ensure their accuracy and attention to detail. If there was disagreement between the two coders as to whether a facility complied with a standard, a third independent student (again blinded to treatment assignment) would adjudicate. Another Coding Committee consisting of Harvard medical students, study coordinator and one of the PIs, mapped questions in the medical audit to each of the seven quality standard categories.[17]

At the end of the coding process, we created an index for each of the seven NCCHC standards categories. All elements in each index ranged from 0 to 1, with either binary indicators to measure compliance with the standard, or a fraction to indicate percent compliance when a standard required multiple elements. Non-response was penalized as described in Appendix Section H.2.2. We take the index for each quality standard as the arithmetic average across all such indicators associated with that standard. Thus, each index can be interpreted as the aggregate percent compliance with the standard, with 0 indicating complete non-compliance and 1 indicating full compliance.

(3) *Mortality:* We use death logs obtained from the medical audit to measure mortality, with the time range of the death logs covering the prior 12 months. To independently verify that facilities were not under-reporting mortality, coders collected deaths reported in the media, which were then matched to death logs using the date and cause of death. We then took the union of deaths from both the medical audit and the media, dropping duplicates, to ensure that we were capturing all identified deaths. For four facilities who did not provide data logs (all in the control group), we only use deaths reported in the media. Using the union of deaths from the medical audit and media reports, we calculate the average deaths per month using a baseline period that covers six months prior to randomization and an endline period covering six months after the expected time of NCCHC's on-site visit.[18] The correlation between endline mortality based on death logs and media reports is 0.82, and we explore non-linear specifications and measures in robustness checks.

V.4 Aggregation of Quality Standards

As per our pre-analysis plan, we aggregate the seven indices representing each category of quality standards in several ways to obtain a meta-index. First, we give all seven indices the same weight and calculate the simple average across all indices. Second, we use a principal component analysis with all outcomes (214 in total), using the first component to create a meta-index. One caveat is that the weights with which the outcomes are aggregated to components are not necessarily positive. We rescale the first principal component so

[17] Further description on all coding processes is provided in Appendix H.

[18] The mean time from randomization to on-site visit was 9.5 months, so our post-treatment period covers the 10-15 months post randomization.

it lies in the [0,1] interval (Lise and Postel-Vinay 2020).[19] Finally, we calculate a weighted average across the seven indices where weights are determined by asking experts (*e.g.*, health care, corrections, policy experts, and previously incarcerated individuals, detailed above in Section V.1) the importance of different outcome categories. The reciprocal rank weights are presented in Figure 6 and show that experts typically rank standards on patient care and treatment as most important, with less weight on governance and medical-legal standards.[20]

V.5 Measurement

Our survey instruments rely on documentation and information provided by facilities who were informed of their treatment assignment, raising the possibility of demand bias or Hawthorne effects. We take several steps to ensure the integrity of the data we collected.

As described above, we designed our survey instruments to target quality standards that could be objectively measured and verified by the research team. For example, we measure compliance with quality standards using components from the facility survey using both facility "self-reported" answers but also independent coding of uploaded documents by students, as well as data from the medical audit. Figure 7 Panel (A) demonstrates the composition of our seven indices by data source, illustrating substantial variation in the extent to which a given standard relies on each source. Notably, quality standards on "safety and prevention" and "patient care and treatment" utilize a high share of data from the medical audit, which relied on direct observation and inspection by our medical personnel and scribe, and rely minimally on facility self-reports. Thus, we view the measurement of these standards as objective and difficult to falsify. We also intentionally chose to exclude staff survey responses in our measurement of compliance with quality standards. Instead, we use the staff survey to create separate metrics of quality and outcomes.

Second, we do not use any of the data NCCHC collected in its on-site visit or final report to the Accreditation Committee as our outcomes. All of the data used in this study to determine whether facilities are meeting standards were collected and coded independently by the research team at Harvard. Figure 7 Panel (B) compares our study's compliance score for all essential standards with NCCHC's compliance score.[21] Recall that a facility must meet 100% compliance with essential standards in order to receive NCCHC accreditation. While the two measures are highly correlated at 0.71 (p-value = 0.0004), Harvard compliance scores are substantially lower on average, with average scores of 0.58 and 0.74 for the study and NCCHC, respectively.

Lastly, we verify the accuracy of our mortality measure given potential concerns about underreporting of deaths. As described above, we cross-check each death reported in the death logs with media reports. In general, we find that the death logs are more complete than media reports because not all deaths are released to news outlets. Our main mortality outcome includes the union of all deaths from either log or

[19] Anderson (2008) proposes an algorithm to aggregate outcomes to an index using the inverse covariance matrix for weighting. Our preliminary power analysis found that indices created with this algorithm perform poorly when a large number of outcomes are to be aggregated.

[20] Specifically, experts ranked standards from most important ($r_i = 1$) to least important ($r_i = 7$) and these ranks are transformed to weights w_i as follows: $w_i = \frac{\frac{1}{r_i}}{\sum_{j=1}^{n} \frac{1}{r_j}}$. The formerly incarcerated (lived experience experts) also place more weight on personnel training whereas the academics, administrators and health care providers (professional experts) place more weight on safety and prevention. Our main aggregation index combines both sources of expertise. Further details on our aggregation methods are provided in Appendix I.

[21] This comparison is only feasible for treatment facilities because NCCHC does not compute scores for control facilities as they do not interact with them until study completion.

media sources, but our findings are robust to using only deaths reported in the news.

V.6 Summary Statistics and Balance

Table 3 presents baseline means of key variables and assesses for balance between treatment and control facilities in our main analytical sample. Panel (A) reports baseline compliance with quality standards, Panel (B) reports baseline mortality, Panel (C) reports baseline staff survey responses, and Panel (D) reports baseline jail characteristics. The first column reports the overall sample mean, the second column represents the coefficient on the treatment assignment indicator, and the third column reports the associated standard error, adjusting for randomization strata fixed effects.

Panel (A) of Table 3 shows that at baseline, jails in our study meet 45-54% of quality standards on average, with the lowest rate of compliance for "patient care and treatment" and the highest rate of compliance for "medical-legal issues." Importantly, there are no significant differences between treatment and control facilities on any of the standards. Panel (B) shows similar balance in the baseline mortality rate. Panel (C) shows that baseline staff survey responses are also similar both in terms of number of responses, respondent demographic characteristics, and baseline measures of staff sentiment indices such as horizontal coordination (between the heath and custody staff) and vertical coordination (between staff and supervisors). Panel (D) demonstrates similar balance on baseline jail characteristics such as number of staff (FTE), whether the jail utilizes a for-profit health vendor (68%), whether the jail was previously accredited by a non-NCCHC organization, and political affiliation of the county and sheriff. The overall F-test of all baseline characteristics is 4.447 with an associated p-value of 1.

Figure 8 presents additional descriptive evidence on the distribution of deaths among facilities in our main analytical sample. Panel (A) presents the distribution of deaths by cause of death. The most common cause of death in jails is undetermined (35%) followed by suicide/homicide (28%), illness (21%), and drug overdose (13%). While some of these undetermined deaths may still be actively under investigation, our independent review of media reports associated with these deaths indicates that many undetermined deaths involved situations alleging homicide, medical emergencies, and drug overdose. The prominence of deaths due to natural causes (21%) is concerning given the average age of incarcerated individuals in the sample is 33. Panel (B) of Figure 8 demonstrates a marked seasonality of deaths in jails – with a spike in the third quarter when 40% of all deaths occur. These patterns are consistent with lack of air conditioning and other heat-mitigation systems that may worsen chronic conditions and/or contribute to acute dehydration and heat stroke (Skarha et al. 2022, 2023; Cloud et al. 2023; Tuholske et al. 2024; Cowan, Lemasters and Brinkley Rubinstein 2024).

VI Empirical Strategy and Results

In this section, we describe our empirical strategy before turning to our main results on compliance with staff views, quality standards, and mortality.

VI.1 Empirical Strategy

We estimate the reduced form intent-to-treat (ITT) effect of assignment to treatment (initiation of the NCCHC accreditation process) using an OLS regression specification of the form:

$$Y_j = \alpha_0 + \alpha_1 Treat_j + X_j\Gamma + \mu_j + \epsilon_j \tag{1}$$

where j indexes facility. Y_j comprise our key outcomes of compliance with quality standards, mortality, and staff sentiment. $Treat_j$ is an indicator for being randomly assigned to the treatment group and μ_j represent randomization strata fixed effects. Baseline measures of the relevant outcome, X_j, are included in some specifications. We use heteroskedasticity-robust standard errors throughout for facility-level outcomes and cluster standard errors at the facility level for individual-level staff outcomes. We also compute *p*-values using randomization inference (RI) obtained by permuting accreditation assignments for each facility 1,000 times.

As noted, some treated facilities failed to complete the accreditation process. We use two-stage least-squares to obtain the treatment on the treated (TOT) estimate:

$$\begin{aligned} Y_j &= \alpha_0 + \alpha_1 \widehat{Accred}_j + X_j\Gamma + \mu_j + \epsilon_j \\ Accred_j &= \beta_0 + \beta_1 Treat_j + X_j\Gamma + \mu_j + \epsilon_j. \end{aligned} \tag{2}$$

where $Accred_j$ is an indicator for whether accreditation was successfully completed according to Figure 1 and treatment assignment is used as the instrument. Control complier means are reported throughout (Kling, Liebman and Katz 2007).[22] The 2SLS estimates account for imperfect compliance as only 13 out of 22 facilities will have received accreditation, with most failing facilities either not implementing any of NCCHC's recommendations and/or not agreeing to a required focus survey. In robustness tests, we code as the endogenous variable the fraction of the accreditation process completed, to allow for the possibility that the scaling is inaccurate, (*e.g.*, if treatment non-compliers still benefited from undergoing some portion of the process). We determine the fraction of completion rates using either NCCHC metrics or the Harvard study metrics.

VI.2 Staff Sentiment

We begin by assessing the effects of our intervention on staff sentiment given the predictions of our model in Section III. Reduced form estimates from Equation 1 are presented in Figure 9. The gray bar represents the regression-adjusted control mean and the blue bar represents the treatment mean plus the estimated treatment effect. These reduced form estimates show large and statistically significant improvements on indices of horizontal coordination, with more modest gains in job satisfaction.

Corresponding two-stage-least-squares estimates from Equation 2 are shown in Table 4. Second stage estimates are presented in Panel (A) and Panel (B) shows first stage *F*-statistics, which range from 56 to 106 depending on the specification. Our 2SLS estimates indicate that completing the accreditation process increases horizontal coordination by 5.9 percentage points, a 10% increase from the control complier mean. Staff satisfaction increased by 3.7 percentage points, a 6% increase. In contrast, vertical coordination and staff views on respect for incarcerated individuals were unaffected by accreditation.

Appendix Table A4 reports results for each individual component of these staff sentiment indices. These results show that completing the accreditation process increased many components such as whether custody and medical staff coordinate and communicate, whether staff feel they are properly trained and whether they

[22]Specifically, we calculate control complier means using two-stage-least-squares regressions of $Y_j \cdot \mathbf{1}[Accred_j = 0]$ on $\mathbf{1}[Accred_j = 0]$ instrumenting with $Treat_j$ along with baseline controls and randomization strata fixed effects.

feel valued at work. These findings support the horizontal coordination case in our model, which should portend improvement in both compliance with quality standards and mortality, if the standards are aimed appropriately (*e.g.,* not a distraction). These results also echo what we find in the qualitative comments: where many in facility leadership noted the importance of knowing what the correct processes were and being able to obtain buy-in from custody staff.

Did accreditation lead to an increase in the number of staff, use of staff (*i.e.,* change in referral patterns), health care management or capital investments? Table 5 suggests it did not. The main differences between treatment and control facilities were in how the staff cooperated with each other and the services (*e.g.,* lab and pharmacy) they provided to the incarcerated individuals. We next turn to whether these changes resulted in differences in the quality of care, as measured not by staff surveys, but by facility surveys and medical audits.

VI.3 Quality Standards

Meta-Index of Quality Standards: We assess the impact of our intervention on a meta-index of quality standards, as described previously in Section V.4 and per our pre-analysis plan. Reduced form estimates from Equation 1 are shown in Figure 10, which present compliance with the meta-index constructed in three ways: (1) a simple average across the seven quality standards, (2) a principal component analysis (PCA) using all outcomes as inputs and taking the first principal component as the meta-index, rescaled to the unit interval, and (3) a weighted average of the seven quality standards using the reciprocal rank weights from our expert survey. These reduced form estimates show large and statistically significant improvements on the meta-index using PCA and expert weights.

Table 6 shows corresponding two-stage-least-squares estimates from Equation 2 on these meta-indices constructed using the three approaches. While the simple average weighting scheme yields a positive but insignificant effect of completing the accreditation process, both PCA and expert schemes – which place more weight on the more objective standards including patient care and treatment – yield significant improvements in the meta-index of quality standards. For example, expert weights yield a 8.5 percentage point increase in quality standards, a 15% increase relative to the control complier mean.

Appendix Table A5 presents results using different expert weights for formerly incarcerated respondents (who are the recipients of care) and all other experts (who are typically providers of care) and shows that our findings are robust to either weighting scheme.

Seven Quality Standard Indices: Figure 11 presents reduced form estimates from Equation 1 on the more disaggregated seven quality standards. As before, the gray bar represents the regression-adjusted control mean and the blue bar represents the treatment mean plus the estimated treatment effect. Across all seven categories, facilities assigned to treatment improved their compliance relative to the control group although some changes were statistically insignificant. Compliance with "personnel training" and "patient care and treatment" improved by a statistically significant 15% and 11%, respectively, relative to the control mean.

Table 7 presents corresponding two-stage-least-squares estimates from Equation 2. Second stage estimates are presented in Panel (A) and generally mirror the reduced form patterns previously discussed in Figure 11. Specifically, completing the accreditation process increases compliance with "safety and prevention" standards by 9.8 percentage points, a 17% increase relative to the control complier mean. Completion of the process also increases compliance with "personnel training" by 14.3 percentage points, a 27% increase

relative to the control complier mean, and increases "patient care and treatment" compliance by 10.2 percentage points, an 18% increase. Panel (B) shows first stage F-statistics, which range from 25 to 47 depending on the specification. Appendix Figure A2 presents two-stage-least-squares estimates on substandards within each of the three categories we find improvements in. We observe increased compliance along the majority of substandards, with notable increases in compliance with clinical prevention (which includes testing for sexually transmitted infections), contraception, personnel credentials, receiving screening, mental health and nursing procedures.

VI.4 Mortality

Figure 12 shows the distribution of the endline mortality rate for the treatment and control facilities. The figure reveals a left shift in the mortality distribution for the treatment group relative to the control group, with treatment facilities concentrated at zero. A Kolmogorov-Smirnov test confirms that the distributions of the treatment and control groups are significantly different, with a p-value of less than 0.01. We also obtain a RI p-value of less than 0.01 when comparing treatment and control means controlling for randomization strata fixed effects.

Table 8 reports two-stage-least-squares estimates from Equation 2 on average deaths per month, again measured over six months following the expected time of NCCHC's on-site visit. Panel (A) presents second stage estimates and Panel (B) presents first-stage estimates, with F-statistics ranging from 27 to 34. Column (1) of Table 8 represents our baseline specification with randomization strata fixed effects only. Column (2) adds a control for the log ADP to proxy for jail population and column (3) is our preferred specification with both randomization strata fixed effects and baseline mortality. We find that completing the accreditation process significantly reduces mortality. In our preferred specification, for example, completing accreditation reduces average deaths per month by 0.25, representing a 86% decline relative to the control complier mean.

In Appendix Table A7, we report two-stage-least-squares estimates of the impact of completing accreditation on different parts of the mortality distribution. Accreditation increases the probability a facility had 0-1 deaths by 48.1 percentage points, but reduces the probability that a facility experienced 2-4 or 5 or more deaths by 32.3 and 10.0 percentage points, respectively. Given that mortality is right skewed and discrete, we also estimate nonlinear GLM specifications (Hardin, Schmiediche and Carroll 2003) using count models that follow a Poisson (columns (1)-(2)) or negative-binomial distribution (columns (3)-(4)) using $\log(\text{ADP})$ as an offset to capture the relationship between deaths and facility population. We also estimate a model of log mortality (columns (5)-(6)) and mortality per average daily population (column (7)). 2SLS estimates from these alternative specifications are similar to our baseline estimates (see Appendix Table A8). Results are also robust to using only deaths reported in the media (see Appendix Table A9).

VI.5 Additional Outcomes: Lawsuits and Recidivism

Table 9 reports 2SLS estimates of accreditation completion on the outcomes of recidivism and lawsuits. We measure individual-level recidivism among 32 jails in our sample for whom we are able to obtain jail bookings data. Column 1 demonstrates that whether or not we could access such data is not correlated with treatment. Columns 2 and 3 reports results for three- and six-month recidivism among individuals released within a 45-day window following the endline survey. Accreditation is negatively associated with recidivism: Individuals released from accredited facilities are 12.8 percentage points and 20.8 percentage

points less likely to be rebooked in the same jail three months and six-months post-release, representing 54% and 52% reductions relative to control facilities, respectively. Columns 4–6 show effects on healthcare related litigation for 44 facilities. Estimates are generally negative but not significant.[23]

VI.6 Robustness

For all our main results, we assess robustness to the use of the starting sample – including the two facilities that never initiated the accreditation process – and to continuous versions of the endogenous variable – to address the possibility that the scaling in our two-stage least squares estimates is incorrect if treatment non-compliers benefited from undergoing some portion of the process.

First, Appendix Table A10 shows pre-treatment balance among the starting sample including those who never initiated accreditation. Appendix Tables A11, A12, A13, and A14 and Appendix Figure A3 present results for staff sentiment, quality standards, and mortality respectively among this sample, which are very similar to our main findings.

Second, we also estimate two versions of continuous improvement, one using the NCCHC scores for important standards, as defined in Appendix Table A1, and another using the Harvard measures of the same.[24] The first stage of the different estimation strategies is shown in Appendix Figure A4, which shows very little difference in the scaling across the varying approaches. The ITT implicitly scales by 1 and the binary TOT is a bit noisier compared to the more precise TOT continuous versions; however the magnitudes are indistinguishable suggesting scaling has trivial policy implications in our context. As shown in Figure 13, the findings for staff sentiment, quality standards, and mortality are similar to our main findings.[25]

VII Expert Predictions

We next turn to assessing heterogeneous effects using the factors predicted by experts. Recall that we conducted an expert survey of domain experts where respondents selected five factors that they believed would most affect whether accreditation of jail health care services by NCCHC has an effect on health care procedures, health outcomes, staff outcomes, and litigation. Appendix Figure A6 shows that the three factors selected by experts as most likely to affect the impact of NCCHC accreditation were the number of medical staff (FTE), the health care quality, and the quality of jail management.

Yet, we find modest evidence that such factors predict heterogeneity. Honing in on the top two factors which are measurable in our survey instruments, we divide facilities into quartiles based on either medical staff FTE per ADP or the quality of health care as proxied by the expert-weighted meta-index of quality standards at baseline. In Figure 14, we plot reduced form coefficients on the interaction between medical staff FTE quartile and treatment assignment on the endline expert-weighted meta-index of quality standards (Panel (A)) and endline mortality (Panel (B)). Panels (C) and (D) examine heterogeneity based on the *composition* of different FTE (*i.e.*, how many distinct types of health care providers were employed by the jail). Panels (E) and (F) present corresponding reduced form coefficients on the interaction between health care quality quartile and treatment assignment on these same outcomes. If anything, we find that facilities in the

[23] These results are not yet finalized as we are double-coding using a team of Harvard Law students.

[24] Our Harvard endline measurement came before four treatment facilities finished their focus surveys. As these facilities did eventually receive accreditation, we set their Harvard scores to 90%, which corresponds to the important standards Harvard score attained by the treatment facility that became accredited without any further steps.

[25] This is also the case in the entire starting sample – see Appendix Figure A5.

lowest quartile of medical FTE at baseline and with the lowest variety in FTE composition experienced greater increases in the meta-index and larger reductions in mortality following treatment assignment, consistent with facilities more efficiently allocating resources. We find more minimal heterogeneity in terms of baseline health care quality, with some suggestive evidence that facilities with good baseline quality (third quartile) experienced greater increases in the meta-index and larger reductions in mortality.

VIII Qualitative Evidence

To better understand the nature of changes that occurred at treatment facilities as they underwent the NCCHC accreditation process, we now turn to qualitative evidence collected during our interviews with facility leadership. Among all treatment facilities, we asked several questions at endline on their experience with the accreditation process, challenges they faced, biggest change implemented, and the relationship between custody and medical staff.[26] Word clouds depicting responses to these questions are shown in Appendix Figure A7. This qualitative evidence supports our empirical findings which show that receiving accreditation improves staff coordination and compliance with quality standards (particularly patient care and treatment).

Experience Undergoing Accreditation: The vast majority of treatment facilities indicated that the process was "nervewracking," "stressful," "daunting," and "eye-opening." Many facilities indicated that "At the beginning, had no clue what were doing" and that this was the "first ever process for the history of this jail." Another common theme was that facilities needed to put in a lot of time and effort and described the NCCHC process as being "pretty thorough and intense." One facility noted that "NCCHC reviewers caught everything. Her ability to point out areas needing improvement was great." Another facility noted that it "was harder to convince corrections that this is something we should do than it was to go through the process. Accreditation process was helpful for highlighting changes that could be made to improve." Another facility commented that the "process in general is awesome... Its about finding shortfalls and closing the gap. Staff has become more involved in the medical process and have better understanding of why we are doing those things. Building relationships between medical and security was another piece."

