
Exploring the drivers of health and healthcare access in Zambian prisons: a health systems approach

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Abstract

Background Prison populations in sub-Saharan Africa (SSA) experience a high burden of disease and poor access to health care. Although it is generally understood that environmental conditions are dire and contribute to disease spread, evidence of how environmental conditions interact with facility-level social and institutional factors is lacking. This study aimed to unpack the nature of interactions and their influence on health and healthcare access in the Zambian prison setting.

Methods We conducted in-depth interviews of a clustered random sample of 79 male prisoners across four prisons, as well as 32 prison officers, policy makers and health care workers. Largely inductive thematic analysis was guided by the concepts of dynamic interaction and emergent behaviour, drawn from the theory of complex adaptive systems.

Results A majority of inmates, as well as facility-based officers reported anxiety linked to overcrowding, sanitation, infectious disease transmission, nutrition and coercion. Due in part to differential wealth of inmates and their support networks on entering prison, and in part to the accumulation of authority and material wealth within prison, we found enormous inequity in the standard of living among prisoners at each site. In the context of such inequities, failure of the Zambian prison system to provide basic necessities (including adequate and appropriate forms of nutrition, or access to quality health care) contributed to high rates of inmate-led and officer-led coercion with direct implications for health and access to healthcare.

Conclusions This systems-oriented analysis provides a more comprehensive picture of the way resource shortages and human interactions within Zambian prisons interact and affect inmate and officer health. While not a panacea, our findings highlight some strategic entry-points for important upstream and downstream reforms including urgent improvement in the availability of human resources for health; strengthening of facility-based health services systems and more comprehensive pre-service health education for prison officers.

Key words: Coercion, health services, health system, nutrition, prisons,

Key Messages

- Many Prison populations in sub-Saharan Africa (SSA) experience a high burden of disease and poor access to health care.
- Despite widespread recognition that prisons are a high-risk environment for poor health deficiencies remain in most SSA countries' response—including continued reliance on isolated highly technical disease-specific interventions.
- Using a systems thinking approach this study demonstrated how prison health is influenced by interactions between the prison environment but also social and institutional factors.
- Key interactions underpinning inmate health included the direct and indirect impacts of insufficient and inadequate nutrition, which catalysed coerced trade in goods and services
- Highly stratified and inequitable living conditions were exacerbated by coerced trade with already poor, socially isolated or young inmates most vulnerable.
- Despite systematic resource and normative barriers, prison officers expressed substantial individual willingness to learn more about health and be engaged in health service improvements.

Introduction

Prison populations in sub-Saharan Africa (SSA) experience a high burden of disease and poor access to health care (Dolan et al. 2007; Todrys et al. 2011) with a range of factors contributing. As in many Western systems, SSA prison populations are disproportionately made up of individuals from low socio-economic backgrounds with higher risk of ill-health on entry to prison (De Viggiani 2007). Although having comparatively modest absolute numbers, SSA countries also experience some of the worst rates of overcrowding globally. Large bottle necks in the criminal justice systems combined with outdated infrastructure contribute to high occupancy rates (United Nations Development Programme 2011; Todrys and Amon 2012). Together with poor sanitation, and the documented risk of both physical and/or sexual violence from other inmates or guards (Haffejee et al. 2005; Human Rights Watch 2010; Osborn 2010) these conditions exacerbate the risk of infectious disease, stress and mental health problems (Fazel and Baillargeon 2011; Reid et al. 2012; Walker et al. 2014). Extremely high rates of HIV and TB in many SSA countries add a layer of risk and complexity to these problems (Henostroza et al. 2013). Such a high burden of disease has negative consequences for prisoners themselves, but also, via the continuous movements of officers, visitors and inmates into and out of the prison system, the community at large (PLoS Medicine Editors et al. 2010; Cowan-Dewar et al. 2011; Henostroza et al. 2013; Stott et al. 2013).

Despite widespread recognition that prisons are a high-risk environment for ill-health (Seifman Visiting Lecturer and Egamberdi 2008; Johnstone-Robertson et al. 2011; Jürgens et al. 2011) deficiencies remain in most SSA countries' response (Directorate of Social & Human Development and Special Programs SADC Secretariat 2009). Strategies to improve health in prisons have tended to be isolated and disease-specific and national health strategic plans often lack substantive reference to prison-specific interventions (UNODC 2010). This is despite the fact that prisons provide an important opportunity to screen, counsel and treat at-risk individuals who will eventually return to the community. The low overall priority given to prisoner health by national and local policy makers remains a key contributing factor (Fazel and Baillargeon 2011)

The emergence of HIV and associated TB epidemics and the need to strengthen prevention and curative services for most-at-risk groups have, to some extent, refocused local attention on prison populations. Nascent research has provided a new evidence-base demonstrating high rates of infectious disease in a range of SSA

prison settings (Noeske et al. 2006; Henostroza et al. 2013; Schwitters et al. 2014; Telisinghe et al. 2014). However, the ability of policy makers and program developers to develop sophisticated and sustainable interventions has been constrained by (among other things) the paucity of research focused on the institutional and social dynamics influencing prisoner health and access to health care. Although it is generally understood that environmental conditions are dire and contribute to disease spread, for example, evidence of how environmental conditions interact with facility-level social and institutional factors to influence risk behaviours or health service access is lacking in most SSA countries. South Africa represents something of an exception with a small but growing number of studies addressing such issues (Sibusiso Sifunda et al. 2006, 2007; Stephens et al. 2009, 2015). In this article, we aim to unpack those interactions in the Zambian setting.

Study setting

In 2015, Zambia had an overall prison population of 18 102 of which 1% was female and 23% was on remand [personal communication, Zambian Prison Service (ZPS) Command]. The network of 87 prison facilities (some male-only, some con-joined male/female) included several large maximum and medium security sites and a host of smaller District and farm prisons with a total official capacity of 6100. Occupancy levels as of 2015 were 277% overall but ranged from a low of 80% to a high of 700%.

Zambian prisons are administrated by the ZPS under the Ministry of Home Affairs. Although the Zambian Prisons Act was revised in 2001 to establish a Health Directorate, budgetary allocations to prison health to date remain almost nil (Government of the Republic of Zambia 2015). Several prison-focused TB and HIV interventions have been included in recent national planning documents such as the Ministry of Health's (MOH) National Health Strategic Plan 2011–15, which stipulates the expansion and strengthening of a TB programme in prisons. The National HIV/AIDS Strategic Framework 2011–15 also advocated for expanded coverage of a core package of combination prevention interventions for prisoners. Notably, however, condom provision in prisons remains taboo and in conflict with Zambian laws that criminalize men having sex with men.

