Cost of corruption in healthcare, measuring its impact and strengthening anti-corruption strategies

A draft for consultation purposes

Executive summary

Corruption in health systems is a significant barrier to achieving universal health coverage (UHC), leading to wasted resources, compromised quality of care, and preventable illness and death. While it is well known that corruption imposes substantial costs, effectively addressing the issue requires robust methods to measure and monitor its financial and health impacts.

This discussion document provides an overview of existing approaches to estimating the cost of corruption in healthcare, offering insights to inform anti-corruption, transparency, and accountability (ACTA) policies and interventions. It highlights promising methodologies for assessing corruption-related losses and underscores the feasibility of empirical measurement.

Existing research estimates that corruption siphons off between 3% and 8% of public health expenditures in high-income countries, while losses in low-income countries range from 10% to over 80%. However, most studies focus on financial losses rather than the direct impact on health outcomes. An illustrative analysis conducted for this paper estimates that approximately 7% of global government health spending—equivalent to $441 billion annually—is lost to corruption. Sensitivity analysis suggests this figure could range from $317 billion to $882 billion. The analysis also estimates that these losses contribute to 76 million lost disability-adjusted life years (DALYs), translating to 7.6 million people losing 10 years of healthy life, with a potential range of 3.4 million to 15.2 million people affected.

Corruption research has traditionally concentrated on more visible abuses, such as informal payments and absenteeism, while less attention has been given to procurement-related corruption, kickbacks, and high-level embezzlement. While informal payments can be reliably measured through population surveys, methodologies for quantifying procurement fraud and high-level corruption remain underdeveloped.

Country case studies from the UK and Uganda demonstrate how different methodologies can be applied. In the UK, researchers aggregated estimates from existing studies on corruption in the National Health Service (NHS), extrapolating from international data where local studies were unavailable. In Uganda, a national household survey measured informal payments and barriers to care, complemented by statistical analysis of administrative data to estimate procurement fund diversion.

Emerging technologies such as artificial intelligence, machine learning, blockchain, and social network analysis offer promising tools for measuring corruption. Still, they should complement, rather than replace, traditional forensic investigations and performance audits.

A key takeaway from this discussion document is that measuring corruption serves multiple purposes: advocacy, policy prioritisation, intervention design, and progress monitoring. Accurate data on corruption's financial and health impacts can strengthen accountability, guide reforms, and ultimately improve health outcomes.

The paper concludes by proposing methodological advancements and policy recommendations to enhance corruption measurement and inform more effective anti-corruption strategies in healthcare.

Introduction

Strengthening the fight against corruption in healthcare

Corruption in healthcare is a significant barrier to achieving Universal Health Coverage (UHC) and improving global health outcomes. It diverts critical resources, reduces service availability, compromises care quality, and prevents people from accessing essential health services. These losses not only weaken health systems but also contribute to avoidable illness and death.

Despite widespread recognition of corruption's impact, efforts to combat it often lack a strong empirical foundation. Without reliable data on the financial and health costs of corruption, policymakers face significant challenges in:

- Developing targeted interventions to address corruption's most damaging effects.
- Securing political commitment to enact meaningful reforms.
- Ensuring efficient resource allocation to maximise health system effectiveness.

Purpose of this discussion document

This discussion document serves to support the development of improved methodologies for measuring corruption in healthcare. Specifically, it:

- Reviews existing corruption measurement approaches, identifying key gaps and challenges.
- Explores opportunities for methodological innovation, leveraging new tools and technologies.
- Strengthens the evidence base for ACTA initiatives.
- Supports efficient resource allocation, ensuring that funds are used to improve health outcomes rather than being lost to fraud or abuse.

Beyond measurement: using corruption cost estimates for impact

In addition to enhancing corruption measurement, this paper examines how cost estimates can drive action by:

- Supporting advocacy efforts – Clear, data-driven evidence helps mobilise political will and public demand for reform.
- Guiding policy prioritisation – Understanding which corrupt practices have the highest costs enables governments to focus interventions where they matter most.
- Strengthening monitoring efforts – Regular corruption cost tracking allows policymakers to assess progress, refine strategies, and improve accountability mechanisms.

Furthermore, this paper outlines WHO's planned collaboration with the Global Network for Anti-Corruption, Transparency, and Accountability in Health (GNACTA) to:

- Advance corruption measurement tools and methodologies.
- Develop and implement effective policy solutions.
- Evaluate the costs and benefits of anti-corruption strategies.

The path forward

Strengthening the ability to quantify and track corruption's impact is a critical step toward improving governance, enhancing transparency, and ensuring healthcare systems operate with integrity. By investing in better measurement, stronger policy frameworks, and evidence-based interventions, the global health community can reduce corruption's harm and accelerate progress toward equitable, high-quality healthcare for all.

The costs of corruption

The importance of estimating corruption costs in healthcare

Estimating the costs of corruption is inherently challenging, as those engaging in corrupt practices deliberately conceal their activities. Individuals and organisations that benefit from corruption often resist transparency initiatives, knowing that greater oversight increases the likelihood of detection and accountability. Despite these challenges, a range of data-driven approaches—including forensic investigations, performance audits, population surveys, administrative data analysis, and electronic tracking—can offer valuable insights into the financial and health impacts of corruption.

Is measuring corruption costs worth the effort?

Some may question whether estimating corruption's financial burden is necessary, arguing that resources would be better spent on direct anti-corruption actions, such as prevention, detection, and prosecution. However, robust cost estimates play a critical role in strengthening anti-corruption efforts by providing evidence-based justification for reforms.

Why measuring corruption costs matters

Reliable corruption cost estimates have significant practical and social value in three key areas:

Advocacy and awareness

- Cost estimates provide clear, quantifiable evidence of corruption's impact, helping to mobilise public and political support for anti-corruption measures.
- Demonstrating corruption's direct financial burden and health consequences strengthens the case for reform and makes it harder for governments to ignore the issue.

Policy prioritisation and resource allocation

- Understanding the scale and distribution of corruption's costs helps governments identify high-risk areas and target interventions more effectively.
- Cost estimates allow decision-makers to weigh the trade-offs between different anti-corruption strategies, ensuring resources are allocated where they have the greatest impact.

Monitoring and accountability

- Regular cost assessments enable governments to track progress and assess whether anti-corruption initiatives are working as intended.
- Corruption measurement provides a benchmark for evaluating reforms, ensuring ACTA initiatives remain effective over time.

Conclusion

While preventing and prosecuting corruption remains essential, measuring its financial and health costs is equally critical. Cost estimates reinforce advocacy, guide policy decisions, and strengthen accountability mechanisms, ensuring that anti-corruption efforts are data-driven, targeted, and effective.

Advocacy

Cost estimates serve as a powerful advocacy tool, helping to maintain political and public attention on corruption's impact. ACTA initiatives often gain traction under one government administration but are later neglected or suppressed by the next. Concrete evidence of corruption's financial toll helps sustain engagement and prevents the issue from being sidelined.

While financial estimates alone may not be enough to drive political action, they can be reinforced with other advocacy tools, such as:

- Compelling case studies that illustrate the human impact of corruption.
- Personal testimonies shared through social media.
- Cross-country comparisons that highlight best practices and expose vulnerabilities.

Cost estimates help shape social norms that promote integrity and accountability by increasing public awareness of corruption's economic and health consequences.

Priority setting

Understanding the scale and distribution of corruption's costs is essential for efficient resource allocation. If corruption has minimal financial and health impact, excessive spending on anti-corruption efforts may be unwarranted. However, if corruption diverts substantial funds and directly undermines population health, more significant investment in ACTA strategies may be justified.

Cost estimates can also help identify which forms of corruption are most harmful, allowing policymakers to focus interventions on high-risk areas. This ensures that anti-corruption efforts are targeted, strategic, and proportionate to the problem.

Monitoring and accountability

Regularly measuring corruption's costs provides a powerful mechanism for tracking progress. Countries can use cost estimates to:

- Monitor changes over time to assess whether corruption is increasing or decreasing.
- Evaluate the effectiveness of anti-corruption strategies, identifying what works and what does not.
- Benchmark health system integrity against other countries or compare regions within a country.

A significant gap in anti-corruption research today is the lack of evidence on the effectiveness of financial control mechanisms. Establishing rigorous, standardised measurement methods allows governments to:

- Strengthen anti-corruption frameworks.
- Prevent future abuse.
- Improve healthcare system integrity.

While preventing and prosecuting corruption remains critical, measuring its financial and health costs is an equally important part of the solution. Cost estimates provide essential data for advocacy, policy prioritisation, and progress monitoring, ensuring that anti-corruption efforts are both practical and sustainable.

By developing transparent and standardised measurement methodologies, governments and health systems can:

- Better protect resources.
- Improve service delivery.
- Advance public health outcomes.

Investing in corruption measurement is not just a technical exercise—it is a strategic tool for driving meaningful reforms and ensuring that healthcare systems operate with integrity, efficiency, and accountability.

Scope and purpose

This discussion document does not seek to provide a comprehensive review of all literature on corruption measurement. Instead, it presents a summary based on a rapid analysis of relevant research, offering key insights to inform ongoing discussions and future work in this area.

The primary objective of this paper is to engage stakeholders, advance normative work on corruption measurement methodologies, and help shape future efforts to assess the financial and health costs of corruption. By identifying gaps and opportunities in existing measurement approaches, this paper aims to support the development of more robust and actionable methodologies.

The estimates presented herein are illustrative rather than definitive. While they should not be interpreted as precise or conclusive findings, they provide a clear indication of the significant financial and health burden of corruption worldwide—affecting both high-income countries and emerging economies. Even with conservative estimates, the scale of corruption-related losses is evident, underscoring the urgent need for stronger measurement tools and targeted anti-corruption strategies in healthcare.

Corruption in health systems: vulnerabilities and context

Corruption exists in all sectors of society, but health systems are particularly vulnerable due to their complexity, significant financial flows, and decision-making under uncertainty. These characteristics create multiple opportunities for abuse:

- Large financial flows attract individuals and groups seeking personal gain.
- Dispersed actors make it challenging to monitor and control resources effectively.
- Uncertainty in decision-making, such as medical diagnoses or treatment quality, can serve as plausible justification for missing funds or substandard services.

Certain types of corruption, such as embezzlement, graft, and procurement fraud, occur across public administration, but the health sector has unique risks. The high market concentration of medical supplies, drugs, and diagnostic tools can limit competition, increasing vulnerability to price manipulation and collusion. Additionally, some corrupt practices are specific to healthcare, such as nurses charging mothers to see their newborns or public sector doctors steering patients toward private clinics for personal profit.

Structural differences and corruption risks

The nature of corruption in health systems often depends on how they are structured:

Publicly owned and operated health services commonly face employment-related and procurement-related corruption, such as ghost workers or inflated supply contracts.

Public health insurance agencies are more prone to embezzlement and fraudulent claims (Carideo, 2024).

No single type of health system is inherently more vulnerable than another—each has its weak spots that must be identified and addressed through tailored anti-corruption measures.

The Role of Governance and Institutional Integrity

The broader social and political environment also influences health sector corruption. It tends to be less severe in societies with strong government legitimacy, social trust, and institutional integrity. Conversely, where law enforcement and judicial systems are compromised, corruption thrives under a culture of impunity.

Understanding these structural, institutional, and contextual factors is essential for designing effective anti-corruption strategies, strengthening oversight, and ensuring that healthcare resources are used efficiently and ethically.

Why Should We Measure the Costs of Corruption?

Even in the absence of corruption, many countries struggle to allocate sufficient funds to their health systems and ensure that spending translates into improved population health. This challenge has intensified in the wake of the COVID-19 crisis, as governments face fiscal constraints, heavy debt burdens, and rising interest rates. Corruption exacerbates these challenges, diverting already scarce resources and undermining health system performance.

While research on health sector corruption has advanced significantly over the past few decades, empirical cost estimations remain limited. Much of the existing literature is descriptive, documenting the various types of corruption, where they occur, and their impact—whether through lost funds, restricted access to care, or inequities in service delivery. However, since 2000, an increasing number of studies have provided quantitative estimates of corruption's financial toll, and a growing body of research offers practical guidance on prevention, detection, and mitigation strategies.

Global estimates suggest that corruption could account for 10% to 25% of total health spending worldwide, amounting to US$750 billion to US$1.87 trillion annually (Transparency International, 2006). This discussion document applies a methodology for calculating global health corruption costs, estimating that approximately US$441 billion—around 7% of total government health spending—is lost to corruption each year.

Regardless of the exact figure, corruption's impact is undeniable. It hampers progress toward national health goals, including Universal Health Coverage (UHC), by depleting resources, reducing service quality, and limiting access to care. Accurately measuring these costs is essential for informing policy decisions, strengthening accountability, and ensuring that healthcare investments translate into better health outcomes.

Defining Corruption

Agreed definitions are essential for measuring the costs of corruption accurately. However, the term "corruption" is used in very different ways. Acts as different as bribing a public doctor, promoting off-label drug use, failing to allocate healthcare funds equitably, or even unrelated moral failings have all been labelled as corruption. To ensure clarity and consistency, this paper adopts a precise definition based on established criteria.

Criteria for Selecting a Definition

To assess potential definitions of corruption for the discussion document, the following criteria were applied:

- Relevance to the health sector – The definition should be applicable to the specific dynamics of healthcare systems.
- Comprehensiveness – It should encompass the primary forms of corruption commonly found in health systems.
- Precision – The definition should be clear enough to enable accurate measurement of corruption losses.

Defining corruption for this discussion document

For this discussion document, corruption is defined as any act that abuses entrusted power for private gain.

This definition includes not only public officials legally responsible for serving the public but also private sector actors—such as healthcare providers, pharmaceutical companies, suppliers, and insurers—who have an ethical obligation to act in the public interest due to the essential nature of healthcare services.

By adopting this definition, the paper provides a clear and measurable framework for assessing the financial and health costs of corruption, guiding the development of effective anti-corruption strategies in the health sector.

Why This Definition?

This definition was chosen because it effectively captures both the key actors and the forms of corruption in the health sector:

- Includes both public and private actors – Corruption in healthcare is not limited to public officials; it also involves private healthcare providers, pharmaceutical companies, suppliers, and insurers, who hold moral and legal responsibilities toward the public.
- It covers a full range of corrupt practices. From informal payments to frontline workers to multi-million-dollar kickbacks in procurement and hospital construction, this definition includes the key corruption risks facing health systems.
- Provides clarity on accountability – It specifies that corruption involves individuals who are entrusted with power, ensuring a focus on actors with responsibility for public resources or decision-making.

Distinguishing Corruption from Other Negative Conduct

A critical aspect of this definition is that corruption requires an abuse of power by someone entrusted with resources or decision-making in the public interest. However, some wrongful actions that divert healthcare funds do not involve an entrusted actor.

For example:

- If a doctor submits false claims to a public health insurer, this constitutes corruption under the chosen definition because the doctor has entrusted power.
- If a criminal enterprise submits fraudulent claims, this may still harm the health system. Still, it does not meet the definition of corruption because this submission does *not involve entrusted power*.

Since most existing corruption measures do not differentiate between these types of wrongdoing, there may be a need to refine corruption classifications in future research. If the focus is the abuse of entrusted power, then measures should distinguish between corruption and broader financial crimes. However, if the primary concern is any abuse that undermines healthcare provision, a more expansive approach may be warranted.

A Typology for Corruption Cost Estimates

Categorising Corruption Costs in Healthcare

Given the diverse nature of corrupt practices and their complex effects on health systems, measuring their financial and health impact requires a structured categorisation approach. Corruption can be assessed based on:

1. The actors Involved – Identifying the key players engaged in corrupt activities:
    - Suppliers (e.g., overpricing contracts, bid-rigging).
    - Healthcare professionals (e.g., informal payments, absenteeism, unnecessary procedures).

- Patients (e.g., fraud in insurance claims, bribing staff for preferential treatment).
- Procurement officers (e.g., collusion, contract favouritism).

2. Type of Abuse – Categorising corruption by specific fraudulent activities:
    - Bribery – Unlawful payments to obtain preferential access or services.
    - Kickbacks – Financial incentives to manipulate procurement or contract awards.
    - Theft and embezzlement – Misappropriation of health funds, medicines, or equipment.
    - Absenteeism – Healthcare staff failing to report to work, reducing service availability.
    - Falsified or substandard drugs – Distribution of unsafe or ineffective medications.
3. Health System Function – Understanding corruption within different components of healthcare:
    - Financing – Fraud in insurance claims, financial mismanagement, and fund diversion.
    - Service provision – Corruption affecting patient care, wait times, and treatment quality.
    - Human resources – Ghost workers, nepotism in hiring, and absenteeism.
4. Corruption Level – Distinguishing between the scale and impact of corruption:
    - Grand corruption – High-level fraud involving senior officials, large contracts, and policy distortions.
    - Petty corruption – Everyday abuses by frontline staff, such as informal payments or minor fraud.
5. Motivation and Intent – Analysing the drivers behind corrupt behaviour:
    - Deliberate fraud – Intentional acts to gain personal or institutional financial benefits.
    - Survival-driven corruption – Low-income staff engaging in informal payments due to low wages.
    - Systemic loopholes – Corruption enabled by poor governance, weak oversight, or legal gaps.

Why Categorisation Matters

A well-defined framework for categorising corruption is essential for:

- Developing targeted anti-corruption strategies tailored to specific actors and abuses.
- Prioritising interventions based on the scale and impact of corruption in different areas.
- Refining cost estimation models by linking financial losses to specific corruption types.

By systematically classifying corrupt practices, policymakers can design more effective, data-driven anti-corruption measures that improve healthcare governance, reduce fraud, and enhance service delivery.

However, most typologies focus on the type of abuse, prioritising visible and easily measurable forms of corruption. As a result, there is more information on informal payments and absenteeism than on

kickbacks in procurement or fraud in high-level health financing. While bribes can be estimated through population and patient surveys, measuring kickbacks in public procurement often requires customised methodologies tailored to a country's specific tendering processes.

To create a comprehensive framework for measuring corruption costs, this discussion document proposes a typology that categorises costs across three broad areas:

- Social compacts and norms
- ACTA mechanisms
- The health system itself.

Social Compacts and Norms

Social norms, trust, and accountability mechanisms shape the prevalence and costs of corruption. In societies with high levels of trust, corruption is generally lower, and oversight mechanisms are more effective and cost-efficient. Conversely, in countries with high distrust and legal impunity, corruption thrives, making ACTA initiatives both more expensive and less effective.

Additionally, in low-resource settings, some practices considered corrupt may function as coping mechanisms (Balabanova, 2020; Van Lerberghe et al., 2002; Vian, 2008). Distinguishing between corruption and adaptive behaviour is crucial when measuring costs, particularly in resource-constrained healthcare systems.

The Costs of ACTA Mechanisms

Investing in ACTA mechanisms is necessary to detect, prevent, and mitigate corruption. However, these mechanisms themselves impose costs, which vary depending on the approach and context. These costs can be classified as:

- Administrative costs – The direct financial expenses of anti-corruption initiatives, including staff salaries, office operations, technology, audits, and enforcement mechanisms.
- Inefficiency costs – The time and resources spent complying with anti-corruption controls, such as recording transactions, preparing reports, and responding to audits. Excessive bureaucracy may delay acquisitions, hiring, and service delivery, leading to bottlenecks in healthcare provision.
- Opportunity costs—The trade-off between investing in anti-corruption efforts and other priorities. These costs consider whether funds allocated to corruption prevention could have achieved more significant health improvements if spent elsewhere.

While ACTA mechanisms help mitigate corruption, their costs must be weighed against their effectiveness to ensure that anti-corruption efforts remain efficient and proportional to the problem they seek to address.

Costs Within the Health System

Once social norms and ACTA costs are accounted for, corruption costs within the health system can be classified into two primary categories:

a. Diverted Funds

This category includes direct financial losses from corrupt activities, such as:

- Embezzlement of public health funds.
- Theft of medicines, medical supplies, or funds intended for patient care.
- Fraudulent reimbursement claims submitted to public insurance systems.
- Bribes and kickbacks in procurement, licensing, and regulatory decisions.
- Unexcused absenteeism by health workers, resulting in lost productivity.

These losses drain public resources, reduce government healthcare budgets, and shift financial burdens onto patients and private sector actors.

b. Foregone Benefits

Beyond financial losses, corruption leads to missed health improvements and negative patient outcomes. These foregone benefits include:

- Compromised patient safety – Corrupt licensing practices allow unqualified individuals to practice medicine, increasing misdiagnosis and harmful treatments.
- Substandard medical supplies – Procurement fraud can lead to the purchase of low-quality drugs or equipment, causing treatment failures and patient harm.
- Reduced healthcare accessibility – Diverted funds mean fewer staff, infrastructure investments, and essential supplies, directly affecting health outcomes.
- Service disruptions – Health workers taking unexcused absences reduce available care hours, leading to longer wait times and poorer service delivery.
- Foregone benefits are often harder to quantify than diverted funds but represent some of the most serious long-term consequences of corruption.

The Distribution of Corruption Costs

In addition to measuring total corruption costs, it is essential to consider who bears the burden:

- Taxpayers – Bear the cost of government health funding lost to corruption.
- Patients – Face higher informal payments and poorer care due to diverted resources.
- Communities – Experience worse health outcomes due to reduced access and lower-quality services.

Beyond Static Costs: Systemic Consequences of Corruption

Corruption does not just result in one-time financial losses—it also creates long-term systemic damage in healthcare. These include:

- Inefficiencies – Theft and fraud reduce healthcare system productivity. For example, medicine stockouts caused by drug diversion force doctors to delay or deny treatments, reducing overall system efficiency.
- Peer effects – When corruption is normalised and goes unpunished, more individuals engage in corrupt behaviours, further undermining system integrity.
- Distorted institutions – To avoid detection, corrupt actors may alter legal frameworks, weaken oversight mechanisms, and manipulate data collection. These changes make corruption easier to commit and harder to detect, causing widespread institutional damage.

This typology offers a comprehensive framework for classifying and measuring corruption's financial and health costs. It distinguishes between:

- Direct financial losses (diverted funds)
- Health-related consequences (foregone benefits)
- The costs of corruption prevention (ACTA costs)
- Systemic inefficiencies and institutional damage.

By systematically categorising corruption costs, this approach avoids double counting and ensures clarity in corruption measurement efforts. Ultimately, understanding these cost structures is essential for designing effective anti-corruption strategies that protect both public resources and patient well-being.

Current Literature and Methods

Measuring the costs of corruption is inherently difficult because most corrupt activities are intentionally concealed. With rare exceptions, those engaged in corruption actively work to hide their actions and resist transparency efforts. As a result, much of the existing empirical literature on health sector corruption focuses on estimating its prevalence and frequency through key informant surveys, household surveys, healthcare provider assessments, and patient reports. However, these studies rarely provide precise cost estimates and even those that do often fail to quantify the total financial and health burden of corruption.

Approaches to Measuring Corruption

Earlier research classified corruption measurement techniques into four broad categories:

- Perception surveys
- Household and public expenditure surveys
- Qualitative data collection
- Review of control systems (Vian, 2008).

An alternative approach, adopted in this discussion document, categorises corruption measurement methods based on how they infer hidden activities. Since corruption is concealed by design, the assumptions behind measurement techniques significantly impact the rigour, precision, and reliability of findings. The four primary approaches are:

- Direct measurement of corruption
- Triangulation techniques
- Context-driven behaviour analysis
- Detection of deviations from honest behaviour

1. Direct Measurement of Corruption

This approach seeks direct evidence of hidden corrupt practices by analysing existing data, constructing new measures, or conducting forensic investigations. While forensic audits are a key tool for enforcement, direct measurement studies aim to understand corruption rather than detect and prosecute it.

Examples of Direct Measurement in Corruption Studies

- Bribery documentation: A study in a large middle-income country hired observers to ride with truck drivers to record bribes paid at checkpoints. The study documented 6,000 bribes along a specific route and later tested how corruption changed when military checkpoints were removed (Olken & Barron, 2009).
- Healthcare absenteeism: Researchers conducted unannounced visits to primary health clinics and schools in six low- and middle-income countries and found that one-third of healthcare workers were absent from their assigned facilities (Chaudhury et al., 2006).
- Police integrity testing: The New York City Police Department (NYPD) randomly tested officers using staged situations involving cash, drugs, or weapons to assess their integrity. About 12–13 criminal acts were detected annually among 1,000 tests (Newham, 2003).
- Medical provider abuses: In Thailand and India, researchers secretly recorded interactions between patients and healthcare workers to measure quality of care and corruption risks (Das et al., 2017; Pongsupap & Van Lerberghe, 2006).

Importance of Direct Measurement

Direct measurement not only provides reliable cost estimates but also helps validate other methods, such as surveys and administrative data analysis. Many institutions, including insurance companies and tax authorities, use direct investigations to assess the accuracy and effectiveness of fraud detection systems.

Triangulation Techniques

Triangulation compares two independent data sources to identify discrepancies that may indicate corruption. The key challenge in this approach is ensuring that corruption is the most plausible explanation for the inconsistencies.

Examples of Triangulation in Corruption Studies

Informal payments: A Bolivian study compared patient-reported payments to the list of government-mandated free services. Payments for services meant to be free indicated informal charges by healthcare workers (Gray-Molina, Rada, & Yáñez, 1999).

Misreporting performance: A major malaria program reported dramatic success, but independent data contradicted these claims, leading to the withdrawal of false reports (Attaran et al., 2006).

Illicit trade estimates: Researchers compared import/export records between countries to uncover discrepancies linked to tax evasion and smuggling (Fisman & Wei, 2004).

Health tax evasion: Studies have tracked tobacco tax evasion by comparing survey-reported cigarette consumption to tax-paid sales data (Lavares et al., 2022; Paraje, 2018).

Gaming fiscal transfers: A U.S. Medicaid study identified state-level fraud, where hospitals artificially inflated expenditures to receive matching federal funds, then transferred excess funds back to state governments (Baicker & Staiger, 2005).

Public Expenditure Tracking Surveys (PETS): A Ugandan study found that only 13% of allocated school funds reached schools, highlighting severe corruption in public expenditure management (Reinikka & Svensson, 2003).

3. Context-Driven Behavior Analysis

These studies examine how changes in policies, regulations, or enforcement impact corrupt behaviour. Some studies use natural policy changes, while others create artificial discontinuities (i.e., experimental interventions) to assess corruption's impact.

Examples of Context-Driven Analysis in Corruption Studies

Kickbacks in procurement: In Buenos Aires, the government announced it would share hospital procurement prices among public institutions. Before any reports were even published, price variation dropped significantly, revealing prior price manipulation (Di Tella & Schargrodsky, 2003).

Absenteeism reduction: A program in India required teachers to submit timestamped photos with students in exchange for bonuses. Absenteeism fell from 42% to 21% (Duflo, Hanna, & Ryan, 2012).

Upcoding fraud: U.S. hospitals exaggerated patient diagnoses for higher insurance reimbursements, but upcoding dropped sharply after investigations were announced (Silverman & Skinner, 2004).

4. Detecting Deviations from Honest Behavior

These techniques identify corruption by finding statistical irregularities in financial, procurement, or administrative data. The assumption is that honest behaviours follow predictable patterns, while corruption introduces anomalies and distortions.

Examples of Deviation-Based Detection in Corruption Studies

Manipulated prices: During the Iraq Oil-for-Food program, researchers found that oil prices were systematically underpriced by $1.3 billion, likely due to bribes and kickbacks (Hsieh & Moretti, 2006).

Bid-rigging in procurement: A study of pharmaceutical procurement in emerging markets found that single-bid tenders were 59% more expensive than competitive tenders, suggesting corruption (Veljanov & Fazekas, 2023).

Falsified voting results: Election fraud researchers detected vote-rigging patterns using statistical techniques that analysed digit frequency distributions in reported vote counts (Beber & Scacco, 2008).

Table 1: Health system corruption types and associated measurement methods

Part of a health system or type of corruption	Direct methods	Indirect Methods
Diverted Funds		
Patient bribes	Facility exit surveys	Healthcare worker surveys
Procurement	Simulated tenders	Price analytics Procurement data analytics Red flag algorithms
Supply theft	Tag tracking	Random visits to black markets, retail establishments, and pharmacies
Funding diversion	Forensic investigation of sources and uses of funds	Expenditure Tracking Surveys Monitor government revenue vs. allocation records. Compare expected service outputs based on time-motion studies with actual outputs.

Facility construction	Random performance audits	Household healthcare-seeking behaviour surveys crossed with facility construction data.
Absenteeism	Random unannounced visits	Patient surveys
Ghost workers	Random unannounced visits	Administrative record analysis Payroll record analysis
Excess purchases	Random forensic investigations Trained auditors presenting as suppliers	Detailed analysis of demand and supply over time in particular districts or facilities, along with comparative data.
Misuse of public healthcare facilities for the provision of or referral to private services	Simulated patients	Exit Surveys
Insurance Fraud (upcoding)	Random performance audits	Patient surveys Healthcare worker surveys Red flag algorithm Counterfactual comparisons based on history of conditions and treatment levels
Foregone benefits		
Lack of healthcare provision due to: Absenteeism Theft of drugs Diversion of funds Cost of bribes	Geospatial surveys of facilities and households Patient surveys combined with random performance audits	Death records from cause-of-death reports Measure the difference between expected health improvements and actual health improvements.
Distorting budget allocation decisions	Whistleblower campaign Embedded informants	Comparisons of budget allocation decisions through time and relative to counterfactuals based on population need and comparator countries/subregions.
Influencing technical procurement reviews	Forensic investigations Trained auditors presented as reviewers Trained auditors presented as company representatives	Review of changes over time in technical decisions Comparison of technical review decisions with similar reviews in other places or at other times Comparative analysis of price and quality data
“Buying” jobs	Trained auditors presenting as candidates Whistleblower campaigns	Review of job and personnel qualifications for mismatches Staff surveys
Paying for medical licenses and degrees	A random audit of healthcare provider qualifications	Review medical school and regulatory agency records

	Trained auditors seeking to buy licenses or degrees Whistleblower campaigns	
Delivery of poor-quality inputs	Random performance audits that measure input quality, e.g., falsified drugs, untrained healthcare workers, faulty equipment	Staff surveys Patient surveys Document review (audits, maintenance records, etc.)

Notes: As discussed in the text, foregone benefits occur when funds are diverted but also when abuses alter decisions without significant financial cost to the healthcare system. The forms of abuse listed under foregone benefits include actions that may not divert substantial amounts of money, which can generate significant diversions. For example, a person may "buy" a particular job because of its potential for demanding bribes, graft, or kickbacks.

Conclusion

A wide range of methodologies exists for measuring corruption and its costs, each with strengths and limitations. While direct measurement provides the most concrete evidence, triangulation, behavioural analysis, and deviation-based detection offer alternative approaches when direct observation is not feasible.

By combining multiple methodologies, researchers and policymakers can build a more accurate picture of corruption's financial and health impact, ultimately guiding more effective anti-corruption strategies in healthcare.

Measuring National Corruption Costs in Healthcare

Efforts to measure national-level healthcare corruption have historically followed two broad approaches:

Key Informant-Based Estimations

- Experts and stakeholders describe common corruption practices and estimate their scale.
- Useful for advocacy but lacks empirical accuracy and is subject to bias.
- It cannot be used to monitor corruption trends or evaluate policy impact.
- Data-Driven Analysis of Measurable Corruption Forms
- It uses surveys, administrative data, and forensic audits to quantify corruption.
- Extrapolates missing data for hard-to-measure forms of corruption.
- Enables priority-setting, tracking progress, and policy evaluation.

The second approach is increasingly used to assess national corruption costs, as illustrated by case studies from the United Kingdom (UK) and Uganda.

United Kingdom: Estimating Corruption in the NHS

A study of the UK's National Health Service (NHS) (Button & Gee, 2015) estimated corruption losses based on data from comparable health systems rather than primary data collection. The study established four criteria for reliable corruption estimates:

- Statistically valid sampling.
- Complete and publicly available reporting or access for auditors.
- External validation using independent data sources.
- Statistical confidence measures indicating accuracy.

Key Features of the UK Approach

- Combines direct and extrapolated measures, making it useful for advocacy and policy-setting.
- It relies on international benchmarking, limiting its ability to track corruption trends within the NHS.
- Highlights the need for regular primary data collection to improve monitoring over time.

Uganda: Estimating Corruption Costs in a Low-Income Context

A study in Uganda (Fazekas et al., 2021) combined direct measurement (household surveys) with indirect statistical estimation to quantify healthcare corruption costs. The study also integrated qualitative insights to interpret and validate the findings.

Methodology

- Household Survey (1,600 respondents)
- Captured bribes, absenteeism, and barriers to healthcare access.
- Assessed how informal payments discouraged people from seeking treatment.
- Administrative Data Analysis (50,000 procurement contracts over five years)
- Used Corruption Risk Tracker methodology (Fazekas & Kocsis, 2020) to estimate procurement losses.
- Compare actual contract prices to estimated fair-market prices under a no-corruption scenario.

Supplementary Data Sources

- Survey validation using other datasets.
- Government administrative records (Inspectorate of Government) for cross-checking.
- Literature review on absenteeism and corruption in Uganda.

- Key informant interviews to contextualise corruption patterns (e.g., state capture, favouritism in hiring, lobbying by pharmaceutical companies).

Findings

- Bribes – 20% of households reported paying bribes, often requiring cutting expenses, borrowing, or forgoing treatment.
- Absenteeism – 17% of households could not access care due to staff absence.
- Procurement corruption – Prices were systematically inflated, with potential savings if transparent tendering had been followed.

Unmeasured Corruption Risks

Several forms of corruption were identified but not quantified, including:

- Theft and diversion of drugs.
- Use of public facilities for private healthcare services.
- Bribery and favouritism in hiring health workers.
- Irregularities in pharmacy licensing.

Lessons from the Uganda Study

- Demonstrates how multiple data sources can be used to validate and refine estimates.
- Highlights the distributional impact of corruption, showing that patients and taxpayers bear different costs.
- Provides a scalable framework that could be replicated or expanded for future studies.

Advancing Corruption Cost Measurement at the National Level

The UK and Uganda studies represent the current "state of the art" for measuring national healthcare corruption. However, further improvements could be achieved through:

- Regular national performance audits to measure bribery, favouritism, and absenteeism.
- Randomised integrity testing of mid-level healthcare managers.
- Direct observation of drug logistics to track theft and diversion.
- Integration of AI and machine learning to detect fraud patterns in procurement and billing.
- Foregone Benefits: Estimating the Health Impact of Corruption

While most corruption studies focus on financial losses, the health impact of corruption remains largely unquantified. Three approaches have been used to estimate foregone health benefits:

1. Cross-Country Statistical Analysis

Studies correlate corruption indices (e.g., Transparency International, World Bank Control of Corruption Index) with health outcomes.

Findings suggest that higher corruption levels are linked to poorer health indicators (Gupta, Davoodi, & Tiongson, 2001).

However, these studies struggle to produce precise cost estimates.

2. Disease-Specific Analysis

The WHO (2017) study on falsified medicines used medical data to estimate:

- 72,000 excess childhood pneumonia deaths annually due to substandard antibiotics.
- 72,000–267,000 additional malaria deaths per year in Sub-Saharan Africa from ineffective antimalarials.
- US$12.1–$44.7 million in avoidable healthcare costs due to malaria treatment failures.

Strengths – Focuses on direct health impacts, linking corruption to specific diseases.

Limitations – Requires high-quality disease surveillance data, which is not always available.

2. Opportunity Cost of Diverted Funds

Foregone benefits can be estimated by calculating the potential health impact of lost funds.

Assumes that diverted money would have been effectively spent on healthcare services.

Estimating Health Losses from Corruption: UK and Uganda

Using data from the UK and Uganda case studies, corruption-related health impacts can be estimated based on public health spending efficiency.

Uganda (Fazekas et al., 2021)

- Estimated annual corruption losses: US$ 182 million.
- There is no direct health efficiency data for Uganda, so data from Malawi was used: US$ 61 per DALY (Disability-Adjusted Life Year).
- Estimated impact: ~3 million lost DALYs annually (equivalent to 300,000 people losing 10 years of healthy life).

United Kingdom (Button & Gee, 2015)

- Estimated NHS corruption losses: US$ 5.7–8.8 billion per year.
- Used UK National Institute for Health and Care Excellence (NICE) cost-effectiveness thresholds:
- GBP 25,000 per QALY (Quality-Adjusted Life Year) (conservative estimate).
- GBP 10,000 per QALY (if applied to highly cost-effective treatments).
- Estimated impact:
    - Upper bound – 69,520 people lose 10+ years of healthy life annually.
    - Lower bound – 18,000 people lose 10+ years of healthy life annually.

Conclusion

Measuring corruption costs in healthcare requires combining financial and health impact assessments. While current methodologies offer valuable insights, future studies should:

- Improve tracking of foregone health benefits, especially for non-fatal health impacts.
- Expand data collection efforts, including periodic performance audits and real-time procurement monitoring.
- Use machine learning and AI to analyse anomalies in billing, procurement, and supply chain data.
- By refining corruption cost estimation methods, governments and international organisations can make more informed policy decisions to protect public resources and improve global health outcomes.

Table 2: Summary illustration for calculating the equivalent health impact of diverted funds

Country		Government Health Spending US$ mn.	Diverted funds US$ mn.	Healthy Life Years lost	People who may have lost 10 or more years of healthy life
Uganda		449	182	2,983,607	298,361
United Kingdom	Lower bound	167,647	5,700	180,120	18,012
	Upper bound	167,647	8,800	695,200	69,520

Sources: Diverted funds based on Button & Gee 2015 and Fazekas et al. 2021.

Global Estimates of Corruption in Healthcare

Estimating global corruption losses in healthcare requires a systematic approach to quantifying diverted funds across countries. Total government health expenditure data is available from WHO's Global Health Expenditure Database. However, a key challenge is determining the proportion of funds lost to corruption, as corruption levels vary across income groups, governance structures, and enforcement capacities.

To develop a robust global estimate, the following steps would be required:

1. Systematic Data Collection – Identifying and analysing reliable national studies that measure corruption-related financial losses.
2. Extrapolation for Data Gaps – Using country-matching techniques (based on economic, governance, and health system characteristics) or regression models to estimate corruption levels in countries lacking direct studies.
3. Application of Corruption Loss Parameters – Once reliable estimates are established for as many countries as possible, the proportion of diverted funds can be applied to national health expenditures to derive total corruption losses.

Estimating Global Corruption Losses

To illustrate how these estimates can be structured, this discussion document groups countries into four income categories based on World Bank classifications. The study applies the corruption loss estimates from Button & Gee (2015) for high-income countries and assigns reasonable loss percentages to low- and middle-income countries based on existing studies.

Using this approach, corruption in healthcare is estimated to cost governments approximately US$ 441 billion annually, or 7% of total global government health spending (see Table 3).

Key Findings

- High-income countries account for the largest financial losses (US$ 255 billion), as they represent over four-fifths of total government health expenditure.
- Lower- and middle-income countries experience higher relative losses as a percentage of spending, potentially exceeding 10-20% of government health budgets due to weaker governance and enforcement mechanisms.
- Corruption's impact on healthcare access is most severe in lower-income countries, where lost funds translate directly into fewer services, understaffed facilities, and compromised treatment quality.

Health Impact of Corruption Losses

Beyond financial losses, corruption also leads to avoidable illness, disability, and death. Using established estimates of health service efficiency and spending impact, these diverted funds could result in:

- 76 million lost Disability-Adjusted Life Years (DALYs) globally.
- The equivalent of 7.6 million people losing 10 or more years of healthy life.
- Lower- and upper-middle-income countries bear the greatest health burden (~47 million DALYs lost), as they:
    - Have significant health spending.
    - Experience large corruption losses.
    - Are more vulnerable to service disruptions due to funding gaps.

Conclusion

These estimates illustrate the scale and impact of corruption in global healthcare systems. While the exact share of diverted funds varies across countries, even conservative estimates indicate substantial financial and health consequences.

To strengthen future estimates, governments and organisations should:

- Expand national corruption measurement initiatives, including regular forensic audits and integrity testing.
- Improve transparency in healthcare procurement, budgeting, and service delivery.
- Integrate real-time corruption detection tools, such as AI-driven fraud analysis and blockchain-based tracking of healthcare expenditures.

By addressing corruption losses, countries can free up billions in misallocated funds, ultimately saving lives and improving healthcare outcomes worldwide.

Table 3: Illustration of calculating global costs of corruption in health

Country Income Group	Government health expenditure	Diverted funds	Share	Associated health loss	People who may have lost 10 or more years of health life
	2021 US$ millions	2021 US$ millions		DALYs	
Low income	4,396	1,099	25%	18,316,870	1,831,687
Lower middle income	94,073	16,933	18%	28,221,952	2,822,195
Upper middle income	966,808	116,017	12%	19,336,153	1,933,615
High income	5,120,244	307,215	6%	10,240,488	1,024,049
Grand Total	6,185,521	441,264	7%	76,115,464	7,611,546

Source: Authors' calculations. See Annex 2.

Accounting for Uncertainty in Global Estimates

Given that these calculations rely on key assumptions regarding the share of government health expenditures lost to corruption and the conversion of diverted funds into health impacts, it is essential to consider a range of plausible estimates.

- Higher Corruption Scenario – If the share of diverted funds were twice as high as the base assumption, global corruption losses would reach US$ 882 billion, leading to an estimated 15.2 million people losing 10 years of healthy life (see Table 4).
- Lower Corruption Scenario – If all country income groups experienced corruption levels similar to high-income countries, global losses would be US$ 371 billion, with approximately 3.4 million people losing 10 or more years of healthy life.

These estimates highlight the potential scale of corruption's impact under different assumptions, reinforcing the need for more precise country-level data and improved methodologies to refine global corruption cost assessments.

Table 4: Range of estimates for global costs of health sector corruption

	Diverted Funds (US$ billions)	People who may have lost 10 or more years of healthy life (millions)
Upper bound	882	15.2
Base case	441	7.6
Lower bound	371	3.4

Interpreting the Results: Beyond Diverted Funds

When evaluating these estimates, it is crucial to recognise that the health impact calculations only account for losses due to diverted funds. However, corruption also affects healthcare in ways that do not directly involve financial diversion yet still compromise access, quality, and outcomes.

To estimate these additional effects, data is needed on:

- Healthcare services are denied or delayed due to informal payments or other financial barriers.
- Distorted allocation decisions, such as prioritising services for privileged groups while neglecting marginalised populations.
- Health outcomes linked to substandard or falsified medicines, as demonstrated by WHO (2017).

Expanding the Measurement of Foregone Benefits

Calculating the full health impact of corruption beyond diverted funds requires additional research:

- Studies on falsified medicines, measuring their effects on treatment failure and patient mortality.
- Research on informal payments and how they influence healthcare-seeking behaviour, particularly for low-income populations.
- Systematic reviews of existing informal payment studies, identifying those that meet reliability criteria (e.g., Button & Gee, 2015) to extrapolate findings to similar countries.

By aggregating these different sources, it would be possible to generate a more comprehensive global estimate of the household burden of corruption—beyond just the funds diverted from public budgets.

New Tools for Estimating Corruption Costs in Healthcare

Advancements in computing, data analytics, and digital technology have revolutionised public administration and financial management worldwide. These innovations present new opportunities for detecting and measuring corruption in the health sector by:

1. Enhancing existing methods – Digital tools have made traditional techniques faster, cheaper, and more reliable. Surveys can now be conducted via phone calls or SMS in remote areas, data can be uploaded in real-time via handheld devices, and geospatial tagging enables precise tracking of healthcare resources.
2. Digitising new forms of data – Innovations like barcode tracking, RFID chips, and digital ledgers help monitor the movement of medical supplies, finances, and transactions, reducing the likelihood of fraud.
3. Leveraging AI, Big Data, and predictive analytics – Advanced algorithms can analyse large, unstructured datasets to detect patterns and anomalies that indicate corruption, providing insights beyond conventional statistical methods.

The applicability of these tools depends on how data is collected and stored. Countries with fully digitised health records, financial management systems, and procurement databases can harness these technologies more effectively. However, many healthcare systems still rely on paper records, making digital analysis more challenging. Ironically, paper records may contain visual clues—such as forged signatures, folded prescriptions, or irregular markings—that disappear in digitised formats. Where scanned records exist, AI tools can analyse handwriting, detect alterations, and identify suspicious inconsistencies (Sparrow, 2019).

While many emerging technologies offer potential applications, this section focuses on four key innovations:

1. Smartphone and handheld technology
2. Blockchain technology
3. Artificial Intelligence (AI)
4. Big Data analytics

1. Smartphones and Handheld Devices

Mobile technology is lowering costs and increasing the accuracy of corruption detection through:

- Digital survey collection – Health workers and researchers can collect real-time patient and household data via mobile devices, reducing data entry errors and enabling instant verification.

- GPS-enabled fraud detection – Geotagging can verify facility locations, service provision, and inventory movement, flagging discrepancies between reported and actual service delivery.
- Inventory and supply chain tracking – Digital records help monitor stock levels, track medication usage, and detect supply chain leakages by comparing expected vs. actual distribution.

These tools allow for faster, more scalable data collection while also reducing manipulation risks that arise when paper records change hands multiple times.

2. Blockchain Technology

Blockchain creates tamper-proof, transparent transaction records that cannot be altered without detection. While it is best known for powering cryptocurrencies, blockchain is already being used in pharmaceutical supply chains to:

- Track manufacturing, distribution, and dispensing of drugs – If a medication batch is found to be faulty or unsafe, blockchain records can quickly trace its entire supply chain history for targeted recalls.
- Enhance procurement transparency – Blockchain provides a clear audit trail of financial transactions, helping detect kickbacks, bid-rigging, and overpricing in medical procurement.
- Deter corruption through accountability – The existence of a permanent, verifiable transaction record makes it harder for officials to engage in theft, fraud, or fund diversion without leaving a trail.

By combining blockchain with AI, datasets can be analysed to identify suspicious procurement patterns, irregular pricing fluctuations, and contract manipulations indicative of corruption.

3. Artificial Intelligence (AI) and Predictive Analytics

AI enables sophisticated pattern recognition and anomaly detection by analysing large, complex datasets beyond human capability. AI applications for corruption detection include:

- Predictive fraud detection – AI can analyse financial transactions, procurement records, patient outcomes, and employee behaviours to identify high-risk transactions suggestive of corruption.
- Natural Language Processing (NLP) – AI can scan medical records, reimbursement claims, and bidding documents to flag collusion, induced demand, or fabricated justifications.
- Training AI with forensic data – AI algorithms improve when trained on known corruption cases. For example, an AI model could analyse thousands of fraudulent invoices to detect new instances of overbilling, ghost workers, or procurement fraud.

However, AI is only as good as the data it is trained on. Without access to confirmed cases of corruption, AI cannot distinguish between genuine transactions and fraudulent activities. Therefore, AI should complement—but not replace—traditional forensic investigations and audits.

4. Big Data Analytics

Big Data refers to large-scale, high-frequency datasets that require specialised tools for analysis. These datasets may be:

- Structured (e.g., financial transactions, procurement records).
- Semi-structured (e.g., electronic medical records, insurance claims).
- Unstructured (e.g., emails, reports, social media posts).

Big Data analytics, often combined with AI, can uncover corruption by:

- Analysing billing and expenditure trends – Identifying overpriced contracts, fake claims, and fraudulent reimbursements.
- Detecting unnecessary procedures and overprescription – Comparing patient data against medical necessity standards to flag excessive interventions.
- Identifying bid-rigging and collusion – Cross-referencing supplier relationships and procurement history to detect conflicts of interest and suspicious transactions.
- Examining deviations in healthcare utilisation – Spotting abnormal service spikes that may indicate fraudulent activity or induced demand.

Additionally, Social Network Analysis (SNA) can map relationships between officials, suppliers, and decision-makers to expose patterns of collusion, favouritism, and undue influence.

Promise and Perils of Emerging Technologies

While these new tools enhance corruption detection, they also raise legal, ethical, and privacy concerns:

- Legal obligations – If corruption is uncovered during research, should findings be reported to law enforcement?
- Confidentiality risks – Whistleblowers, survey respondents, and researchers must be protected from retaliation.
- Data security – Even anonymised datasets can be de-anonymised if cross-referenced with other sources, putting individuals at risk.

New technologies can enhance privacy protections—for instance, encrypted mobile data collection reduces unauthorised access. However, digital records also introduce new vulnerabilities. Without proper safeguards, sensitive information could be hacked, misused, or exploited by corrupt actors.

Additionally, corrupt individuals often have access to the same (or better) technology. For example:

- Fraudsters test insurance claim systems to find loopholes, then submit thousands of fraudulent claims before detection (Sparrow, 2019).
- Corrupt officials manipulate AI-driven fraud detection algorithms by feeding false data to camouflage illicit transactions.

Human Oversight Remains Essential

No matter how advanced digital tools become, human intelligence remains irreplaceable in anti-corruption efforts.

- Statistical tools identify outliers, patterns, and anomalies, but they do not account for human intent.
- Behavioral insights and investigative techniques help distinguish between legitimate and fraudulent activities.
- Corruption is dynamic—as anti-corruption measures evolve, so do corrupt strategies. Preventing fraud requires constant adaptation and proactive intelligence gathering.

In essence, technology amplifies the effectiveness of anti-corruption efforts, but it must be integrated with traditional forensic investigations, financial audits, and governance reforms.

By combining advanced data analytics, digital tracking, and human expertise, governments and organisations can develop more effective, scalable, and resilient anti-corruption strategies in healthcare.

Anti-Corruption Strategies in Healthcare

Measuring corruption is not an end in itself. The primary value of corruption measurement lies in its ability to:

1. Determine whether corruption is significant enough to warrant action.
2. Assess the cost-effectiveness of ACTA efforts.
3. Identify priority areas for intervention.
4. Support the design and implementation of policies to prevent or mitigate corruption.

This section does not attempt to duplicate the extensive guidance available from various organisations on ACTA strategies. Instead, it illustrates how corruption measurement plays a critical role in both diagnosing the problem and taking action by exploring five key anti-corruption approaches:

1. Shaping Social Norms and Behaviors
2. Strengthening Accountability Mechanisms
3. Implementing Systemic Checks and Balances
4. Developing Intelligence and Monitoring Systems
5. Focusing on Results-Based Oversight

1. