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Corruption

An Impediment to Delivering Pathology and Laboratory Services in Resource-Limited Settings

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ABSTRACT

Objectives: Corruption is a widely acknowledged problem in the health sector of low- and middle-income countries (LMICs). Yet, little is known about the types of corruption that affect the delivery of pathology and laboratory medicine (PALM) services. This review is a first step at examining corruption risks in PALM.

Methods: We performed a critical review of medical literature focused on health sector corruption in LMICs. To provide context, we categorized cases of laboratory-related fraud and abuse in the United States.

Results: Forms of corruption in LMICs that may affect the provision of PALM services include informal payments, absenteeism, theft and diversion, kickbacks, self-referral, and fraudulent billing.

Conclusions: Corruption represents a functional reality in many LMICs and hinders the delivery of services and distribution of resources to which individuals and entities are legally entitled. Further study is needed to estimate the extent of corruption in PALM and develop appropriate anticorruption strategies.

Key Points

- Although corruption represents a functional reality in many health systems of low- and middle-income countries (LMICs), it hinders the delivery of quality health care in these countries.
- Common forms of health sector corruption in LMICs include informal payments, absenteeism, theft and diversion, kickbacks, self-referral, and fraudulent billing.
- Further research is needed to understand the types of corruption in pathology and laboratory medicine, evaluate their impact on the provision of these services in LMICs, and develop realistic anticorruption strategies.

Pathology and laboratory medicine (PALM) services are essential for timely diagnosis, treatment, control, and prevention of diseases in low- and middle-income countries (LMICs). Effective PALM services are recognized as a component of strong health systems.¹ Many studies have documented challenges in scaling up PALM services in LMICs, including equipment maintenance, lack of human resources, and gaps in supply chains.² Yet, few studies have explored the role of corruption in weakening PALM services. This issue is especially important today, when significant investments in PALM services are being made in LMICs in the wake of coronavirus disease 2019 (COVID-19). Unfortunately, these investments can also facilitate corruption, such as the emerging reports of COVID-19–related corruption in sub-Saharan Africa.³ Corruption, or “the abuse of entrusted power for private gain,”⁴ is related to the asymmetry in knowledge between providers and patients, complex interactions between numerous actors in health systems, and public spending on health globally.⁵

This review describes potential forms and the impacts of corruption on the delivery of PALM in LMICs. We begin with a brief exploration of corruption in the United States related to PALM and proceed to health care sector corruption more generally in LMICs and provide potential examples of how these forms of corruption may manifest in PALM. Finally, we explore the theoretical frameworks for understanding corruption as this understanding can help us effectively prevent, detect, and mitigate corrupt practices in PALM in LMICs.

Materials and Methods

We assessed data from two sources. First, we evaluated cases of PALM fraud and abuse in the United States. All cases of health care fraud investigated by the US Department of Health and Human Services Office of Inspector General that culminated in civil or criminal enforcement in 2019⁶ were queried. Cases related to laboratory or pathology schemes were included in this review.

Second, a critical review of literature on health sector corruption in LMICs was performed using PubMed. We searched for articles published in English after 1999, the year that the OECD Anti-Bribery Convention, the first global anticorruption convention, came into force. We used keywords “corruption AND population health,” “corruption AND health systems,” “corruption AND health care,” “corruption AND qualitative,” “informal payments AND health care,” “absenteeism AND health care,” “informal payments AND pathology,” “informal payments AND laboratory,” “corruption AND pathology,” and “corruption AND laboratory.” We also used the “Similar Articles” function in PubMed and referenced the bibliographies of sources.

After removing duplicates and screening abstracts, 35 articles meeting at least one of the following criteria were retained: evaluated the impact of corruption on health outcomes, assessed the prevalence of corruption in the health sector of LMICs, characterized forms of corruption and their impact, and one review that provided a theoretical framework for understanding corruption in the health sector. Last, Google search engine was selectively used to further explore queries that were not amenable or did not provide ample results in PubMed (eg, evidence of laboratory supply diversion within the popular press and social science literature describing the role of collective action in combatting corruption).

PALM-Related Corruption in the US Health Care System

High-income countries (HICs) are not immune to health care sector corruption. Fraud and abuse cost the US health care system \$82 to \$272 billion annually and specifically cost Medicare and Medicaid \$30 to \$98 billion annually.⁷ In 2019, the US Department of Health and Human Services Office of Inspector General reported 413 cases of Medicare and Medicaid fraud that culminated in criminal or civil action by the Department of Justice. Eighteen, or approximately 4%, of these enforcement actions were laboratory related.⁶

Although laboratory testing accounts for only 2.6% of annual health care spending in North America and the average laboratory claim is less than \$200,⁸ laboratory-related fraud and abuse are highly profitable. In fact, the largest case of health care fraud ever charged by the Department of Justice was a fraudulent genetic testing scheme.⁹ Laboratory testing is uniquely susceptible to fraud and abuse due to the number and heterogeneity of the laboratories, evolving testing landscape, and high-volume and low-cost nature of the services⁸; the latter specifically makes fraudulent activity in the laboratory difficult to uncover with routine auditing.

The Healthcare Fraud Prevention Partnership (HFPP) categorizes laboratory fraud and abuse schemes into three major types.⁸ The first is “abuse of billing standards,” referring to exploitation of processes to extract additional reimbursement for medically necessary tests. The second is “medically unnecessary testing,” encompassing claims for which there is no reasonable clinical indication. Last, “improper laboratory relationships” combines illegal referrals, ownership, and compensation arrangements.⁸ This includes violations of the Physician Self-Referral Law (42 USC § 1359), or “Stark” Law, prohibiting physicians from referring patients to clinical laboratories with which the physician or family member has a financial relationship,¹⁰ as well as the Anti-Kickback Statute (42 USC § 1320a-7b(b)) barring remuneration to physicians for laboratory testing referrals.¹⁰

One can apply the HFPP framework to categorize the 18 laboratory-related fraud and abuse cases from 2019.⁸ One case involved abuse of billing standards, 9 cases involved medically unnecessary testing, and 14 cases involved improper laboratory-physician relationships ■ **Figure 1**.⁶ Nearly half of the cases (n = 8) involved medically unnecessary genetic testing.⁶ This includes a multistate operation, nicknamed “Operation Double Helix,” where recruiters solicited buccal swabs and Medicare identification numbers from senior citizens under the guise of “free” genetic testing. Participating

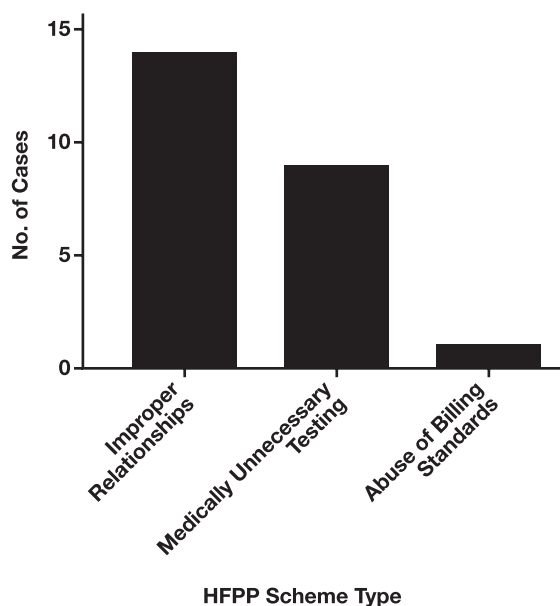


Figure 1 Laboratory-related US fraud and abuse cases from 2019 organized by Healthcare Fraud Prevention Partnership fraud and abuse scheme type.

physicians placed fraudulent orders in exchange for kickbacks, and a network of laboratories performed the testing and billed Medicare.¹¹ This scam resulted in the arrest of nine physicians and more than \$2.1 billion in fraudulent Medicare claims, making it monetarily the largest indictment of health care fraud ever made by the Department of Justice.⁹

Although the other cases of laboratory-related fraud reported in 2019 may not have been as profitable as Operation Double Helix, the themes are similar. Nearly all cases involved physicians or recruiters receiving monetary kickbacks for referring patients to particular laboratories, usually for medically unnecessary testing.⁶ The remaining cases involved laboratories billing Medicare for testing that was not clinically indicated or more complex than the actual test performed or submitting claims for validation specimens.⁶ Given the inherent difficulty in detecting fraud and abuse in the laboratory, the scale and total cost of this type of corruption are unknown.

One of the sequelae of health care-related fraud and abuse is adverse patient outcomes, particularly for vulnerable populations. A study of Medicare beneficiaries from 2012 to 2015 found that nearly 790,000 beneficiaries were treated by providers who were subsequently excluded from participating in federal health care insurance programs for fraud violations, such as prescription fraud and unnecessary care.^{12,13} These fraudulent providers were thought to have contributed to 6,700 premature deaths among beneficiaries over 1 year.¹³ Moreover, patients treated by fraudulent providers were more likely to be nonwhite,

dually eligible for Medicare and Medicaid, and disabled compared with those treated by nonexcluded providers.¹² On average, Medicare reimbursed these fraudulent providers nearly 2.5 times more per beneficiary.¹³

Less is known about the direct impact of PALM-related fraud and abuse on patient care in the United States. However, evidence suggests that physician self-referral for anatomic pathology services results in unnecessary biopsies.^{14,15} Although this form of self-referral is legal under an exemption to the Stark Law,¹⁶ it creates a financial incentive for unnecessary testing. One study showed that urologists who self-referred for pathology services performed more prostate biopsies and had lower cancer detection rates than urologists who did not have this type of financial relationship.¹⁴ This self-referral practice resulted in an excess of 918,000 biopsies, costing Medicare \$69 million in 2010.¹⁵ These findings suggest that unethical financial relationships between clinicians and PALM services may facilitate decision making that is driven by financial incentives rather than clinical need.

PALM-Related Corruption: An Undiagnosed Problem in LMICs?

Although the impact of PALM-related fraud and abuse has yet to be fully characterized in the United States, even less is known about its effects in LMICs. Ascertaining the role of corruption is critical given the growing awareness that PALM represents an essential, but often overlooked, component of health systems in LMICs.¹⁷ This awareness has led to several initiatives aimed at improving these services in regions where they have previously been neglected.¹⁷⁻²⁰ Such initiatives need to consider how corruption weakens PALM service delivery. To start exploring the impact of corruption on PALM, one can look at previous studies characterizing corruption in other parts of the health sector in LMICs.

Corruption in Low- and Middle-Income Countries

Corruption is associated with deleterious population health outcomes. Previous studies indicate that countries with high levels of corruption have lower life expectancies,^{21,22} lower immunization rates,²³ and higher infant and child mortality rates.^{22,24} They have increased rates of antibiotic resistance²⁵ and spend less on health as a percentage of gross domestic product than countries with less corruption.²¹

This review discusses the following forms of corruption that occur in the health sector of LMICs and their potential manifestations and impacts on PALM service delivery: informal payments, absenteeism, theft and diversion of resources, kickbacks, self-referral, and falsifying information. These practices limit access to medical services and reduce quality of care. They prevent patients from obtaining the care they need due to inability to pay, long wait times, and/or resources that are artificially scarce due to diversion and misappropriation.

Informal Payments

Informal payments are “payments to individual and institutional providers, in kind or in cash, that are made outside of official payment channels or are purchases meant to be covered by the health care system” (Table 1).²⁶ Drivers of informal payments include low public sector salaries,^{27,30} cultural beliefs around gift-giving,^{27,29} normalization of bribery in other sectors,³¹ and marketization of health care, creating a transactional relationship between providers and patients.^{27,29,30} Health care workers learn this behavior from mentors, supervisors, and colleagues in systems where corruption is pervasive.^{29,30,32} Although the frequency varies by country, informal payments are a method of financing health care in LMICs across the globe from areas as culturally distinct as Eastern Europe, sub-Saharan Africa, South America, and South Asia.²⁶

Informal payments disproportionately affect vulnerable populations.³¹ Individuals who already experience low-quality care^{33,34} and are in poor baseline health,^{33,34} at high socioeconomic risk,³⁵ or low-income^{34,36} are more likely to make informal payments. Contrary to patient perception, health care workers who accept informal payments do not necessarily provide a higher level of care and may actually be less sensitive to the medical needs of their patients compared with health care workers who do not accept informal payments.³⁷ Last, informal payments negatively affect the morale of health care workers, who feel the practice is harmful to the reputation of their profession,²⁹ promotes unhealthy competition among colleagues,^{30,37} and creates relationships in which health care workers feel indebted to patients who have made these payments.³⁰

Only rare examples of laboratory-related informal payments have been reported in the literature. One study from Nigeria found that patients paid over 3.5 times the published cost for malaria tests in informal payments.³⁸ Another survey conducted in Armenia reported that 42.8% of caregivers for children younger than 7 years made informal payments for laboratory services that

should have been free of charge.³⁹ The frequency of informal payments decreased following allocation of additional government funding to cover the cost of pediatric care.³⁹

Based on these findings and other reports in the popular press,⁴⁰ laboratory testing represents an opportunity to solicit informal payments by charging for tests that should be free, charging to release test results or perform phlebotomy services, or collecting fees for medically unnecessary testing. In contrast, laboratories may also be subject to making informal payments to government officials, distributors, or manufacturers to maintain a reliable supply chain and to ensure timely service and/or repair of equipment.

Absenteeism

According to Transparency International, absenteeism is considered a form of corruption when public health care workers “choose to engage in private pursuits during working hours.”⁴¹ This frequently takes the form of dual practice, where health care workers are absent from their public position to provide care in the private sector for additional income. Absenteeism is also a problem in nongovernmental organizations (NGOs).⁴²⁻⁴⁴

Absences are a reality in workplaces around the world; however, the practice of frequent, voluntary, unauthorized absences is a pervasive problem in LMICs. A comprehensive survey of health centers in LMICs spanning three continents estimates the overall absentee rate among health care workers at 35%.⁴³ In one study of public-sector health care workers in rural Uganda, absenteeism was so pervasive that changes to workflows had to be negotiated to account for the reality of constant understaffing.⁴⁵ In fact, the ability to be absent without repercussions has been reported as a benefit to holding a public-sector position.⁴⁶ Low or unreliable public-sector salaries, suboptimal work environments (eg, demanding workloads, inadequate infrastructure, frequent stock-outs), and lack of accountability are commonly cited drivers of absenteeism.^{31,42-44,46-51}

The most significant driver of dual practice is low public-sector salaries. Among public-sector physicians from Portuguese-speaking sub-Saharan African countries, monthly salaries were enough to support a family of two for only 7 days.⁴⁴ Physicians' private-sector earnings often exceed their public-sector salaries, with one study estimating that 7 hours of private work was equivalent to 1 month in the public sector.⁴⁸ However, physicians are reluctant to exit the public sector due to the professional credibility conferred by these positions, opportunities to collaborate with NGOs, job stability, and pensions.^{42,44,48}

Table 1
Potential Manifestations and Implications of the Types of Corruption Present in Low- and Middle-Income Countries Within PALM

Type of Corruption	Definition	Potential Manifestations in PALM	Potential Implications for PALM
Informal payments	Cash or in-kind payments made outside of official channels and/or for services meant to be covered by the health care system	<ul style="list-style-type: none"> Charging fees for tests that should be free Charging additional fees for services that should be included in the cost of the test (eg, releasing test results, phlebotomy) Collecting fees on medically unnecessary testing Requiring informal payments to suppliers or government officials to maintain supply chains or ensure timely service/repair of equipment Frequent absences by pathologists and/or laboratory scientists from public-sector positions to work in private laboratories, research laboratories, or NGOs during working hours 	<ul style="list-style-type: none"> Limits access to PALM services if patients are unable to afford the informal payments Compromises testing capacity if laboratories cannot make informal payments to ensure reliable supply chains and to service/repair of equipment Limits access to PALM services due to reduced human resource capacity Increases turnaround times for diagnostic reports and laboratory testing Increases workloads for employees who are present, compromising morale and testing quality
Absenteeism	Frequent, unauthorized, and voluntary absences from public-sector positions to engage in private-sector activities during working hours	<ul style="list-style-type: none"> Theft of reagents, equipment, supplies, test kits, and so on for resale in the private sector Diverting reagents and supplies and substituting lower-quality ones in their place Diversion of official user fees Paying or receiving remuneration for referring patients to private laboratories or for performance of medically unnecessary testing 	<ul style="list-style-type: none"> Erodes the reputation of PALM as an essential component of health care delivery in LMICs Limits access to PALM services due to stock-outs of reagents and supplies Compromises testing quality due to substitution of lower-quality reagents/supplies
Theft and diversion	Taking or using resources to which one is not entitled and without permission	<ul style="list-style-type: none"> Referring patients to private laboratories with which the pathologist or laboratory scientist has a financial relationship Fraudulently documenting testing that was never performed or performed on falsified patients to receive reimbursement or to divert testing kits for resale 	<ul style="list-style-type: none"> Limits access to PALM services due to stock-outs of reagents and supplies
Kickbacks	Knowingly offering, paying, or receiving remuneration to facilitate patient referrals or generate other business	<ul style="list-style-type: none"> Referring patients to private laboratories with which the pathologist or laboratory scientist has a relationship 	<ul style="list-style-type: none"> Diverts limited resources from public-sector laboratories Causes patient harm secondary to unnecessary testing
Self-referral	Referring patients to services for which the physician or someone the physician knows has a relationship	<ul style="list-style-type: none"> Referring patients to private laboratories with which the pathologist or laboratory scientist has a financial relationship 	<ul style="list-style-type: none"> Diverts limited resources from public-sector laboratories
Fraudulent billing	Knowingly submitting a false or fraudulent claim for services that were not provided or for a higher complexity of services than that required	<ul style="list-style-type: none"> Referring patients to private laboratories with which the pathologist or laboratory scientist has a financial relationship Fraudulently documenting testing that was never performed or performed on falsified patients to receive reimbursement or to divert testing kits for resale 	<ul style="list-style-type: none"> Limits access to PALM services due to stock-outs of reagents and supplies

NGO, nongovernmental organization; PALM, pathology and laboratory medicine.

Similar to informal payments, while absenteeism is a reality of public health systems in LMICs, it is ultimately detrimental to health care delivery. Absenteeism has been associated with lower rates of prenatal human immunodeficiency virus testing in Kenya.⁵² Absenteeism, not infrastructure or patient complexity, was the reason for 59% of referrals by a health center in Uganda to an overburdened tertiary care facility.⁴² Absenteeism deteriorates workplace morale due to the additional stress it places on staff who are present,⁴⁵ and physicians in one study expressed shame in the practice.⁴⁴ Pervasive absenteeism creates inequities in the health system by increasing wait times, diverting resources to the private sector, and incentivizing the provision of low-quality care in the public sector to drive patients to the private sector.^{44,45,49,51,53} Last, when senior-level health care workers are absent, there is little to no supervision of junior staff and increased task-shifting to unqualified personnel.^{45,53,54}

Manifestations of absenteeism in PALM are similar to other health sectors. There is a shortage of pathologists in LMICs, particularly in sub-Saharan Africa,⁵⁵ and based on the anecdotal experience of one of the coauthors (T.A.), pathologists engage in dual practice for similar reasons cited by their clinical colleagues. The same motivations may underlie absenteeism among medical laboratory scientists, who have ample opportunities to work in private-sector or research laboratories or for NGOs.

The major consequences of absenteeism in PALM are prolonged turnaround times for diagnostic reporting and laboratory testing and compromised quality of services. Delayed or poor-quality test results negatively affect care for individual patients and can also erode the role of PALM as a critical component of health care in LMICs. Without timely and accurate pathology and laboratory results, clinicians will continue to rely on syndromic diagnoses and empiric treatments.²

Theft and Diversion

Theft can occur at any point in the health care delivery system, from the highest levels of government to the direct provision of services.⁵⁶ The latter often takes the form of diverting medications, equipment, and supplies for personal financial gain.^{51,54,57,58} However, other forms of theft and diversion include charging more than the stated price and pocketing the difference,⁵⁷ reserving higher-quality products for resale and providing patients substandard products in their place,^{31,51} diversion of official user fees,⁵⁴ and using public resources to care for private clients.³¹

The scope and regional variability of this behavior within the public sector are challenging to measure. A survey of 10 health centers in Uganda found that a median of 76% (range, 40%-94%) of publicly provided medications and 71.5% (range, 68%-77%) of official fees were diverted.⁵⁴ A survey of patients in Costa Rica demonstrated that over 32% of respondents had prior knowledge of public-sector pharmaceutical theft.⁵⁹

Qualitative studies suggest that theft is a challenge particularly in sub-Saharan Africa. Health care workers from multiple countries report having personal knowledge of theft within the public health system.^{51,54,57,58} Most health care workers intended to resell diverted medications, equipment, and supplies in the private sector, and some acknowledged that this theft was an organized endeavor involving multiple actors rather than sporadic occurrences.^{57,58} Motivations for theft are similar to those that drive absenteeism and informal payments, namely, frustration and declining morale within the public sector as a result of low salaries and poor working conditions.^{57,58}

Pharmaceutical theft has been shown to limit access to necessary medications,^{54,59} and theft of orthopedic equipment and supplies was felt to contribute to frequent stock-outs and difficulty in legitimately procuring these resources.⁵¹ These actions have the potential to erode public trust and damage the reputation of public health systems in LMICs.⁵⁷

PALM is particularly vulnerable to theft and diversion due to its reliance on reagents, consumable supplies, and equipment. Incidents of theft involving laboratory tests have been exposed in the press⁶⁰; however, the prevalence and impact of these practices on PALM are unknown. Theft and diversion can cause stock-outs, thereby limiting patient access to laboratory testing. Moreover, substitution of lower-quality reagents, similar to what has been reported for medical devices,³¹ compromises the accuracy and reliability of laboratory results.⁶¹

Kickbacks, Self-Referral, and Fraudulent Billing

Other forms of corruption in the health sector of LMICs are similar to what was previously described for the United States, specifically kickbacks, self-referrals, and fraudulent billing.⁴¹ In Vietnam, physicians and pharmacies were paid inducements by pharmaceutical companies to prescribe and stock specific medications.³² Kickbacks in PALM involve paying inducements to providers who refer patients to private laboratories for testing that can be done in public facilities. Although formal study of kickbacks in PALM within LMICs is limited, one coauthor (T.A.) has observed anecdotal evidence that

this practice is occurring in laboratories within Southeast Asia and sub-Saharan Africa.

Similarly, PALM represents an opportunity for self-referral if physicians direct patients to private laboratories they own or with which they have a personal or financial relationship.⁶² Last, falsifying information may take the form of fraudulent billing for “ghost” patients, similar to what has been previously described for medications.⁵⁴ In many LMICs, medical care related to certain populations or conditions (eg, prenatal care, tuberculosis) is provided by the government at no cost to patients. Consequently, laboratories could document testing that was never performed on real or falsified patients to charge the government or pocket extra testing kits for resale. As described for other forms of corruption, low public-sector salaries are a common denominator in accepting kickbacks or falsifying documentation.^{32,51,54}

Determinants of Corruption

The above examples illustrate that corruption occurs in countries of all income levels. However, the underlying determinants may differ in HICs vs LMICs. Some have suggested that motivations based on “need vs greed” affect the type and scope of corruption.⁶³ In “need” corruption, citizens feel they must engage in corruption to receive services to which they are legally entitled, whereas “greed” corruption occurs when actors willingly engage in corruption (such as offering a bribe) for benefits to which they are not entitled. Although both “need” and “greed” corruption exist in LMICs, “need” corruption is less common in HICs.⁶³

Most, if not all, of the above examples of US laboratory-related fraudulent activities represent “greed” corruption, where the objective was to gain a personal financial advantage at the expense of patients and taxpayers. However, the examples of corruption that occur in LMICs arguably represent a form of “need” corruption. Patients must engage in corruption by making informal payments to access health care to which they are entitled. Health care workers may engage in various forms of corruption to supplement their unsustainable public-sector salaries.

Strategies for Mitigation: One Size Does Not Fit All

This framework of “need” vs “greed” corruption is particularly useful for understanding why anticorruption strategies may have limited success in LMICs.^{64,65}

Anticorruption reforms emphasize the importance of transparency, reducing discretionary power of public officials, improving detection and enforcement, minimizing incentives, breaking up monopolies, and promoting greater accountability. Mechanisms for achieving these reforms include privatization,⁶⁶ establishing independent anticorruption agencies,^{56,67} and leveraging technology for enhanced monitoring and detection.⁶⁸

However, strong evidence supporting the effectiveness of these strategies in reducing corruption is lacking.⁵⁶ One systematic review of health sector anticorruption reforms retrieved over 10,000 references; however, no studies met the primary analysis criteria (strong study design and evidence of outcomes), and only nine case studies met the authors’ secondary analysis inclusion criteria (clear description of the intervention and methods to collect and analyze data). Eight of the case studies described strategies implemented in HICs.⁵⁶ The only intervention with high certainty of evidence was a series of legislative and executive efforts to counteract Medicare and Medicaid fraud and abuse in the United States. This intervention included formation of an independent anticorruption agency and was instrumental in enhancing fraud and abuse monitoring and detection and holding fraudulent actors accountable. On average, these anticorruption programs returned US\$6.8 to \$8.1 for every US\$1 spent on fraud control⁵⁶ and were responsible for shutting down the fraudulent laboratory-related activities described in previous sections.

Mechanisms that target corruption within billing systems are generally relevant in countries with some form of social health insurance. More important, some argue that the above reforms are most effective in mitigating “greed” corruption, where there is one actor or a group of actors who are engaging in corrupt behavior and there are other actors in the public or private sector who are willing to hold them accountable.^{63,65} This may not be the case in many LMICs, where corruption is systemic and the risks of not engaging in corruption outweigh any potential rewards associated with holding corrupt individuals accountable.⁶⁵

For example, similar attempts to create an anticorruption agency in India were not as successful in holding corrupt actors accountable.⁶⁷ Although this effort uncovered widespread corruption in the public health sector, largely from citizen reporting, few convictions resulted from these investigations. This failure to enforce anticorruption regulations was attributed to weak political will for true reform and corruption within law enforcement, the judiciary, and the anticorruption agency itself.⁶⁷

An effort undertaken in Uganda also involved formation of an anticorruption agency with considerable autonomy

for detection and enforcement.⁶⁹ Through this initiative, the rate of bribery among health care workers declined dramatically, stolen health supplies worth over US\$80 million were recovered, and health care workers were arrested and later convicted of corruption-related crimes.⁶⁹ Despite these achievements, the aggressive tactics used by the agency may have had several unintended consequences.⁶⁹ For instance, because the crackdown on corruption did not also involve concomitant efforts to reinvest resources in the health sector, morale among health care workers declined, leading to a strike that crippled the country's health care system. In addition, qualitative evidence suggests that diversion of medical supplies for resale in the private sector was still occurring, and while formal bribes declined, these may have simply been replaced by informal payments.⁶⁹ Perhaps most important, this anticorruption initiative did not address one of the commonly cited motivations for corruption in the health sector of LMICs: low public-sector salaries.

The previous sections have reviewed the types of corruption in HICs and LMICs, and our findings suggest that (1) there is some overlap in the forms of PALM-related fraud and abuse in the United States and health sector corruption within LMICs (ie, kickbacks, fraudulent billing, self-referral), but (2) the underlying determinants of this corruption differ depending on a country's level of economic development, and (3) mitigation strategies must be adapted to these underlying determinants. The following sections will explore these mitigation strategies in more detail.

Mitigating Corruption in PALM Services

Based on what is known about laboratory-related fraud and abuse in the United States, and drawing on knowledge of the drivers of health sector corruption in LMICs, one can expect corruption to obstruct the delivery of PALM services. Therefore, it is imperative that pathologists and laboratory professionals take action to prevent corruption. Potential approaches that take into account each individual region's unique institutional factors include risk management, mapping accountability linkages among individuals in the health system, and promoting collective action and community engagement. Evidence related to each of these three approaches is discussed in more detail below.

Risk Management

A risk management approach to corruption emphasizes strategies that target the forms of corruption posing the greatest risk to the delivery of health care services.

These strategies should promote authentic adherence, motivated by a genuine desire to reduce fraud in the most vulnerable areas of the system.⁷⁰ In contrast, many traditional anticorruption reforms have a "zero-tolerance" approach, resulting in nonspecific and excessively bureaucratic processes that emphasize paper-based compliance and are susceptible to further corruption.⁷⁰

A key component of the risk management approach is engagement of individuals in anticorruption initiatives who have operational knowledge of the system.⁷⁰ In the case of PALM, pathologists and laboratory scientists will have insights into infrastructure, equipment, supply chain, and human resources that are uniquely susceptible to corruption and what forms this corruption may take. Anticorruption efforts can then be customized to prevent the types of corruption that pose the greatest threat to the sustainable delivery of PALM services.

Mapping Accountability Linkages

As an anticorruption strategy, accountability is contingent on the existence of sanctions for corrupt behavior and consistent and fair enforcement of these sanctions.⁷¹ Unfortunately, the enforcement component of accountability is often absent in many LMICs.^{63,65,67}

One strategy to better understand the state of accountability within LMIC health systems is to map the relationships of actors who are directly involved with or influence the resources allocated to PALM.⁷¹ A detailed accountability map will provide a comprehensive view of the health system as it relates to delivery of PALM and inform how changes to reporting systems or enforcement mechanisms within one aspect of the system can have unintended downstream consequences elsewhere. This systemwide knowledge can help prevent implementation of anticorruption policies that are ineffective or, worse, exacerbate corruption.

Collective Action and Community Engagement

Last, pathologists and laboratory scientists involved in PALM can support collective action and community engagement initiatives. Collective action is required to break the cycle of corruption. Citizens who have the most to lose from systemic corruption must mobilize to demand fair and equitable access to public services and advocate for the institutional and governance changes required to eradicate "need-based" corruption.⁷² This will undoubtedly take time and requires local leaders with a commitment to changing institutional structures. Collective action approaches should be implemented at a grassroots level and involve local pathologists and laboratory staff.⁷²

Community engagement to fight corruption can also occur on a smaller scale. A randomized experiment in Uganda demonstrated that enlisting citizen-clients within the community to monitor health care delivery was associated with increased service utilization and reduction in absenteeism.⁷³ This led to improved health outcomes such as reduced fertility rate and mortality rate for children younger than 5 years.⁷³ In addition, formalized citizen feedback can catalyze and inform anticorruption efforts. Information gleaned from social audit surveys assessing perceptions of and experiences with corruption in Nicaragua was used to lobby for anticorruption policies and develop ethics training for public officials.⁷⁴

The above examples of mitigation strategies may seem out of the scope of PALM. Yet, the strength of PALM service delivery in LMICs hinges on the extent of systemic corruption in the health sector. Common themes that emerge from these strategies include (1) analyzing accountability relationships to understand where corruption is most likely to occur and anticipate downstream effects of proposed reforms, (2) focusing efforts on anticorruption strategies that will yield the most beneficial impacts on PALM service delivery, and (3) empowering local pathologists, laboratory professionals, and community members to formulate and implement sustainable anticorruption reforms.

Conclusions

Corruption hinders access to high-quality health care and wastes public resources in both HICs and LMICs. Although the characteristics of PALM make it uniquely susceptible to exploitation by corrupt actors, the prevalence, types, and impact of corruption in PALM within LMICs have yet to be adequately characterized. Further empirical research is needed to understand PALM-related corruption and to develop realistic prevention measures. Reducing corruption in PALM will allow us to improve health outcomes for the most vulnerable populations. Anticorruption policies should be formulated in conjunction with local experts and implemented with the cooperation of the citizens who have the most to gain from these reforms.

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