Challenges Faced During Accreditation: Treatment facilities indicated a range of challenges. Several facilities mentioned difficulties having to do with changes in contracted health providers or staff turnover that occurred during the NCCHC accreditation process. Other facilities noted that it took a lot of work to change policies and obtain buy-in from staff: "Hardest part was just getting people on board." Obtaining support from custody staff, in particular, was a common theme. As one facility told us, "The biggest challenge was getting the officer buy in. Why are we doing this we have never done this before?" Several other facilities mentioned staffing and resources constraints with respect to meeting standards on suicide watch, chronic disease, and dental services.

Biggest Change Implemented: Almost all treatment facilities indicated that the biggest change was with respect to the aspects of screening and initial health assessments. One facility noted "It was that intake for the initial and it going immediately going to medical." Another facility stated that the "receiving screening is one of

[26]Specifically we asked facilities to (1) "Please describe your facility's experience undergoing NCCHC accreditation process," (2) "Were there any challenges your facility faced during the NCCHC accreditation process? If so, what were they?" (3) "In your opinion, what is the biggest change your facility has implemented as a result of the NCCHC accreditation process?" and (4) "Do you think that the relationship and coordination between correctional and health care staff has changed due to the NCCHC accreditation process? If so, how has it changed?"

the bigger ones. Way more contact with patients when they come in now. Also coordination with custody staff is more comprehensive now."

Mental health screening and processes of care were also subject to substantial change, according to some facilities. For example, one facility stated, "Staying on top of mental health assessments was important. With the new protocols, the facility can ensure psychiatrists are staying on top of what they need to be doing." Other facilities shared similar changes, such as "Really focused on turnaround time for health assessments and review," and "chronic disease management, screening everyone on admission, accreditation gave teeth to move these forward on the admin end," and "Increased timeline of how fast we are seeing people when they come in. Increasing the care they are receiving."[27]

Finally, several facilities commented on broader cultural change. One facility noted "the biggest change was the mentality of the whole staff in understanding why this process is important; took a lot of effort and heightening the understanding of staff; they must take steps in the standards for a reason" and another facility noted that they implemented "a lot more meetings, sitting down and collaborating."

Relationship between Custody and Medical Staff: About half of the treatment facilities noted substantial changes in the relationship between medical and custody. Medical leadership at one facility told us that "The staff had to have conversations about how processes will work, which meant discussing how custody versus medical execute certain processes." Medical staff reported that "Showing the deputies all of the different regulations and rules we need to follow that they need to help us with. Understand why we are asking for certain things. Really good education for us and custody. Makes it easier to do our work." As one facility leader noted: 'Yeah, when you look at officers they have a better understanding why they are making sure sick call slips are being given timely and being seen timely after submission rather than just giving aspirin."

IX Concluding Comments

Despite being the only U.S. population constitutionally guaranteed a right to adequate health care, incarcerated individuals face a dire situation in U.S. jails. In the last decade, official mortality rates within jails have increased sharply, particularly among the large unconvicted population. And our data suggest that the severity of the problem is substantially underreported, with mortality rates among our jails being three times higher than suggested by official statistics.

In this study, we evaluate whether accreditation, a commonplace method to assess quality in health care, can address the hidden health care crisis behind bars. Over a period of four years, we conducted the first RCT across jails and the first RCT of accreditation in health care in the U.S. Using original survey instruments developed by our research team, we find that NCCHC accreditation has statistically significant and economically meaningful effects on a range of outcomes. Accreditation improves measures of coordination among staff and improves compliance with quality standards, particularly those addressing personnel and training and patient care and treatment. We also find that accreditation substantially reduces mortality, with a reduction of up to 86% in the half-year following the expected time of the NCCHC on-site visit. These findings are supported by our qualitative evidence, which indicate that treatment facilities improved alignment between staff and implemented timely screenings of incarcerated individuals, particularly in the very first days of incarceration where mortality tends to be the highest. A back-of-the envelope benefit-cost

[27] Dental care was also mentioned by several facilities, and it was noted to be particularly important given the lengthening stay of inmates in jails.

calculation taking into account the reductions in mortality, recidivism, and litigation, as well as financial and personnel costs associated with accreditation, yields an annual net-benefit ranging from $9.5 to $98.8 million (see Appendix Section J).

Ultimately, our study shows that accreditation can improve health care and save lives in U.S. jails. There have been recent policy efforts to mandate accreditation across all jails (Berwick, Beckman and Gondi 2021). Our findings also illustrate that at least in the U.S. jail context, accreditation as a form of quality disclosure can inform staff of best practice, improve accountability and collaboration between agents, and yield positive and measurable effects on health outcomes.

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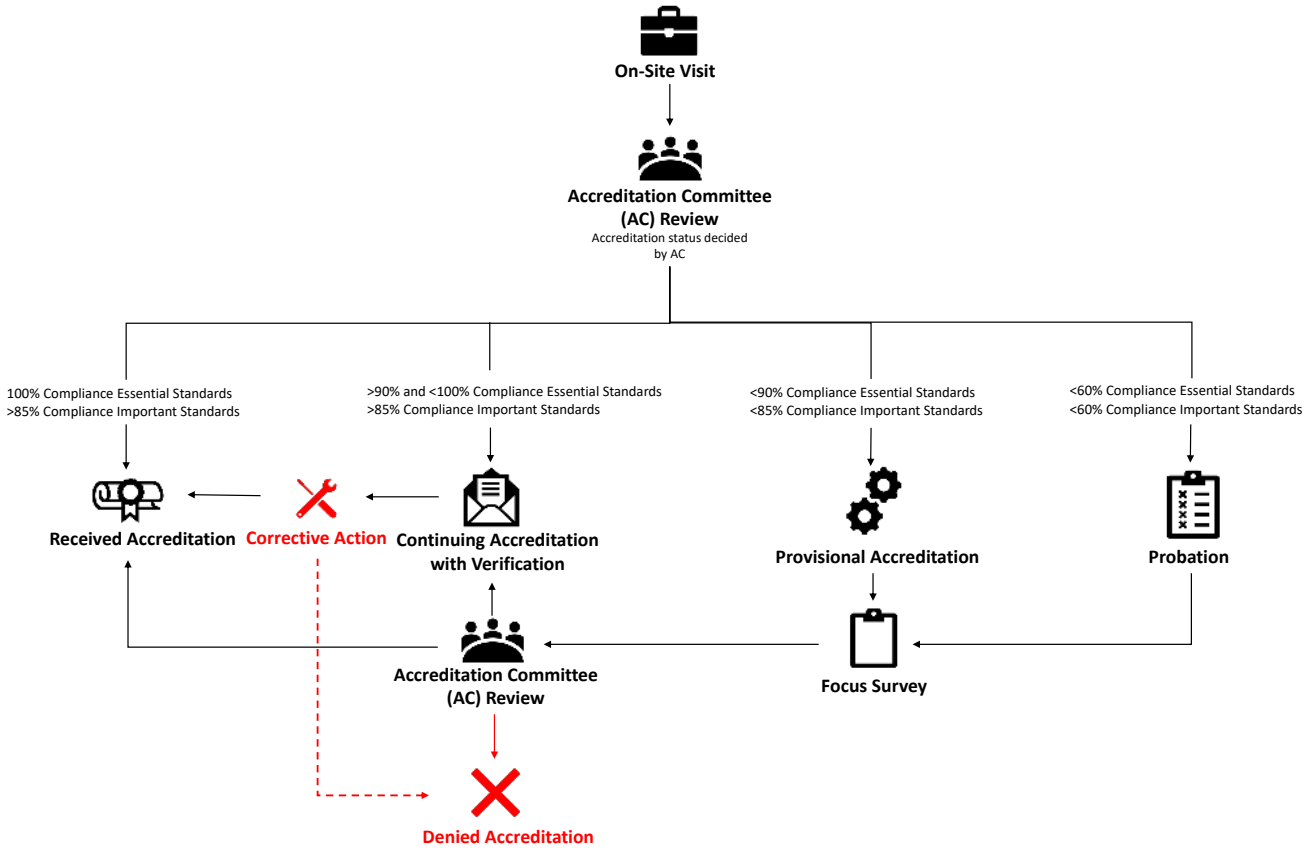
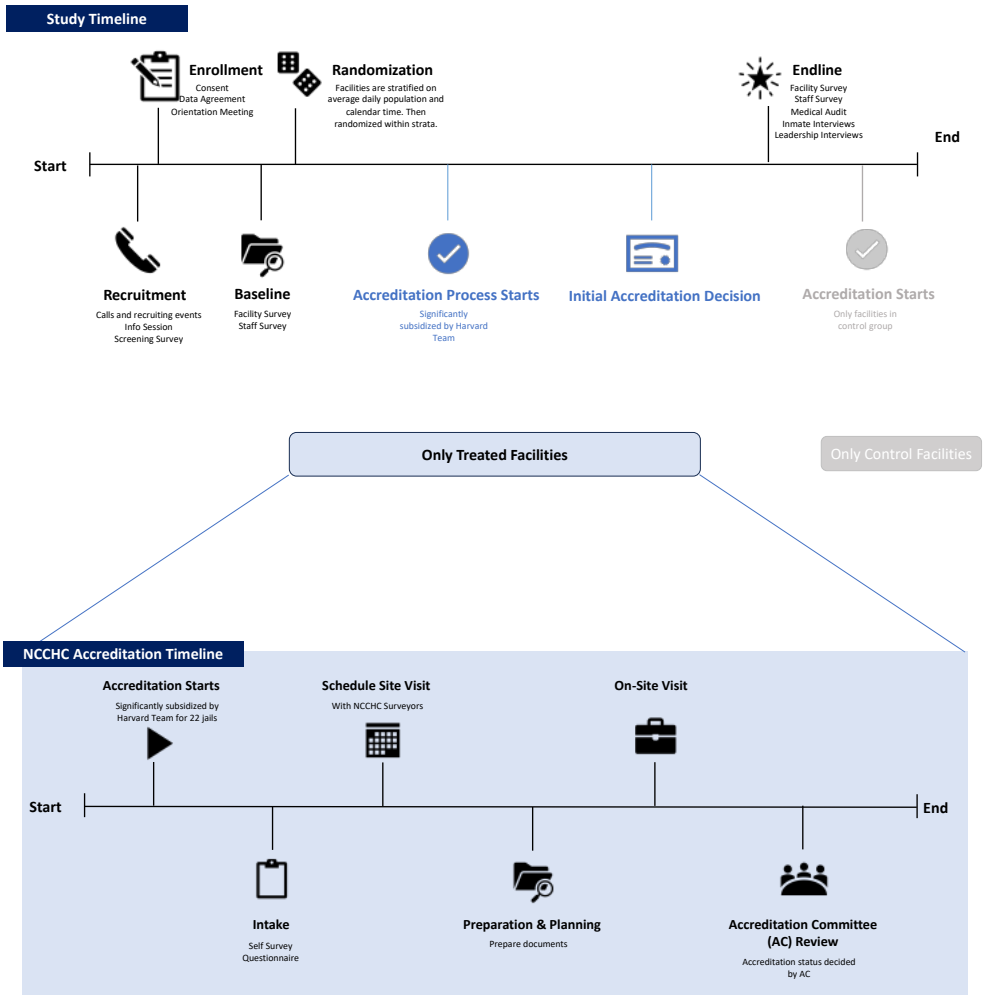
Figure 1: Accreditation Decision Process



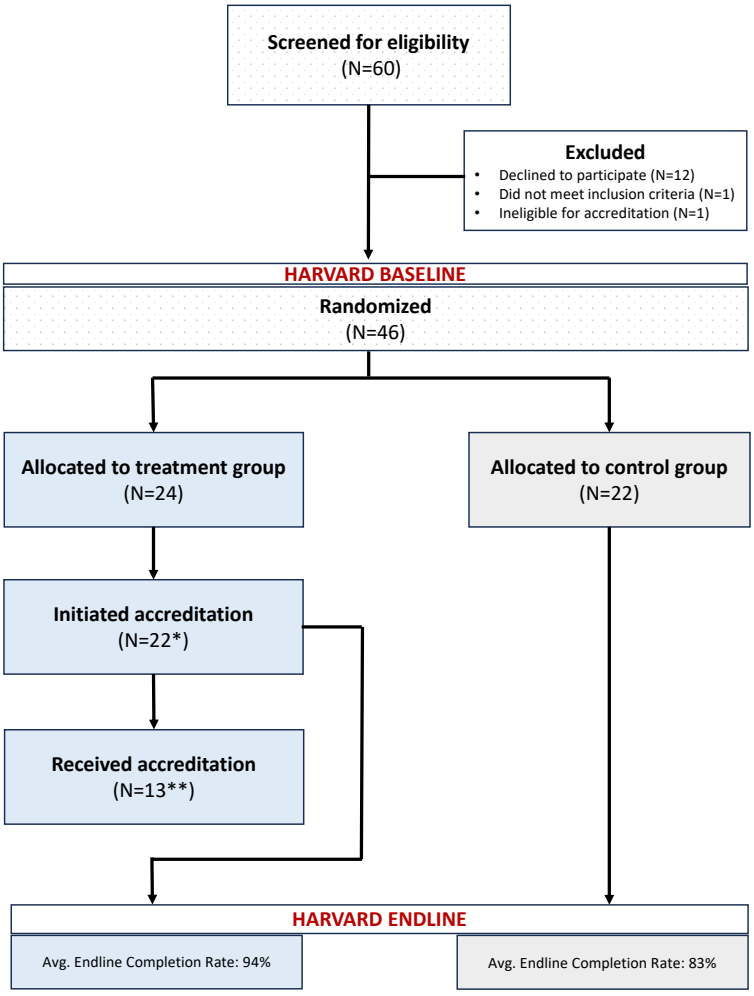
Notes: This figure depicts the NCCHC accreditation process. The holistic process is based in part on compliance with important and essential standards. Facilities that comply with less than 90% of essential standards and less than 85% of important standards have apparent deficiencies that significantly lower their compliance levels below that acceptable for accreditation and are placed on "Provisional Accreditation" status. Facilities that comply with less than 60% of essential and important standards have excessive standard noncompliance and are placed on "Probation" status.

Figure 2: Study Timeline



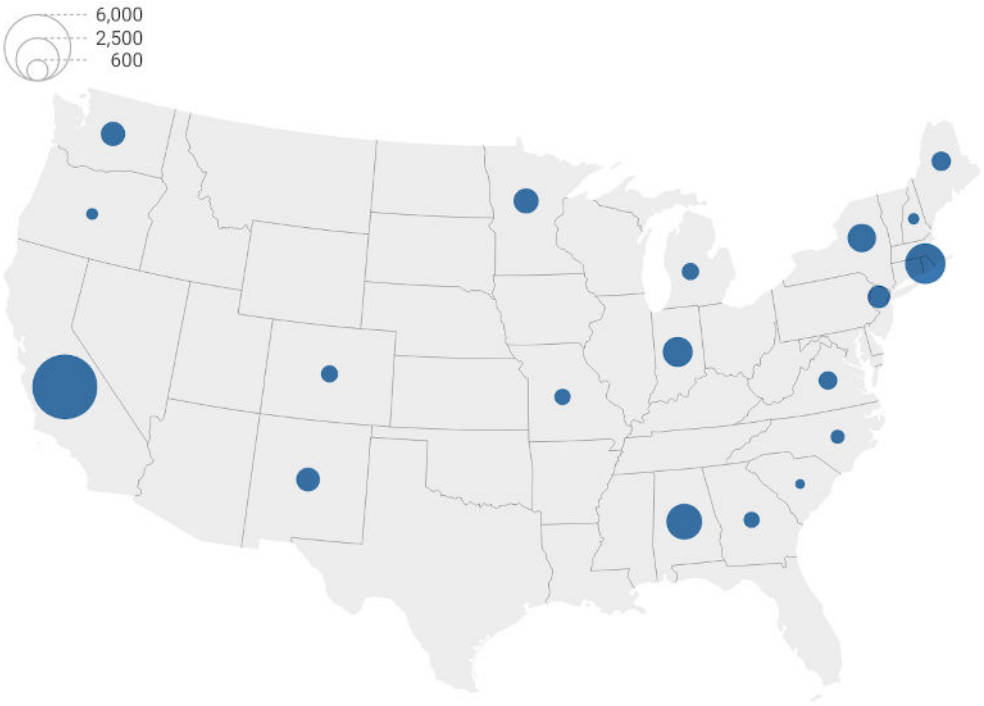
Notes: This figure depicts the Harvard study timeline. The top panel illustrates the Harvard study timeline from recruitment to endline for all facilities. The bottom panel illustrates the NCCHC accreditation process for facilities randomized to the treatment group who initiated the accreditation process. See also Appendix Section C for additional details.

Figure 3: Study Flow Overview



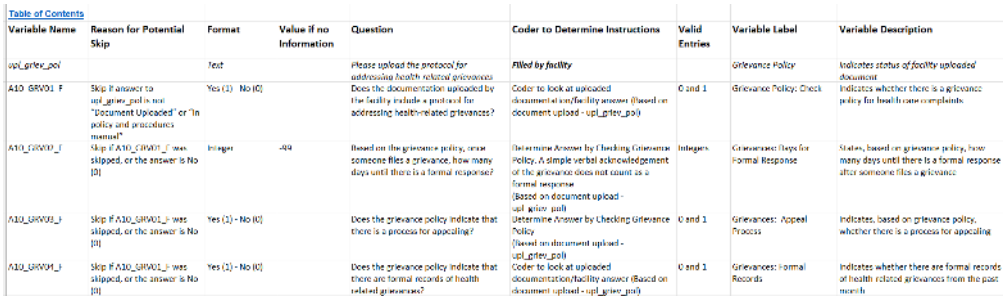
Notes: This figure provides an overview of the Harvard study flow. 60 facilities were screened for eligiblity for the study. Of those 60, 12 did not want to participate, one did not qualify due to not meeting the inclusion criteria, and one was ineligible to participate in accreditation due to the structure of health services at the facility. The Harvard study baseline completion rate is 100% as it was a prerequisite for randomization. The average endline completion rate is computed as the proportion of facilities that completed the endline facility survey, endline staff survey, medical audit, and provided a death log. Therefore, the denominator of the endline completion rate for both the treatment and control group is 4x22=88. Out of the 24 facilities allocated to treatment, 2 never initiated accreditation for reasons orthogonal to assignment, as discussed in the main text, and are excluded from the main analytical sample. These two facilities had average endline completion rates that are much lower (25%) than the other facilities. Results remain largely unchanged when including these two facilities, using baseline to impute missing values (see Appendix Table A13 and A14). * 2 facilities did not begin accreditation; ** 1 facility is still under review but is very close to receipt of accreditation. The draft will be updated upon its completion.

Figure 4: Map of Study Jails and ADP



Notes: This map depicts the geographic location of the facilities in our main analytical sample (N=44). The size of the circle represents the total ADP across facilities within that state.

Figure 5: Example from Facility Survey Coding Manual



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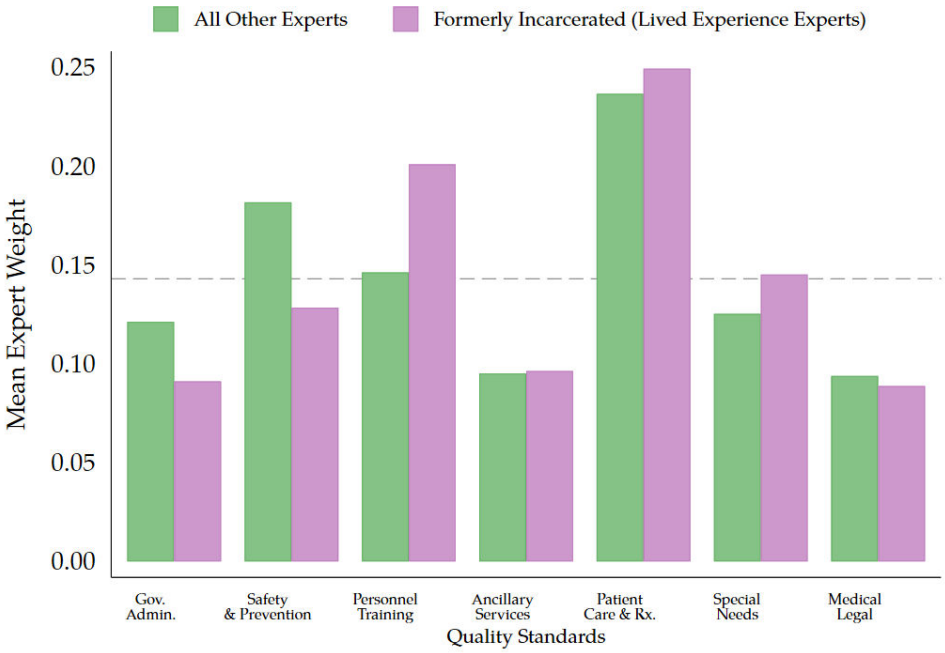
Variable Name	Reason for Potential Skip	Format	Value if no Information	Question	Coder to Determine Instructions	Valid Entries	Variable Label	Variable Description
upl_grlev_pol		*Text*		*Please upload the protocol for addressing health related grievances*	***Filled by facility***		*Grievance Policy*	*Indicates status of facility uploaded document*
A10_GRV01_F	Skip if answer to upl_grlev_pol is not "Document Uploaded" or "In policy and procedures manual"	Yes (1) No (0)		Does the documentation uploaded by the facility include a protocol for addressing health-related grievances?	Coder to look at uploaded documentation/facility answer (Based on document upload - upl_grlev_pol)	0 and 1	Grievance Policy: Check	Indicates whether there is a grievance policy for health care complaints
A10_GRV02_I	Skip if A10_GRV01_F was skipped, or the answer is No (0)	Integer	-99	Based on the grievance policy, once someone files a grievance, how many days until there is a formal response?	Determine Answer by Checking Grievance Policy. A simple verbal acknowledgement of the grievance does not count as a formal response (Based on document upload - upl_grlev_pol)	Integers	Grievances: Days for Formal Response	States, based on grievance policy, how many days until there is a formal response after someone files a grievance
A10_GRV03_I	Skip if A10_GRV01_F was skipped, or the answer is No (0)	Yes (1) - No (0)		Does the grievance policy indicate that there is a process for appealing?	Determine Answer by Checking Grievance Policy (Based on document upload - upl_grlev_pol)	0 and 1	Grievances: Appeal Process	Indicates, based on grievance policy, whether there is a process for appealing
A10_GRV04_I	Skip if A10_GRV01_F was skipped, or the answer is No (0)	Yes (1) - No (0)		Does the grievance policy indicate that there are formal records of health related grievances?	Coder to look at uploaded documentation/facility answer (Based on document upload - upl_grlev_pol)	0 and 1	Grievances: Formal Records	Indicates whether there are formal records of health related grievances from the past month

Notes: This figure depicts an example from our coding manual that assists coders in determining whether a facility complies with standards on grievance policies.

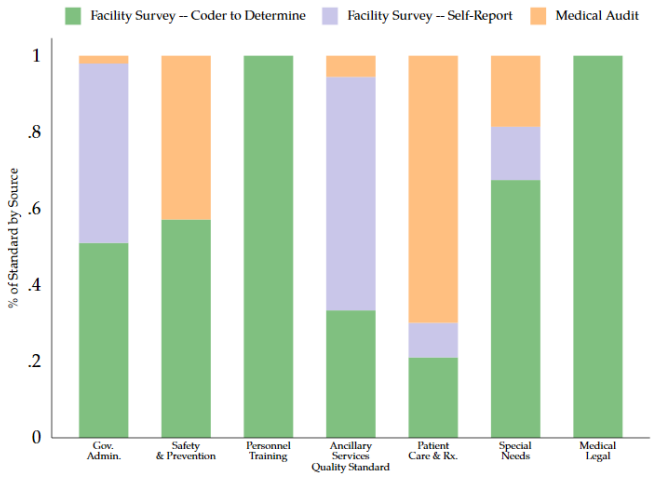
Figure 6: Expert Weights



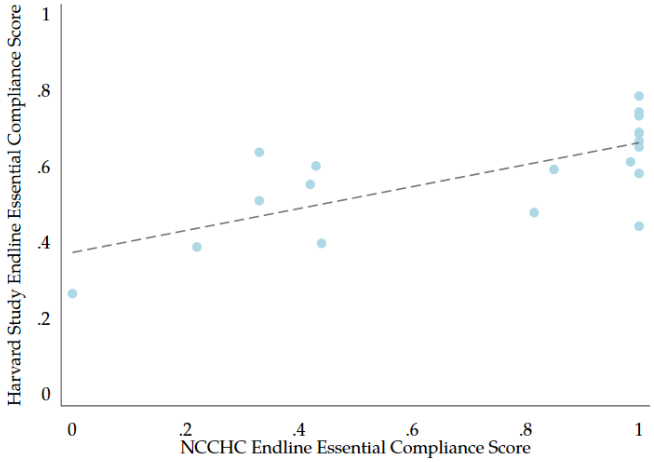
Notes: This figure shows the reciprocal rank weights placed on the seven quality standards by the formerly incarcerated (lived experience experts) and other experts (jail administrators, jail health professionals, and policy and public health experts).

Figure 7: Measurement of Quality Standards

Panel (A) Composition of Standards



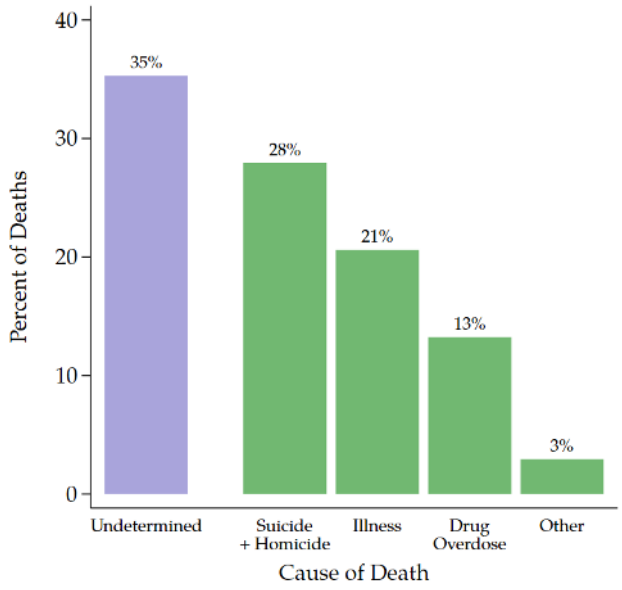
Panel (B) Corr. Harvard and NCCHC Compliance



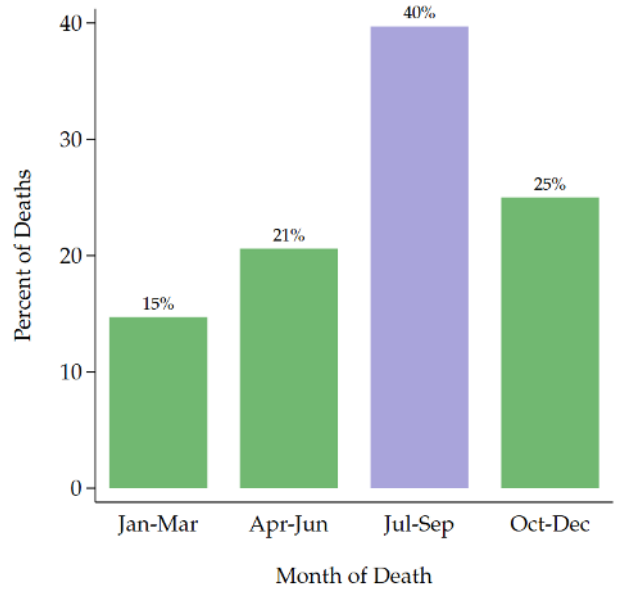
Notes: Panel (A) shows the proportion of variables used to construct the seven quality standards from the (i) facility survey – self-reported, (ii) the facility survey – coder to decide, and (iii) the medical audits. Panel (B) shows the correlation between the Harvard study compliance scores and the NCCHC compliance scores. The study score follows the same approach as used in the NCCHC accreditation process, but uses the study-collected data instead.

Figure 8: Distribution of Mortality by Cause and Season

Panel (A) Cause of Mortality

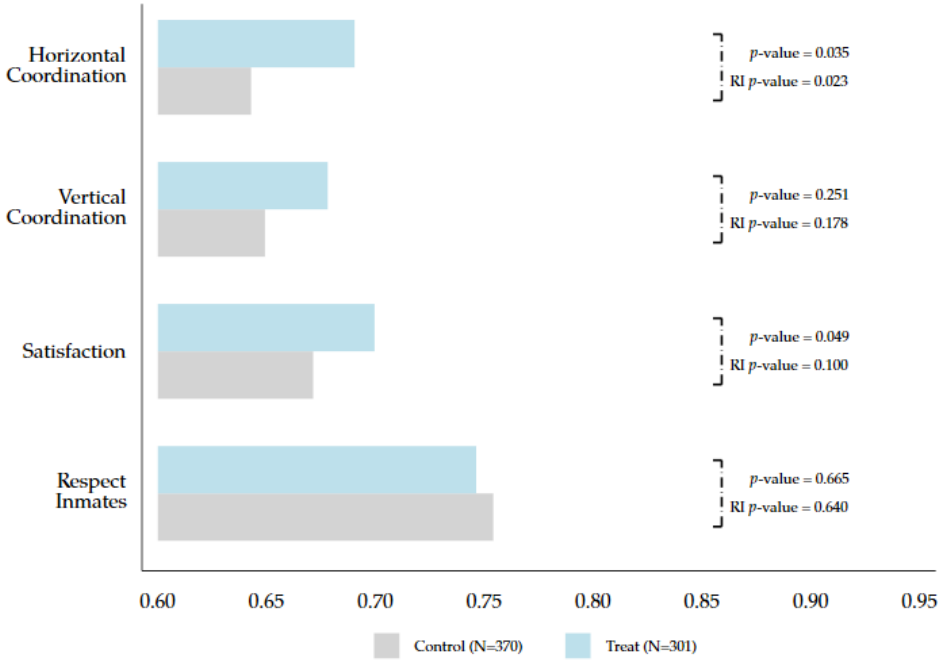


Panel (B) Seasonality of Mortality



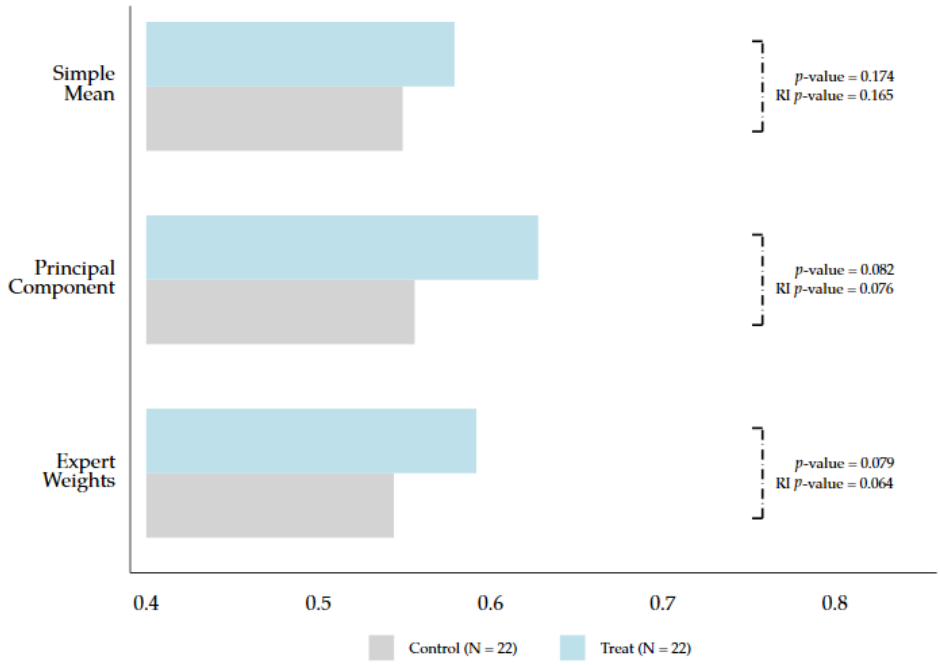
Notes: This figure shows cause and month of death using data from death logs provided by jails. Four facilities in the analytical sample did not provide a death log so media reported deaths are used instead. Panel (A) disaggregates the total number of deaths in the sample by cause of death and plots the share of each cause as a percentage of total deaths. If the cause is unknown, undetermined, or if the report is pending, it is classified as undetermined. In the event of a death by suicide or homicide, it is classified as such. If a pre-existing condition, infection, or any other physical ailment is indicated as the cause of death, the death falls under illness. In the event of a drug toxicity, or overdose, the death is labeled as a drug overdose. If a death does not fall into any of these four categories, it is classified as other. Panel (B) shows the seasonality of deaths by plotting the mean number of deaths for each quarter of the year. The date of death indicated for each death in the death log is used to identify the quarter of the year.

Figure 9: Effect of Accreditation Assignment on Staff Sentiment Indices: Reduced Form Estimates



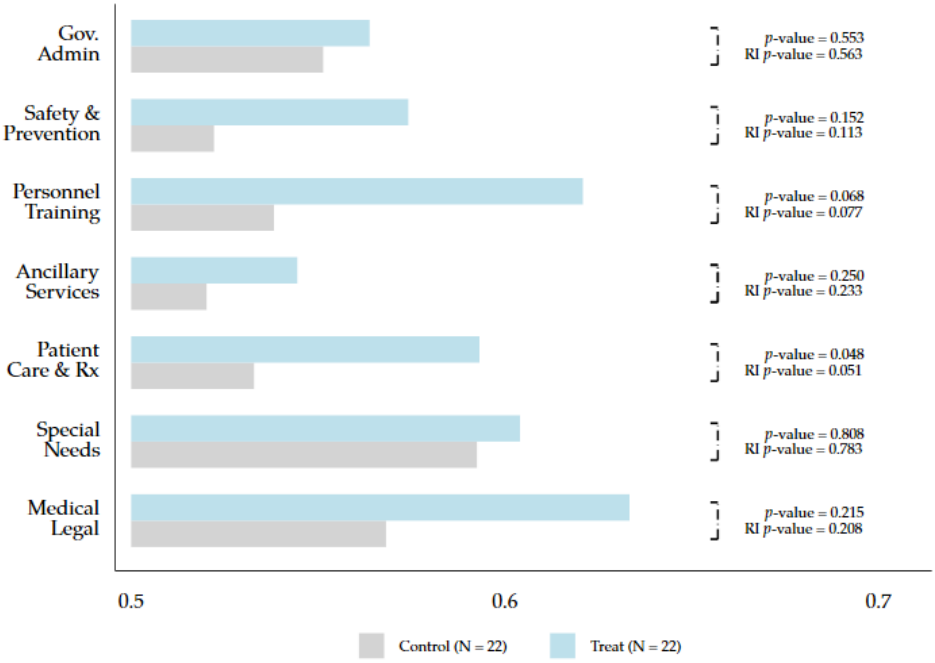
Notes: This figure shows the treatment effect of accreditation assignment on four staff sentiment indices. Staff sentiment indices are created using data from the baseline/endline staff survey. The horizontal coordination index (bar 1) includes: (1) "Custody staff support the implementation of clinical decisions and partner with clinical staff"; (2) "Custody and clinical team staff work collaboratively to give good health care to inmates"; (3) "There is open communication between custody and health staff." The vertical coordination index (bar 2) includes: (1) "Staff feel comfortable speaking up when they see something that may negatively affect inmate care"; (2) "When staff speak up about inmate safety and care decisions, those with greater authority are open to their concerns"; (3) "My supervisor considers staff suggestions for improving inmate health and safety"; (4) "My supervisor considers staff suggestions for improving staff health and safety"; (5) "My supervisor takes direct actions to address staff concerns for improving inmate health and safety"; (6) "My supervisor takes direct actions to address staff concerns for improving staff health and safety." Questions (1) and (2) are only asked to health staff. The satisfaction index (bar 3) includes: (1) "I received the training I need to do my job well"; (2) "I have the tools and resources I need to do my job well"; (3) "I am satisfied with my job"; (4) "I find my job to be meaningful"; (5) "I feel valued at my job"; (6) "I find my job to be challenging"; (7) "I would recommend my job to others." The respect inmates index (bar 4) includes: (1) "Inmates at this facility are treated with respect." These questions are answered on a Likert scale and renormalized on a scale from 0 to 1 with higher values representing stronger agreement. In all bars, the control mean (gray) is calculated as the mean of staff in the control group. Treatment effects are obtained from estimating Equation 1, controlling for the baseline mean of the respective outcome variable at the facility level and randomization strata fixed effects. The treatment mean (blue) plotted is calculated as the control mean plus the estimated treatment effect. We obtained endline responses from 40 jails and we impute missing endline responses for the other 4 facilities in our sample with baseline values. *p*-values based on robust standard errors and randomization inference (RI) are shown.

Figure 10: Effect of Accreditation Assignment on Meta Quality Standards: Reduced Form Estimates



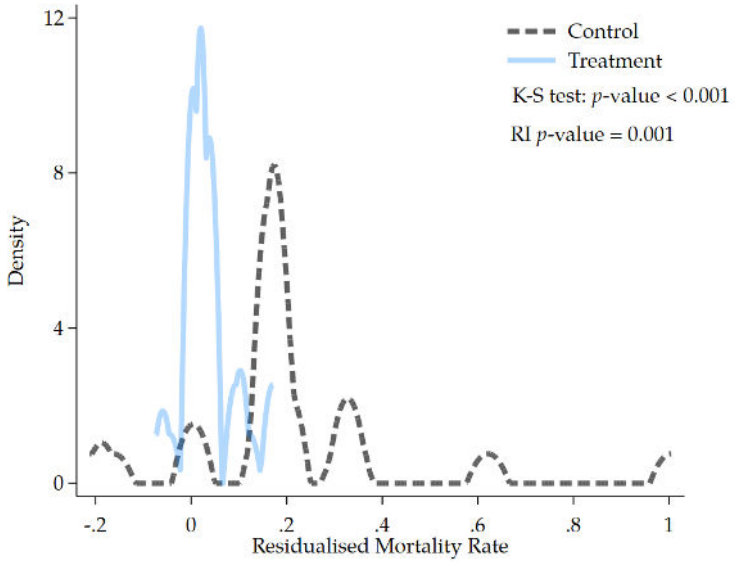
Notes: This figure shows the treatment effect of accreditation assignment on meta quality standards constructed by combining the seven quality standards in three ways as described in the main text: equal weights, the first component using principal component analysis, and reciprocal rank weights using our expert survey responses. For detailed definitions of the standards and their calculation see Appendix Section I and for expert weights see Figure 6. In all bars, the control mean (gray) is calculated as the mean of facilities in the control group. Treatment effects are obtained from estimating Equation 1, controlling for the baseline mean of the respective outcome variable at the facility level and randomization strata fixed effects. The treatment mean (blue) plotted is calculated as the control mean plus the estimated treatment effect. *p*-values based on robust standard errors and randomization inference (RI) are shown.

Figure 11: Effect of Accreditation Assignment on Quality Standards: Reduced Form Estimates



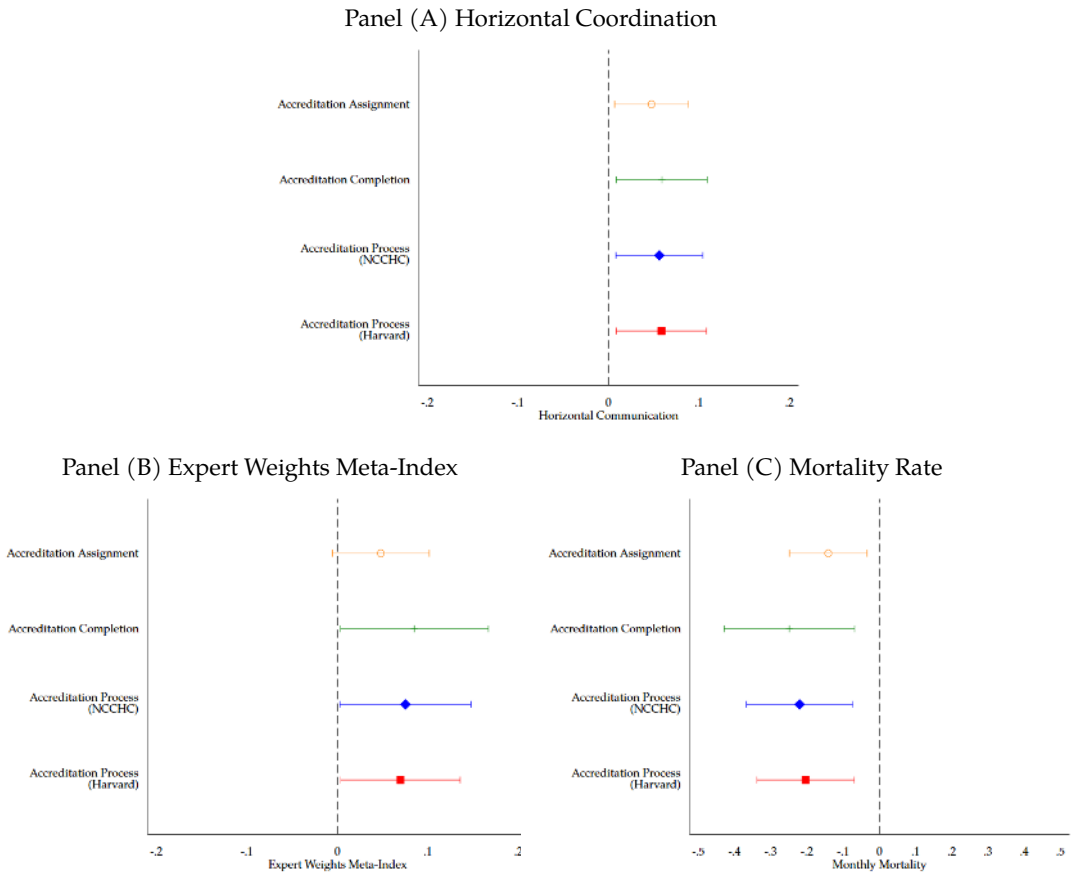
Notes: This figure shows the treatment effect of accreditation assignment on the seven quality standards. Quality standards are created using data from the baseline/endline facility survey and look-back medical audit. For detailed definitions of the standards and their calculation, see Appendix Section I). In all bars, the control mean (gray) is calculated as the mean of facilities in the control group. Treatment effects are obtained from estimating Equation 1, controlling for the baseline mean of the respective outcome variable at the facility level and randomization strata fixed effects. The treatment mean (blue) plotted is calculated as the control mean plus the estimated treatment effect. *p*-values based on robust standard errors and randomization inference (RI) are shown.

Figure 12: Effect of Accreditation Assignment on Mortality:
Reduced Form Estimates



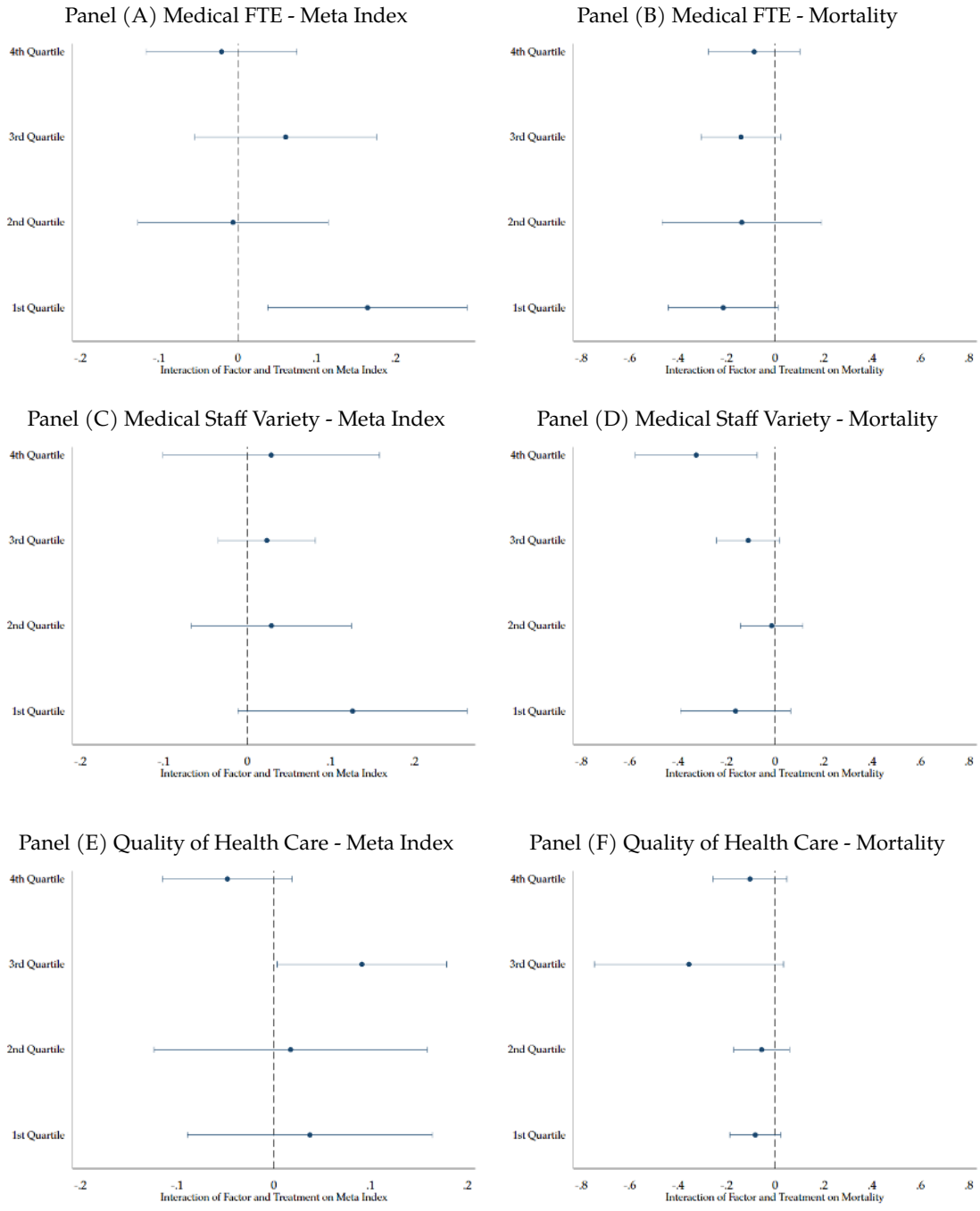
Notes: This figure shows the distribution of mortality for the treatment and control facilities. The mean monthly mortality rate is residualised on strata fixed effects for each group separately and the group-specific mean is added to the residuals. The p-value for the Kolmogorov-Smirnov test for equality of distributions is reported. We also report the Randomization Inference p-value, obtained by permuting accreditation assignments for each facility 1,000 times.

Figure 13: Comparison of Accreditation Effects



Notes: The figure shows the effects of accreditation assignment, completion, and process on horizontal coordination (Panel (A)), expert weights meta-index (Panel (B)), and monthly mortality (Panel (C)). The accreditation process is measured by Harvard and NCCHC scores separately, which are detailed in Section VI.6. The coefficients of accreditation assignment come from estimating Equation 1. The coefficients of accreditation completion and process come from estimating Equation 2.

Figure 14: Heterogeneous Treatment Effects by Quartile Analysis:
Reduced Form Estimates



Notes: This figure shows heterogeneity in treatment effects. Panels (A) and (B) show coefficients from the interaction between accreditation and each Medical FTE quartile, based on Equation 1, for the expert weights meta index and mortality, respectively. Panels (C) and (D) present coefficients from the interaction between accreditation and each Medical Staff Variety quartile, calculated by the types of medical staff available at facilities, based on Equation 1, for the expert weights meta index and mortality, respectively. Panels (E) and (F) present coefficients from the interaction between accreditation and each Quality of Health Care quartile, proxied by the meta-index expert weights at baseline also based on Equation 1, for the expert weights meta index and mortality, respectively.

Table 1: Quality Standard Indices

Category	Description	Examples
Standard A *Governance Administration*	Standards in this section address the establishment of a health care system that ensures access to care, professional administration of all aspects of health care, and monitoring and quality improvement policies that effectively process health care issues from identification through resolution.	• health record content • staff FTE • continuous quality improvement • grievance process
Standard B *Health Promotion, Safety and Disease Prevention*	Standards in this section address the need to optimize education, safety, and preventive care. Policies and procedures related to these standards require involvement by all facility staff.	• infectious disease prevention • suicide prevention • contraception
Standard C *Personnel Training*	Standards in this section ensure that appropriately trained personnel are in place to deliver health care to the inmate population and that qualified health care professionals are evaluated for continuing competency.	• staff credentials • custody staff training • health staff orientation
Standard D *Ancillary Health and Care Services*	Standards in this section address the establishment and maintenance of all necessary procedures for the provision of ancillary health care services.	• medications • clinic space and supplies • emergency response plan
Standard E *Patient Care and Treatment*	Standards in this section ensure the delivery of health care from arrival through discharge for health care issues. All care is timely, appropriate, and continues until resolution of the problem or until discharge.	• health care screenings • oral care • discharge planning • health care requests
Standard F *Special Needs and Services*	Standards in this section address patients with special health care needs and establish compliance requirements specific to each health care issue.	• mental health services • MAT • sexual abuse protocol • pregnancy care
Standard G *Medical-Legal Issues*	The standards in this section ensure that health services comply with legal requirements.	• use of restraints • segregation • informed consent/refusal

Table 2: Representativeness Table

	Mean	Coefficient	SE
Panel A: Jail Characteristics			
ADP	372.493	32.037	(54.743)
Admissions	5,177.080	1,281.462*	(747.622)
Avg. Stay Length (Months)	1.096	-0.207***	(0.079)
# Staff	104.897	33.541	(23.620)
Under Consent Decree	0.044	0.005	(0.034)
Maximum Jail Capacity	438.440	74.366	(86.527)
Holds Felony Offenders	0.484	-0.123	(0.077)
Panel B: Incarcerated Population Characteristics			
Share Male	0.833	0.011	(0.009)
Share White	0.596	-0.072**	(0.035)
Share Black	0.263	0.011	(0.035)
Share Hispanic	0.111	0.049	(0.032)
F-stat		1.334	
Analytical Sample Facilities		41	
Comparative Facilities		1085	

Notes: Data are from the Census of Jails (COJ) (2019) (U.S. Department of Justice 2022). We compare jails in our analytical sample to other jails in the COJ. We match 41 out of the 44 analytical jails who report in the COJ to 1085 other county jails that house adults with an ADP between 100 and 3000. Column (1) reports the sample mean. Column (2) reports the coefficient of an indicator, equal to one if the facility is within our analytical sample. Column (3) reports the associated robust standard error. ADP, the number of admissions, and the number of staff are reported at the reporting unit level. A reporting unit can manage multiple facilities. We adjust such variables to the facility level by dividing by the number of facilities managed by each reporting unit. Average stay of length (months) is calculated as $(ADP * 365/Admissions)/12$. We report an omnibus test of balance by regressing in-sample status on all variables in the table, and compute the *F*-statistic from a test of the variables' joint significance. To preserve the full sample when computing the joint *F*-statistics, we replace missing values in each variable with zero and add a missing indicator. The *F*-statistic is reported at the bottom of the table. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 3: Balance Table

	Mean	Coefficient	SE
Panel A: Baseline Quality Standards			
Governance and Administration	0.502	-0.022	(0.041)
Health Promotion, Safety and Disease Prevention	0.493	0.069	(0.055)
Personnel and Training	0.504	0.000	(0.075)
Ancillary (Supportive) Health Care Services	0.502	0.006	(0.046)
Patient Care and Treatment	0.454	-0.009	(0.036)
Special Needs and Services	0.514	0.057	(0.062)
Medical-Legal Issues	0.544	0.017	(0.101)
Simple Mean Meta-Index	0.495	0.002	(0.040)
Principal Component Analysis Meta-Index	0.361	0.073	(1.703)
Expert Weights Meta-Index	0.495	0.016	(0.046)
F-Stat		1.865	
Panel B: Baseline Mortality			
Avg. Monthly Deaths	0.064	-0.035	(0.053)
Panel C: Baseline Staff Survey Responses			
# Staff Responses	25.864	-6.284	(7.461)
Share Male	0.517	0.038	(0.062)
Age	41.978	0.477	(1.511)
Share White	0.650	-0.023	(0.090)
Share Black	0.142	0.109	(0.075)
Share Hispanic	0.144	-0.047	(0.060)
Horizontal Coordination	0.656	-0.006	(0.030)
Vertical Coordination	0.668	0.008	(0.050)
Satisfaction	0.687	-0.025	(0.021)
Respect Incarcerated Population	0.735	-0.005	(0.030)
F-Stat		1.298	
Panel D: Baseline Jail Characteristics			
All FTE	5.795	-1.180	(1.306)
For-Profit Health Vendor	0.682	0.009	(0.144)
Previously Accredited	0.114	0.064	(0.095)
Share of Docs Received	0.645	-0.078	(0.067)
Share County Voting Republican	0.445	-0.021	(0.039)
Sheriff is Republican	0.318	0.018	(0.127)
F-Stat		1.052	
F-Stat		4.447	
Observations		44	
Strata FE		✓	

Notes: Data are from the baseline facility survey, baseline staff survey, medical audit look-back, death logs and media reports of death. Column (1) reports the sample mean, columns (2) and (3) report the coefficient on an indicator for treatment assignment and the associated robust standard error, respectively. Panel (A) compares baseline quality standards (for detailed definitions of the standards and their calculation see Appendix Section I). Share of health staff is the number of health staff who took the staff survey divided by the total number of staff that took the staff survey. ADP stands for average daily population. FTE is the number of full-time equivalents of health staff. For-profit health vendor indicates that the facility has hired an external private company to provide health services. Horizontal coordination, vertical coordination, satisfaction, and respect for inmates are staff sentiment indices constructed using individual questions from the staff survey. These questions are answered on a Likert scale and re-normalized on a scale from 0 to 1 with higher values representing stronger agreement. We report an omnibus test of balance by regressing treatment assignment on either the variables within the same panel or all the variables in the table, controlling for randomization strata fixed effects. We compute the *F*-statistic from a test of the variables' joint significance. Joint *F*-statistic is listed at the bottom of each panel and also at the bottom of the table. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 4: Effect of Accreditation Completion on Staff Sentiment Indices: 2SLS Estimates

	Horizontal Coordination (1)	Vertical Coordination (2)	Satisfaction (3)	Respect Inmates (4)
	Panel A: Second Stage			
$\widehat{Accreditation}$	0.059**	0.037	0.037**	-0.010
	(0.027)	(0.031)	(0.018)	(0.023)
	Panel B: First Stage			
Treat	0.807***	0.782***	0.771***	0.784***
	(0.078)	(0.097)	(0.103)	(0.095)
F-stat	106.08	64.94	56.05	68.26
Control Complier Mean	0.618	0.627	0.639	0.764
Observations	671	671	671	671
Number of Clusters	44	44	44	44
Strata FE	✓	✓	✓	✓
Baseline Control	✓	✓	✓	✓

Notes: This table reports 2SLS estimates of the treatment effect of accreditation completion on four staff sentiment indices obtained from estimating Equation 2. All specifications include randomization strata fixed effects and the baseline mean of the respective outcome variable. Staff sentiment indices are created using data from the baseline/endline staff survey. The horizontal coordination index includes: (1) "Custody staff support the implementation of clinical decisions and partner with clinical staff"; (2) "Custody and clinical team staff work collaboratively to give good health care to inmates"; (3) "There is open communication between custody and health staff." The vertical coordination index includes: (1) "Staff feel comfortable speaking up when they see something that may negatively affect inmate care"; (2) "When staff speak up about inmate safety and care decisions, those with greater authority are open to their concerns"; (3) "My supervisor considers staff suggestions for improving inmate health and safety"; (4) "My supervisor considers staff suggestions for improving staff health and safety"; (5) "My supervisor takes direct actions to address staff concerns for improving inmate health and safety"; (6) "My supervisor takes direct actions to address staff concerns for improving staff health and safety." The satisfaction index includes: (1) "I received the training I need to do my job well"; (2) "I have the tools and resources I need to do my job well"; (3) "I am satisfied with my job"; (4) "I find my job to be meaningful"; (5) "I feel valued at my job"; (6) "I find my job to be challenging"; (7) "I would recommend my job to others." The respect inmates index includes: (1) "Inmates at this facility are treated with respect." These questions are answered on a Likert scale and renormalized on a scale from 0 to 1 with higher values representing stronger agreement. Control complier means are computed as described in the main text. Standard errors are clustered at the facility level. We obtained endline responses from 40 jails and we impute missing endline responses for the other 4 facilities in our sample with baseline values. $*$, $**$, and $***$ refer to the statistical significance at 10, 5, and 1 percent level, respectively.

Table 5: Effect of Accreditation Completion on Medical Inputs:
2SLS Estimates

	Medical FTE (1)	Vendor Change (2)	Refer Out (3)	Equipment (4)	Services (5)
	Panel A: Second Stage				
$\widehat{Accreditation}$	-1.286	-0.063	-0.029	0.016	0.126**
	(0.949)	(0.203)	(0.038)	(0.032)	(0.051)
	Panel B: First Stage				
Treat	0.599***	0.578***	0.899***	0.580***	0.577***
	(0.101)	(0.104)	(0.070)	(0.102)	(0.105)
F-stat	35.27	31.04	165.22	32.29	30.32
Control Complier Mean	8.111	0.302	0.813	0.915	0.262
Observations	44	44	562	44	44
Baseline Control	✓	✓	✓	✓	✓
Strata FE	✓	✓	✓	✓	✓

Notes: This table reports 2SLS estimates of the treatment effect of accreditation completion on medical inputs from estimating Equation 2. Column (1) is Medical FTE as reported in the facility survey. Column (2) is an indicator for whether the facility changed their vendor between baseline and endline as reported in the facility survey. Column (3) is the average of a rescaled Likert scale for whether health care staff can readily refer out. Column (4) covers medical equipment including: handwashing facilities/alternate means of hand sanitation, examination table, scale, thermometers, a light capable of providing direct illumination, blood pressure monitoring equipment, stethoscope, ophthalmoscope, otoscope, transportation equipment, trash containers for biohazardous materials and sharps, sterilizer for non-disposable medical or dental equipment, equipment and supplies for pelvic examinations if female inmates are housed in the facility, oxygen, AEDs, pulse oximeter, PPE, multiple-test dipstick urinalysis, finger-stick blook glucose tests, peak flow meters, stool blood-testing material and pregnancy test knits. In medical equipment, we also include dental equipment, hand washing facilities or alternate means of hand sanitation, dental examination chair, examination light for dental procedures, proper instruments for dental examination, trash containers for biohazardous materials and sharps from dental procedures, dentist's tools and PPE. Column (5) covers medical services including: pharmacy, records, radiology, physical therapy unit, emergency, labs, hospice and medical orthoses or prostheses or other aids to impairment. Each component of equipment and services has the same weight and we calculate a weighted share. All specifications except for Column (2) include the baseline measure and randomization strata fixed effects. Control complier means are computed as described in the main text. Robust standard errors are reported in parentheses. $*$, $**$, and $***$ refer to the statistical significance at 10, 5, and 1 percent level, respectively.

Table 6: Effect of Accreditation Completion on Meta Quality Standards: 2SLS Estimates

	Simple Mean	Principal Component	Expert Weights
	(1)	(2)	(3)
	Panel A: Second Stage		
$\widehat{Accreditation}$	0.052	0.125**	0.085**
	(0.034)	(0.061)	(0.042)
	Panel B: First Stage		
Treat	0.575***	0.576***	0.564***
	(0.094)	(0.096)	(0.099)
F-stat	37.82	35.87	32.16
Control Complier Mean	0.599	0.632	0.572
Observations	44	44	44
Baseline Control	✓	✓	✓
Strata FE	✓	✓	✓

Notes: This table reports 2sls estimates of the treatment effect of accreditation completion on meta quality standards constructed by combining the seven quality standards in three ways as described in the main text: equal weights, the first component using principal component analysis, and reciprocal rank weights using our expert survey responses. For detailed definitions of the standards and their calculation see Appendix Section I and for expert weights see Figure 6. All specifications include the baseline quality standard and randomization strata fixed effects. Control complier means are computed as described in the main text. Robust standard errors are reported in parentheses. $*$, $**$, and $***$ refer to the statistical significance at 10, 5, and 1 percent level, respectively.

Table 7: Effect of Accreditation Completion on Quality Standards:
2SLS Estimates

	Gov. Admin. (1)	Safety & Prevention (2)	Personnel Training (3)	Ancillary Services (4)	Patient Care & Rx. (5)	Special Needs (6)	Medical Legal (7)
	Panel A: Second Stage						
$\widehat{Accreditation}$	0.020	0.098*	0.143**	0.042	0.102**	0.021	0.114
	(0.031)	(0.059)	(0.071)	(0.031)	(0.047)	(0.078)	(0.078)
	Panel B: First Stage						
Treat	0.606***	0.533***	0.578***	0.575***	0.591***	0.544***	0.574***
	(0.088)	(0.106)	(0.104)	(0.104)	(0.092)	(0.100)	(0.103)
F-stat	47.40	25.21	31.12	30.63	41.01	29.52	31.16
Control Complier Mean	0.612	0.587	0.528	0.545	0.568	0.676	0.646
Observations	44	44	44	44	44	44	44
Baseline Control	✓	✓	✓	✓	✓	✓	✓
Strata FE	✓	✓	✓	✓	✓	✓	✓

Notes: This table reports 2sls estimates of the treatment effect of accreditation completion on the seven quality standards from estimating Equation 2 (for detailed definitions of the standards and their calculation see Appendix Section I). All specifications include the baseline quality standard and randomization strata fixed effects. Control complier means are computed as described in the main text. Robust standard errors are reported in parentheses. $*$, $**$, and $***$ refer to the statistical significance at 10, 5, and 1 percent level, respectively.

Table 8: Effect of Accreditation Completion on Mortality: 2SLS Estimates

	(1)	(2)	(3)
	Panel A: Second Stage		
$\widehat{Accreditation}$	-0.296***	-0.225***	-0.249***
	(0.114)	(0.073)	(0.092)
	Panel B: First Stage		
Treat	0.578***	0.603***	0.568***
	(0.104)	(0.103)	(0.108)
F-stat	31.04	34.12	27.71
Control Complier Mean	0.333	0.262	0.288
Observations	44	44	44
Strata FE	✓	✓	✓
Control for ADP		✓	
Baseline Control			✓

Notes: This table reports 2SLS estimates of the effect of accreditation completion on mortality obtained from estimating Equation 2. The outcome variable is the average number of deaths per month occurring in the six-month window starting ten months after treatment assignment, the expected time of the NCCHC on-site visit. Column (1) controls for randomization strata fixed effects. Column (2) adds a control for the log ADP of the jail. Column (3) replaces log ADP with baseline mortality. Baseline mortality refers to the average number of deaths per month occurring during the six months preceding treatment assignment. All specifications include randomization strata fixed effects. Control complier means are computed as described in the main text. Robust standard errors are reported in parentheses. $*$, $**$, and $***$ refer to the statistical significance at 10, 5, and 1 percent level, respectively.

Table 9: Effect of Accreditation Completion on Recidivism and Litigation:
2SLS Estimates

	Recidivism			Litigation		
	Has Jail Records	3-Month Recid	6-Month Recid	# Lawsuits		
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: Second Stage					
$\widehat{Accreditation}$	-0.016	-0.128	-0.208**	-0.222	-0.223	-0.203
	(0.216)	(0.084)	(0.086)	(0.157)	(0.141)	(0.161)
	Panel B. First Stage					
Treat	0.578***	0.662***	0.621***	0.578***	0.603***	0.557***
	(0.104)	(0.131)	(0.130)	(0.104)	(0.103)	(0.109)
F-stat	31.04	25.65	22.88	31.04	34.12	26.23
Control Complier Mean	0.778	0.238	0.397	0.302	0.286	0.288
Observations	44	9748	9748	44	44	44
Strata FE	✓	✓	✓	✓	✓	✓
Control for ADP	-	-	-		✓	
Baseline Control	-	✓	✓			✓

Notes: This table reports 2SLS estimates of the effect of accreditation completion recidivism and litigation. Column 1 shows the treatment effects of accreditation completion on whether having booking records. Columns 2 and 3 show the treatment effects on 3-month and 6-month recidivism, with the outcome variable being a binary indicator for whether an inmate released within 45 days of the endline survey is re-booked within 3 months and 6 months of release, respectively. Columns 2-3 control for the baseline 3-month or 6-month recidivism rate, respectively. Column 4-6 show the treatment effects of accreditation completion on healthcare related lawsuits. The outcome variable is the total number of lawsuits occurring in the six-month window following the endline survey. Column 5 controls for log ADP. Column 6 controls for the baseline lawsuits instead, which refers to the total number of lawsuits occurring during the six months preceding the baseline survey. All specifications include randomization strata fixed effects. Control complier means are computed as described in the main text. Columns 2-3's standard errors are clustered at the facility level. $*$, $**$, and $***$ refer to the statistical significance at 10, 5, and 1 percent level, respectively.