Evidence from several recent epidemiological studies demonstrates that Zambian prison inmates experience high rates of communicable disease. In 2011 in Lusaka Central Prison, the rate of TB was demonstrated to be 3.9% (3900/100 000) more than four times the prevalence in the population of Lusaka Province (Henostroza

et al. 2013). In the same facility, HIV prevalence in 2011 was twice that of the national population (27% vs 14.3%) and 30% greater than in Lusaka province (27% vs 21%). Similar findings with respect to TB and HIV prevalence have been reported in previous studies and appears to reflect a regional trend with high rates of prison-based HIV reported in South Africa (41%), Cote d'Ivoire (27.5%) (Dolan et al. 2007) and Zimbabwe (50%) (Alexander 2009) among others (Ekouevi et al. 2013; Shalihu et al. 2014).

In 2013, with funding from the European Union, ZPS, the MOH, Ministry of Community Development Mother and Child Health (MCDMCH) with support from the Centre for Infectious Disease Research (CIDRZ) and the United National Office for Drugs and Crime (UNODC) embarked on an ambitious 3-year prisons health system strengthening programme. The overall objective was to strengthen the management, coordination and implementation of prison health services through a series of staged interventions at the Ministry level, Directorate level and prison facility level. To help inform this process and provide stakeholders with current evidence, a component of baseline research was built into the project. This article reports findings from a component of that research.

Methods

Study design and conceptual framework

In this article we present findings from a study that aimed to describe the interactions between structural and relational factors influencing Zambian prisoner health, health risks, and access to health care. To deepen our understanding of the relationship between the social conditions prisoners received, their health care and health, we conducted in-depth interviews of a clustered random sample of prisoners in a purposeful sample of prisons, as well as prison guards and health care workers in the same sites. Our analysis was guided by the concepts of dynamic interaction and emergent behaviour, drawn from the theory of complex adaptive systems. As is now widely recognized (Gilson 2010; Topp et al. 2015) health systems are not simply mechanistic delivery systems for health services, but complex social systems characterized by multiple actors (Bennett et al. 2011) and localized social and political power structures (Paina and Peters 2012). An analytical approach that recognizes these complex features and explores their interactions with other, broader contextual factors (e.g. structural, material and relational) is thus helpful for developing rich explanations and a deeper understanding of the factors underpinning prisoner health risks and health service access (Malik et al. 2014).

Study population and sampling

Four large Zambian prisons were purposively selected based on geographic spread (one facility in each of four provinces), and a range of security levels (two medium security, one maximum security and one low-security District facility). In each site, we had a recruitment target of 20 male inmates (including 10 known to be HIV positive) and 5–10 prison officers. Participant inclusion criteria included having lived or worked in the selected prison site for 3 months or more, and being capable and willing to provide informed verbal consent. We excluded those under 18 years of age (Zambia's legal age of consent) and those with a known history of mental illness.

Sampling of inmates was carried out using a quasi-random approach. The primary investigator (PI) first identified the total number of cells and randomly selected 4. From a list of inmates within the selected cells, the PI randomly selected 10 individuals. Ten additional inmates were selected from a full list of inmates recorded as

receiving HIV care and treatment, obtained from the prison health clinic. Where an inmate was unavailable due to illness, assigned labour duties or other reasons, a replacement was selected. Recruitment of prison officers was purposive (based on rostered staff lists) and designed to ensure a mix of interviews with senior management, non-ranking prison officers and professional health personnel working at the prison clinic or nearby public health centre.

Recruitment and interview procedures

Data collection was carried out by a team of six multi-lingual Zambian research assistants (RAs), working in three pairs. RAs were recruited based on previous experience conducting sensitive in-depth interviews and received an intensive 5-day training encompassing human subjects protection, familiarization with the study's aim and the study tools, the Zambian prison context, and best-practice approaches to qualitative interviewing.

With prior permission from the Commissioner of Prisons and the Officer in Charge the PI worked closely with the prison nurse or clinical officer to make arrangements for the removal of randomly selected inmates to a nominated venue within each prison. Security protocol meant that inmates could only be identified and accompanied from their cells by an officer. In two facilities, interviews were conducted in closed-door rooms. In two facilities, interviews were conducted at tables placed in a large open area (e.g. mess hall) that enabled a prison officer to stand in line-of-sight but at a distance of >30 m to ensure audio-confidentiality. These conditions were non-negotiable based on security requirements.

To ensure participant protection we adopted a verbal consent protocol. Special care was taken to both offer voluntary participation and to minimize staff or other inmates' knowledge of any individual's participation in the study. Potential participants were provided clear information that the study was not linked to medical treatment or any other service. Verbal consent was witnessed by an independent lay health worker recruited from the closest public health centre. All participants were offered a copy of the study information sheet but were not obliged to take or keep a copy if they felt it would compromise their confidentiality. Interview participants were not paid or incentivized to participate.

Interviews were carried out in the participant's choice of English or one of four local languages and were approximately one hour in length. Interview guides included questions on topics that investigator experience and the literature have shown to be important to inmate health. Questions covered both factual and chronological detail as well as perceptions and experiences and social relations.

Data management and analysis

Analysis began during field work with reflective, investigator-led debriefing sessions at the end of each day of interviewing. Important and emergent themes or topics were noted and incorporated into subsequent interviews and summary notes transcribed and incorporated into analysis. A final debriefing workshop to discuss cross-facility similarities and differences was conducted after the completion of all fieldwork. All interviews were audio-recorded, and later transcribed and translated into English (where necessary) in a single step. Transcripts were imported into NVivo QSRTM and read twice in full prior to a draft code-book being developed. Two rounds of coding were conducted, with codes refined during the process. Draft findings and interpretations were reviewed and member-checked by two other investigators at each stage of an iterative process. Codes were gradually consolidated and grouped into larger themes relating

Table 1. Demographic characteristics of interview respondents in four prison facilities

	Facility 1	Facility 2	Facility 3	Facility 4	Total
Inmates Male	20	18	20	21	79 (100%)
Convicted (%)	14 (70%)	18 (100%)	19 (95%)	19 (90%)	70 (88%)
Mean time served (months)	28	64	74	20	—
Mean age (years)	37	44	34	32	—
Ever married (%)	16 (80%)	16 (89%)	13 (65%)	16 (76%)	63 (80%)
Mean no. children	2	4.2	2.1	2.4	—
HIV-positive	8 (40%)	9 (50%)	7 (35%)	9 (43%)	33 (41%)
Officers or other prison staff					
Male staff	5	4	4	3	16
Female staff	3	2	5	6	16
Total interviews	31	31	34	35	111

to inmate health and healthcare. A summary of draft findings was additionally circulated within the ZPS to garner feedback. Our approach was guided by recognized qualitative analysis techniques including reading for content, coding, data reduction, data display and interpretation (Yin 2009; Cataldo et al. 2011; Taegtmeyer et al. 2011).

Findings

A total of 111 interviews were conducted comprising 79 with male inmates and 32 with prison staff (including male and female officers and health workers). Table 1 describes basic demographic characteristics for the inmates and the breakdown of interviews conducted in each of the four study sites.

In semi-structured interviews, 79 prisoners (100%) and 32 officers (97%) reported feeling anxious about or afraid for their health at some point during their stay or work in prison. With further analysis, five major themes emerged as central determinants of health as well as shaping the access and quality of health services available to prisoners. These themes were (1) environmental conditions, (2) nutrition and cooking arrangements, (3) social networks and relationships, (4) prison health services and protocol, and (5) coercion. Findings from these five overarching areas of prison life will be detailed in sequence.

In the following sections, we refer to the prisons where the study was conducted as Facility 1–4. Although we are conscious that different nomenclature is the standard in different countries, in this article we use the term ‘prisoner’ and ‘inmate’ interchangeably.

Environmental conditions

Overcrowding and sleeping conditions

Interviews confirmed high rates of overcrowding across all four facilities, with associated negative effects on both inmates’ and officers’ physical and mental health. In Facilities 1, 2 and 4 inmates described sleeping conditions that included having to sit all night (Facility 1), having to sleep head to shoulder with three to a bed or mattress (Facility 2), or head-to-shoulder on the floor without a mattress (Facility 4). Male inmates in Facility 3 reported overcrowding but to a lesser extent.

It is a tragedy [...]. People in prison don’t wish for nights, they pray [the sun] does not set so they don’t go through that 16 h. It is very painful, [being locked up] for 16 h, trying to find where to sit, stepping on each other when going to the toilet. It is very painful. [Facility 1, Inmate 21]

Prison hurts me most when we are [trying to] go to sleep, when you come outside [in the morning] and do other things you feel a

bit at home. But when we go to sleep because of congestion I can’t even say we sleep. We sit. That’s where there is a problem [Facility 1, Inmate 19]

Mirroring inmates’ concerns, officers from all four sites reported high levels of anxiety relating to overcrowding and, in particular, the risk of airborne infectious disease transmission.

Looking at the congestion, we are at risk of contracting these airborne diseases. [...] we have seen officers fear to enter prisons because of the airborne diseases [They say:] ‘when I enter I will contract TB’. Congestion is inside but we take these diseases to our families outside. [Facility 1, Officer 3]

I am mostly confined in the office and you can see even the way the offices are [...] So inmates come and are also discharged from this office and if a prisoner maybe has these communicable diseases from close sleeping, with this type of infrastructure, I think it is very easy for me to contract an illness. [Facility 3, Officer 4]

Sanitation and hygiene

A universal complaint among inmates and officers interviewed in this study concerned the poor state of prison sanitation and inmates’ struggle to maintain personal hygiene. Broken toilets, insufficient toilets to cope with the number of inmates, lack of cleaning products to maintain the toilets and bathrooms and the absence of toilet facilities in cells (resulting in use of covered buckets) were concerns raised by respondents in all four sites.

In relation to the impact of these conditions on health, a great majority ($n=67$, 85%) of inmates mentioned – unprompted – anxiety regarding the potential for infectious disease transmission resulting from inadequate sanitation, including sporadic and insufficient water supply.

Our bathing is really bad, they have stopped water from moving in a place where we bathe from, so you will find the dirt water reaching our waist, and in the same dirt water people urinate, they was wounds they do all sorts of things there, it is just the grace of God that we are not sick now. [Facility 2, Inmate 9]

Toilets are not in good condition, they are always open, and sometimes they are used without even pouring water in them. You find that flies sit in the toilets. So when we return from work in the afternoon, when it is past lunch time, we find our food just left in the open, with flies sitting on it. Since we are not allowed to eat from the cells we eat from outside with flies all over, so there is a lot of diarrhoea, toilets are not good at all. [Facility 3, Inmate 8]

Many of the officers interviewed also described fears relating to the spread of diarrhoea, dysentery and cholera, albeit to a lesser degree.

There is diarrhoea and whenever we experience diarrhoea our families also get affected. So these are some of the frustrations and challenges we are experiencing. [Facility 1, Officer 3]

Several officer respondents observed that an improvement in inmates' living conditions would have a direct and positive impact on their own working environment, as one respondent explained:

We live with the inmates most of the time, so we should make sure that the environment is clean because if the inmate's environment is dirty it can also affect us. If you have got a healthy prisoner it will [create] a healthy officer. If we have got a prisoner who [...] not healthy it will affect our work, we won't work properly. [Facility 3, Officer 3]

Nutrition and cooking arrangements

Of the 79 inmates interviewed, 76 (96%) mentioned either the quantity or quality of prison food as insufficient. Along with overcrowding, nutrition was the most heavily emphasized health concern among inmates, a finding substantiated by the majority of the prison officers interviewed.

Insufficient food, and related dependency on family or friends to bring supplementary food were reported by inmates from all sites. Breakfast constituted unsalted porridge or 'samp' served around 08:00. Lunch, constituting nshima (cooked corn meal) and beans and/or small dried fresh-water fish (kapenta) served between 12:00 and 16:00 depending on the facility. In Facilities 1 and 2, supper was an extra portion served at the same time as lunch and saved for later. In Facility 3, food was required to be eaten outside the cell resulting in lunch and supper typically being a merged meal. In Facility 4, inmates reported no extra serving for supper and additionally noted that broken cooking facilities meant that at the time of study they were also not receiving breakfast porridge. In Facilities 3 and 4, portions of kapenta were handed to inmates uncooked, requiring them to either independently source firewood and/or charcoal and cooking oil or otherwise eat the dried fish raw. Constituting a significant food sanitation risk, inmates in three sites reported 'saving' their last meal of the day (served prior to the afternoon lock-up) by wrapping it in reused plastic bags and then placing it under blankets to keep it warm.

For general inmates the only protein provided in prison rations was kapenta, with occasional church donations including soya chunks. Common complaints included the extremely poor quality of the kapenta commonly known as 'Kabbabba', which was often still mixed with sand or stones that were difficult to remove.

We eat the same food, we always eat kapenta which has stones such that if you rinse it twice the stones will still be there. So you have to soak it for 15–20 minutes, wash it and rinse it just the way we rinse clothes 6–7 times. [Facility 3, Inmate 17]

Quality of meals, particularly the lack of vegetables and associated vitamin and protein deficiencies were ubiquitous concerns across the four sites.

We eat the same food over and over. We need to be changing, we don't have vegetables. [Facility 2, Inmate 3]

Inmates also frequently mentioned diarrhoea, weight loss and lethargy related to poor diet. Respondents from all four facilities, but most frequently those in Facility 2 reported fluid retention and swelling in their legs related to vitamin deficiencies (and exacerbated by long periods of immobility at night). A number of HIV-positive inmates reported that in addition to being inadequate, meals were ill-timed in relation to their medication schedule.

The things that really give me problems in here is food. You know the medicine I'm drinking is strong and like now, I have already drunk my medicine but I have not yet eaten, so that is going to give me problems. [Facility 3, Inmate 20]

Despite such concerns, some HIV-positive inmates in Facilities 1 and 2 also reported receiving extra or different prison-sponsored rations based on their condition. In Facility 2, HIV-positive inmates were routinely provided with an extra meal per week by the Catholic Church.

A number of inmates described being able to access supplemental food by visiting friends and family. However, approximately half of inmates interviewed at each site noted that the prison was too far or too expensive for family members to visit regularly. Begging or trading services for food (see next section) from those with regular visitors or other forms of external support was widespread.

Social networks and relationships

Inmate health and health seeking behaviours were influenced by a range of social and relational factors. Primary among these was an inmate social structure, which afforded certain inmates significant privileges and power over other inmates (Box 1).

Inmate interviews consistently revealed Special Stages and Cell Captains to be the most influential inmates within the prison, as one inmate explained:

[Special stage] are influential because they are considered to be the eyes of the prison officers. They can move without restriction. If they want to go into town they can go and come back, without any problem. Even in to [other provinces] they can go and come back. [Facility 1, Inmate 1]

Box 1 Inmate hierarchy

Inmate hierarchy in Zambian prisons is based on a combination of time served and good behaviour that enables 'promotions' through various 'stages' (1–5) of the hierarchy. The highest, Stage 5 or 'Special Stage' appointments are made on the recommendation of an Officer in Charge and are ratified by the Prisons Commissioner. Notably, all Special Stage appointments come with responsibilities and privileges including access to the officers, substantially better sleeping arrangements and the ability to deputize other inmates to carry out certain duties (see Table 2).

Special Stagers are responsible for deputizing 'Cell Captains' who maintain discipline within individual cell blocks and who have the authority to report 'cases' of indiscipline. Cell Captains are also responsible for the management of illness within their cell including identification of sick inmates and facilitating referrals to the clinics. Overall Cell Captains have 'Peacemaker' deputies responsible for maintaining order in the cell, after lock-up and 'Policemen' responsible for order outside the cell during the day. Study respondents in Facilities 1, 3 and 4 also described a type of captain called 'Gang leaders' responsible for corralling inmates for work under supervision in prison farms each day. Cell Captains typically have sleeping privileges and greater freedom of movement including easier access to internal health services (where they existed). However, these are by arrangement with the Special Stage rather than formalized rights.

Table 2. Responsibilities and privileges of 'special stage'

Responsibilities	Privileges
Early morning unlock and inmate count	Greater mobility & freedom of movement
Reporting of sick inmates	Greater access to officers
Maintaining cell discipline	Authority to supervise other inmates outside prison
Penultimate daily cell check	Authority to discipline/report other inmates
Assisting as requested by officers	Special sleeping quarters (unofficial privilege)

Appointment to Special Stage or Cell Captain was officially based on a history of good behaviour, level of education and officers' confidence in an individual's self-discipline. However, some inmates described other factors as important for promotion including real or perceived wealth and connections outside the prison. Some, especially inmates from Facility 3, reported how officers' cultivated friendships with inmates who they felt could provide them (the officers) with strategic opportunities (financial, political or otherwise) either immediately or in the future.

[Special stage] are chosen by the officers and the Commissioner. But what I see is that there is corruption. [Officers] are choosing those with a lot of money. They are the ones that have such opportunity even though they are not qualified. Maybe it is because they are business men, they can just corrupt these officers. [Facility 1, Inmate 4]

The inmate hierarchy had both direct and indirect implications for inmate health and health seeking behaviours. Interviews confirmed that some inmates had privileged access to officers and/or services, and significant power over others' ability to access the same. In all four study sites, for example, a sub-set of inmates described how being in favour with Cell Captains or other senior inmates was important if one wanted to access healthcare. Without such favour, inmates reported being denied access, accused of lying in order to get out of routine duties, or being repeatedly told that they had to wait. Notably, such reports were more prevalent amongst non-HIV infected inmates.

Prison health services and protocol

Healthcare access

Inmates' access to health services in the four sites was variable. A number of respondents, predominantly those diagnosed with HIV and/or TB, described prison as a setting where, for the first time in their lives, they had received information about how to improve their health. Inmate peer educators were described as instrumental in providing such information, delivering regular health talks to inmates in their cells and helping to funnel sick inmates, particularly suspected TB patients, to the clinic. A number of inmates also described receiving support to access HIV testing, seek treatment and maintain their treatment. Common themes in these accounts included the encouragement from officers and other inmates and the structured nature of prison life that assisted in planning clinic visits and medication refills.

Outside of HIV- and TB-specific services, inmate access to health services was more varied and 36 (62%) of the 58 inmates interviewed in Facilities 1, 2 and 3, and all 20 (100%) of those interviewed in Facility 4 reported at least one health service access problem. Clinic location (internal vs external to the prison) and lack

of health workers that limited clinic opening hours were the most common issues. Although the internal clinics in Facilities 1, 2 and 3 were easier to physically access, health worker shortages limited hours of clinic operation and in Facility 2, inmates reported that access was limited to certain allocated days based on the inmates' sentence and the holding cell to which they were allocated (convict, life-sentence or condemned).

In all four sites, the unavailability of accompanying officers was a common factor limiting access to health services. Condemned prisoners and remandees in Facilities 2 and 3, respectively, reported difficulties reaching the internal clinic due to their being considered a 'flight risk' and the associated necessity of being accompanied by a senior inmate or officer. In all facilities, officers were required to accompany inmates to any external public health centre or hospital. Both inmates and officers reported the frequent need for referrals to external services due to the limited capacity of internal clinics.

The attitudes of some officers towards inmate health were described as playing a role in health service access. In all four sites, a confirmed diagnosis of TB or HIV appeared to be an advantage in accessing both internal and external care. Access to external services, particularly a hospital was, however, more tenuous. This was especially so in cases where no obvious and visible physical symptoms were present:

Sometimes you would not be feeling too well and you want to go to the clinic and you tell the officers, They will just brush you aside and say: 'You came with your illnesses here and you want to be troubling us [to take you to the clinic]'. So that really makes us sad. [Facility 4, Inmate 1]

[Officers] don't care until we are very sick. That is when they take us to the hospital. Most [inmates] die even on the way to the hospital because it is late. [Facility 3, Inmate 7]

It is different in [prison] compared to when I was outside, I would just walk to the clinic and I would be treated right there and then. Now here it takes long for them to bring you to the clinic. They wait till your illness is worse. That is when they believe that you are sick. Our friends have lost lives in that process here. [Facility 2, Inmate 16]

At all sites, access to health care during the night was clearly limited by security protocol with inmates reporting differing experiences depending on the attitudes of the night officers. These experiences ranged from highly responsive to overtly neglectful.

HIV-infected inmates and those on anti-tuberculosis treatment reported having routine access to their medication. In general cases, inmates would collect their drugs during planned visits to either internal or external clinics and subsequently hand over their medications to the cell-captain. Cell captains were responsible for the safe storage and daily dispensation of drugs to inmates. Disrupted access to these chronic medications was occasionally reported and linked predominantly to security incidents resulting in inmate 'lock-down' (a single report) or lack of transport (eight reports across the four sites).

You find that I'm supposed to go for review but there is no transport so for me to go and get my medication is difficult because we get our medicines from the general hospital. [Facility 4, Inmate 14]

An important but unanticipated barrier to health service access came in the form of the authority of some senior inmates. As outlined in Box 1 a well-established inmate hierarchy was in place in all four sites. Senior inmates appointed by officers and themselves able to deputize other inmates were frequently responsible for administering inmates' access to health care. This involved generating lists

of inmates feeling sick, accompanying inmates to the clinic, or even working as lay staff themselves at the health centres. In all four sites, a sub-set of inmates reported prejudicial behaviour on the part of some senior inmates at some point in the health care process. Several particularly acute situations were also reported in cases where senior inmates' permission was required for a 'junior' inmate to be absent from a work gang, as one respondent described:

Even if you are sick [the senior inmates] will refuse [to let you go to the clinic], thinking that you are just avoiding work. The time I was sick I used to go to the farm while I was sick. We would go to the farm and [...] you would be required to shell the maize and carry the maize in the bags. [Facility 4, Inmate 10]

A majority of officers confirmed that they had access to prison health facilities, either inside the prisons or via the health centres close by, and most described the services as adequately responsive. Critically, however, interviews revealed that some junior officers perceived inmates' access to healthcare to be better than their own.

Differences are there. For [inmates] all goes on smoothly, [health care] is free. But for us [officers] we are a working class. We are attended to, but then, maybe because they know that the medication in our clinics is specifically for prisoners who are vulnerable, we might be given a prescription [to buy the drugs]. For the inmates, I feel they are more advantaged than us. [Facility 1, Officer 1].

Related, some officers noted that low staff numbers made it difficult to take time off work to access healthcare, even for routine HIV check-ups.

When somebody says I am on ARVs and asks for permission to go to the hospital or whatever, some don't understand. [Also] to get a bed rest, that is a challenge. [The] authority doesn't give chances to officers to attend to problems they have, it is very challenging. [Facility 4, Officer 1]

In direct contrast to the accounts of most of the HIV-positive inmates interviewed, moreover, a number of officers made reference to the stigma within the officer corps of accessing HIV care and treatment. Fear of disclosure of HIV-status was noted by several officer-respondents as a reason for delaying or lying about their own medication pick-up appointments, as one officer explained:

Sometimes you can have a card and appointment date [for HIV care and treatment], but you can't bring it out because [senior officers] think maybe there is no secret. They will start talking to other officers. They will say 'ayenda kutenga ma ARVs' (he has gone to get ARVs). So that situation [is because] of people's fear. And they may just delay, or ask for bed rest without saying they are going to the hospital. [Facility 4, Officer 1].

Health care quality and responsiveness

Inmates provided varied accounts of the quality and responsiveness of prison health services. A very few inmates reported finding the quality of care they received in prison 'better' than that they had accessed outside prison with key factors being the free service, prioritized access (over regular community members) and routine follow-up visits.

When I came here I was sick but was taken care of. Maybe if I was [at] home I was not going to manage. I would have used traditional medicine, and I would have delayed the healing process. So by coming to prison and going to the hospital it helped me to recover very well [...] the prison is doing good job. A lot of people start taking ARV from here. [Facility 4, Inmate 2]

More commonly, however, inmates reported negative perceptions of prison health service quality and responsiveness. A majority attributed these problems to shortages of health workers, equipment or drugs. Limited health workers resulted in peremptory consultations and a lack of time (or inclination) to address inmates' concerns. With the exception of antiretroviral and anti-tuberculosis drugs, non-availability of pharmaceuticals and the difficulty of accessing external health centres that might have better supplies led some inmates to comment that attending the clinic was ultimately a futile exercise.

I fail to manage [my illness in prison] because I don't have any support. I tried to go to the clinic but [there was] nothing. I was given some medicine but it is not doing anything. If I was taken straight to the hospital I [feel I] would be okay. But I don't have that power to get that [access]. [Facility 3, Inmate 7]

P. Sometimes you can come with a rash but they won't have medicine. Instead of them buying or requesting from the hospital for that medicine they will write a prescription for you to buy.

I. So how do you buy the medicine in prison?

P. That's the problem that we have [Facility 2, Inmate 13]

Health workers' attitudes was another factor in inmates' and officers' (very different) perceptions of health quality and responsiveness. Many inmates reported negative experiences with health workers employed directly by ZPS and concurrently holding an officer rank (as was the case in the three internal prison clinics at Facilities 1, 2 and 3). Descriptions centred on the health workers' 'security-mindedness' and the fact that these individuals responded as officers first and health workers second. The same inmates advocated strongly for the exclusive hire of externally contracted health workers without any link to the prison system, who they felt were more likely to 'treat us like humans'.

It's very different here [in prison]. You know, the reception [by a health worker] itself is medicine. Outside a doctor will not look at me as a prisoner but as a patient. But inside here you may be even be [punished] by the clinical officer for frequently visiting the clinic. So outside treatment is better. [Facility 2, Inmate 4]

Prison officers, while acknowledging the health worker shortfall and its impact on health service quality viewed the problem differently. They saw external personnel as a barrier to the efficient operation of prison services due to lack of security clearance or familiarity with basic security protocol. In direct contrast to inmates, therefore, a number of officers described the need for an increase of ZPS employed health workers with officer training. This, they felt, would alleviate bottlenecks and misunderstandings based on transfer and referral procedures and result in more inmates being able to access care more easily.

We need to have more trained staff, because at the moment we have very few. We need to have a lot trained officer in health, that way it will help, as they work they will understand then very well. As it is we just rely on the ministry of health who do not know about the inmates [Facility 1, Officer 1]

Of note, a number of officers also expressed a strong desire to be trained and updated on important health matters themselves, in order to be able to protect themselves and so as to better understand and assess inmate needs.

On the issue of training, when you look at health, it is dynamic. There are new illnesses that come each time. And the management [of disease] changes. [The officers] have to be updated on these things. We should get information all the time. That can help. [Facility 3, Officer 2]

Inmate respondents gave varying reports of the conduct and professionalism of senior inmates who worked in the clinics, but commonly described the preferential treatment reserved for, on the one hand HIV-positive and TB patients, and on the other hand, those able to provide ‘payment’ or favours. At all sites, a number of inmate respondents expressed lack of confidence in fellow inmates to treat them fairly, assess their health needs appropriately or maintain their confidentiality.

You know this place is big so you can be the twenty of you at the clinic and [the inmates there] will treat only fifteen and say the other five should come in the afternoon. And they give priority to those who are too bad [powerful]. [Facility 3, Inmate 12]

The [inmates at the clinic] talk too much. When I go to the clinic and complain they scare me, saying they will put me in the penal block. [Facility 3, Inmate 15]

Coercion

Trade and coercion

Limited staffing, harsh environmental conditions and basic food shortages provided a critical backdrop to the frequent bartering of goods and services amongst inmates, and also between inmates and officers. Inmate (and some officer accounts) confirmed various ‘mediums of exchange’ with the most common being cigarettes, cooking oil and vegetables.

In all four facilities inmates with access to additional food, either from outside the prison (via gifts from family or during external farm work) or inside the prison (via control of garden plots—Box 2) were able to trade for other types of food, clothes, electronic equipment and even drugs. As described in the quote below, cigarettes operated as a form of currency:

In prison cigarettes works as money. So I bought this radio using a brick of cigarettes. Visitors bring me packets which I don’t finish. Then I save and exchange them for other things. Those who go outside even sell cigarettes outside and get money to buy things. [Facility 1, Inmate 5]

Despite the nominal ban on money, inmates in Facilities 3 and 4 described an active cash economy, made possible through officers’ access to inmates’ ‘docket’ where personal effects (including cash supplied by family or friends) were held in trust. Inmates could authorize officers to access this cash to buy goods—both legal and illegal. In Facilities 1 and 2, inmates reported an active barter system but no cash trade within the prison walls.

Study respondents reported various level of trade in contraband, including raw tobacco, marijuana, pharmaceuticals, and in Facility 3 only, knives and other weapons (not guns). In all sites, inmates mentioned trade in medications facilitated by senior inmates with access to health clinic stores or other inmates’ drugs. Reports of an active black market in medications, particularly psychiatric medications that ‘make them act like they’re drunk’ were reported by multiple inmates in Facilities 2 and 3.

Box 2 Prison garden plots, trade and violence

In Facilities 3 and 4, ownership of garden plots found within prison walls was a key component of internal trade. Although nominally providing vegetables for all inmates, these plots were, in reality, controlled or ‘owned’ by senior inmates.

Garden plot ownership was both a status symbol and a material advantage, providing ready access to otherwise scarce vegetables that could be eaten, sold or used to secure favours. As an important commodity, plot ownership was frequently linked to jealousies and violence.

The ones [who own gardens] that have been here for a long time, [like] the captains. They sell these gardens, so those that have money also get advantage. When you have a visitor you may use the gifts you get to buy some land and grow your own garden. [Facility 3, Inmate 16]

These vegetables have owners. You have to use power to have them. They belong to the inmates who have energy to fight. [Facility 4, Inmate 2]

Smuggling of goods around, into and out of the prison was described by inmates as being facilitated by a sub-set of officers who were paid in cash or kind. This situation was enabled by some officers’ sense of socio-economic disadvantage, as described by one respondent

The prisoners are being cared for [better] as compared to officers. I don’t know why, but even when you talk in terms of food, [prisoners] are the first priority to be given food. You will find that maybe when an officer has got a problem, maybe he wants some rations or [similar], the prisoner is still considered first [Facility 3, Officer 3].

Such trade had both direct and indirect implications for health and healthcare including the ability of some inmates to bribe other prisoners and officers to give them privileged access to the health clinic or transport to reach the hospital.

For you to get [to hospital], you must have a packet of cigarettes. Or money in your account so that you get good services. For you to get help you need to provide something. [Facility 3, Inmate 11]

Violence and coercion

Reports of physical violence and coercion were comparatively few across our study sample. Despite deliberate explorations of the topic, we did not find strong evidence of widespread arbitrary physical violence (e.g. every-day events, or violence affecting a substantial proportion of inmates) by either inmates or guards. Contrary to expectation, in fact, guards and inmates—particularly longer-serving inmates—drew comparisons between the ‘the way it used to be’ and ‘the way it is now’.

What I used to hear before coming to prison, I used to hear that they beat [people]. But from the time I came I have never seen that. From the time I came to prison. [Facility 1, Inmate 16]

It [violence] was there before in the past but recently there has been some calmness, I keep saying post and pre, I’m telling you the attitude of the inmates is slowly improving [Facility 2, Inmate 4]

Nonetheless, a large number of inmates indicated ongoing anxiety related to the threat of violence—both psychological and physical.

There are people in here [...] they have just turned into something else. You will find that you are seated quietly, and they will just push you. If you say something they will start beating you [Facility 3, Inmate 2]

Seventy-one inmates (90%) including a majority of those interviewed at all sites specifically reported that male-to-male sex occurred within the facility where they were currently held. Although respondents described sex taking place amongst a relatively small sub-group of prisoners, their accounts routinely characterized sex as a coerced exchange, with repeated emphasis on the role that lack of access to food and other basic necessities played in some inmates' vulnerability.

I: What do you think is the biggest influence on your health in prison?

R: It is the poverty we go through in here. It makes people do things, even sodomy, that they don't even intend to do. [Facility 3, Inmate 5]

P: Yes I have seen people being caught [having sex]. Some say they were promised to be given food. Some a TV. Some were promised to be given money. [Facility 3, Inmate 14]

Many inmates explicitly linked the frequency of coerced sex to inmates' differential access to material support from family or friends.

There are people in here who have all the food. They have relatives who bring them all the food they need. So they are the ones who are busy having sex with their fellow men. And if you are weak or you like eating good food and have no-one to visit you, they will have sex with you. [Facility 3, Inmate 14]

Sometimes it is due to lack of food, for instance I have visitors that bring me food, and that young person does not have, I would just tell him that I will give him food in exchange of sex. [Facility 1, Inmate 3]

Respondents also consistently identified those who were younger in age, and those who had spent less time in prison as more vulnerable:

You can imagine the young ones. They will be admiring food. They don't get full [from prison rations]. So they will ask for some food [from another inmate]. He will be given [...] and when they try to sodomise him he can't refuse because that person is the one giving him food. So he will just give him his buttocks. [Facility 2, Inmate 9]

A smaller number of respondents reported hearing of instances of forced sex or attempted forced sex. In all four facilities, inmates noted that the response to any serious accusation or discovery of sex (whether forced or coerced) was a beating by other inmates followed by formal disciplinary action—often solitary confinement—by the officers.

P: Yes [some inmates] force themselves on others. They wake up in the night. People wake up to beat that person [and] in the morning report them to the officers and they will be charged. [Facility 3, Inmate 1]

Inmates' accounts were consistent in reporting that condoms were not used, with several respondents pointing out that to be caught with a condom was tantamount to providing physical evidence of a criminal act. Exceptionally in the context of this study, five inmates from one facility described a rudimentary sexual social order, in which individuals took on the role of 'wives' and 'husbands'. These relationships were described as both coercive and protective, with 'wives' being generally younger, and better-looking but lacking access to external support for food or toiletries. 'Husbands' were more powerful inmates, sometimes Cell Captains or Special Stage, with access to additional food and other commodities that they gave to wives. Several inmates attributed higher incidence of reported violence in this facility to tensions between 'husbands' and other inmates perceived to be preying on their

'wives'. This sexual hierarchy was not reported in any of the other three sites.

Discussion

This study set out to explore and describe the institutional and social dynamics influencing prisoner health and access to health care in Zambia. It is one of very few studies systematically examining the interactions between structural and relational features of prison life in SSA and the influence of these interactions on prisoners' and prison officers' health. The findings presented here complement data from a growing number of prison-based epidemiological studies in the region (Henostroza et al. 2013; Schwitters et al. 2014; Telisinghe et al. 2014) by providing evidence to help explain the social and structural mechanisms that underpin high rates of disease in prisons. As such, this article is an important addition to the evidence base but also represents a strategic point of departure for discussions about 'how', 'why' and 'where' prison policy and health service reform should take place.

Findings presented here demonstrate a critical interaction between the failure of the Zambian prison system to provide basic necessities (including adequate and appropriate forms of nutrition, or access to quality health care) and the prevalence of both inmate-led and officer-led coercion. We found, for example, that due in part to the differential wealth of inmates and their support networks on entering prison, and in part to the accumulation of authority and material wealth within prison, there was enormous inequity in the standard of living among prisoners at each site. In the context of inadequate access to food and services, these inequities in wealth placed poorer inmates at great risk of coercion. Coercion was evident in the behaviour of some (often senior) inmates, as well as prison officers who privileged wealthier inmates in exchange for bartered goods and access to potential future benefits. Although not specifically investigated, the comparatively low rates of pay within the Zambian Prison Service were reported by several inmates as a factor potentially encouraging officer participation in these activities.

Together with these deep inequities and the various forms of coercion arising, a majority of inmates and facility-based officers described high levels of anxiety linked to the physically and psychologically stressful environment. Mirroring findings from previous studies (Todrys and Amon 2011; Todrys et al. 2011; Open Society Institute 2011) both inmates and officers noted the appalling state of physical infrastructure, hygiene and sanitation—specifically, massive overcrowding, lack of soap and clean water, and insufficient, broken or unsanitary toilets—as ongoing sources of anxiety with concerns about the potential for infectious disease almost ubiquitous. Worryingly, five years after a landmark study by Human Rights Watch (2010) and Todrys et al. (2011) there appears to have been little apparent change in some of these basic conditions.

Our findings suggest that physical violence in the study sites was related to catalytic living conditions including anger over queuing for food or water, or to resistance to or reports of inmates having sex. Amongst inmates, stress related to intimidation and the threat of violence was also evident. Although physical violence was reported to be a relatively rare occurrence, the brutal nature of it when it did take place was frequently noted. This combined with the lack of recourse for its victims contributed to substantial fear amongst inmates and in at least two facilities, inmates noted widespread acceptance by officers of mob justice as an effective means of discipline and control. The indirect effects of intimidation and fear

for safety arising from such circumstances were implicit in many accounts. Despite this, findings also suggested some—as yet unquantified—reduction in prison guards' use of arbitrary violence by comparison to the high levels previously reported by [Human Rights Watch \(2010\)](#). This may be an important indirect outcome of that report.

In relation to health care and health service access, data from this study enhance our understanding of the health service setting in Zambian prisons. Findings point to the way ongoing, high-level resource shortages undermine the provision of even a basic package of primary health services with shortage of health workers, lack of basic drugs and medical commodities (with the exception of antituberculosis treatment and antiretroviral therapy) and insufficient funding for prisoner transport. This in turn feeds into and enabled an *ad hoc* approach to rationing health service access by prison officers. As a result, and even in relation to the comparatively better supported HIV and TB treatment services, we found multiple instances of breakdown in continuity of care, with implications for individual clinical outcomes and broader public health risks. The reliance of several internal prison clinics on poorly supervised inmate-health workers to deliver some services contributed to bias in access to both service and treatment, based on the ability to 'pay', submission to coercion, and those in privileged social networks. Pointing to the potentially skewing effect of disease-specific investment in HIV and TB services in prison, moreover, our data also demonstrated that prisoners 'without' TB and HIV but requiring health care experienced a greater degree of difficulty in accessing responsive services compared with those diagnosed with TB or HIV.

Presenting new evidence in relation to a critical component of the prison health system, our interviews with a range of prison officers produced some critical insights. Contrary to previous reports ([Human Rights Watch 2010](#); [Todrys et al. 2011](#)), and again, potentially reflecting a middle-term outcome of that work, officers interviewed in this study consistently expressed concerns about inmate health. At the very least exhibiting an awareness of international standards, a number of officers expressed concerns about prisoners' right to basic necessities. Perhaps more significantly, almost all the interviewed officers expressed concerns about inmate (ill)-health because of the potential threat that this represented to their own and their families' wellbeing, a finding consistent with those of [Todrys and Amon \(2011\)](#). Overall, most officers expressed a strong preference for improving inmates living conditions. However, as described above, the data pointed to a series of structural and cultural factors which shaped officers' ability or willingness to respond appropriately to inmates' health needs. These factors included the shortage of officers and high inmate-to-officer ratio that encouraged reliance on inmate hierarchies to maintain control; the rigid military-style hierarchy of the officer-corps which inhibited responsive action in the case of health emergencies, and the lack of familiarity or understanding of common health problems and their causes. Acknowledging the inadequacy of health services in prison and their own response to it, a number of officers expressed a desire to be better educated about how to recognize and handle health problems.

Strengths and limitations

We adopted a methodologically rigorous approach based on representative site selection and simple random sampling of inmate respondents, and representative purposive sampling of prison officers. Collection of qualitative data from both inmates and officers helped us 'test' the claims of various respondents and enhanced the validity

of our findings. Unusually in the context of prison research in this region, and in part due to the strong relationships developed between the investigator team and the Zambian Prisons Service over the course of several service-support projects, we obtained permission to record and transcribe all interviews, enabling in-depth analysis based on verbatim (anonymized) transcripts. No restrictions were placed on publication of these findings by ZPS and publication additionally received clearance from the Zambian Ministry of Health. With more time and resources, a larger sample of prison sites and informants including open-air prisons and juvenile inmates would have strengthened the study's representativeness. However, the sample was deemed appropriate given our study's stated aims and in the context of broader security and logistical constraints of the prison setting. Clearly, the findings from this study carry most relevance to the Zambian prison setting.

Policy relevance

This study was designed to inform a larger programme of work focused on strengthening the Zambian prison health system by providing a more sophisticated understanding of the current context of health and healthcare in Zambian prisons. Increasingly it is recognized that lack of consideration of the context into which public health or health system strengthening interventions are directed can minimize or even negate their effectiveness ([Hawe et al. 2009](#); [Gilson et al. 2011](#)). Indeed, [Hawe et al \(2009\)](#) suggest that the most important dimension of complexity is often not the intervention itself, but rather the context into which it is introduced. Understanding the influence that this context on 'levers' of change—within a given policy or intervention is thus critical ([Adam and De Savigny 2012](#)).

Based on a more comprehensive and nuanced analysis of the prison and prison healthcare setting, the findings from this study point to a number of necessary upstream and downstream reforms. In the short term and at the micro-level, reform is needed to ensure a basic package of health services—including but not exclusively focused on TB and HIV—is available in every facility to every inmate needing them. An ideal situation would include the urgent recruitment and placement of adequately resourced professional healthcare workers in every Zambian prison. Given the absolute resource constraints in play, however, a compromise may require the formation of facility-based teams of officers and inmates, responsible for assessing, delivering, monitoring and reporting on health services and prisoner health outcomes. Critically, the adoption of such strategy must be rooted in a clear understanding of the inherent danger flagged by this study's findings, of some inmates becoming 'gatekeepers' to health service access of other inmates. Mechanisms designed to protect against such behaviours—including both social accountability and incentive schemes to reward health service responsiveness—would be critical.

More far-reaching 'upstream' reforms should include a raft of criminal justice measures as previously outlined by [Todrys and Amon \(2012\)](#), but also adequate resourcing of the Zambian Prison Service to radically improve prison nutrition and the officer-to-inmate ratio. As reported in our findings, lack of food is a key driver of the risk of coercion. Although the Zambian prisons are operating in a resource-constrained environment, the human and economic costs of inadequate nutrition and services to meet basic needs are contributing to the likely higher costs stemming from disease spread in the prisons and to the community at large.

Lack of officer numbers and officers' reliance on appointed senior inmates to maintain discipline was also implicated in a range of behaviours that placed less well-off, younger or otherwise more vulnerable prisoners at risk. Strengthening pre-service health education, sensitization and awareness of incoming prisoner officers to ensure their competence to recognize and respond to inmate health issues represents an obvious area of reform. Our findings demonstrate a strong desire to improve health competency among prison officers at all levels. Revision and extension of existing modules and development of clearer health protocols will be an important reform, with potential to contribute to sustained reduction arbitrary decision making around inmates' access to healthcare. Improved financing for human resources for health and appropriate staffing of prison health clinics by professional health workers represent equally urgent reforms.

Conclusion

This analysis adds to the extremely limited body of work examining prison health and health care both in Zambia and SSA. Building on some previous work this article clearly illustrates a complex interplay between resource shortages, structural conditions and prisoner relationships in shaping both health risks and access to health care in the Zambian prison setting.

Norwithstanding the growing recognition of the high burden of disease among Zambian prisoners, the issue of prison health has historically been given low priority by policy makers and health programmers alike. Inmates themselves are often stigmatized and the public is often ambivalent about providing quality care to those accused or convicted, particularly in settings where public sector financing is already limited. Yet the high degree of mobility between prison and the community via released inmates and oscillating prison officers and prison visitors means that diseases transmitted and acquired in prison can quickly become a community and public health issue. Effective management of these problems requires a comprehensive understanding of clinical, behavioural, social and structural determinants contributing to the current health status of prison inmates. This study has contributed to that evidence base.

Ethical clearance

The study received ethical clearance from the University of Zambia Biomedical Research Ethics Committee and the University of Alabama at Birmingham Institutional Review Board.

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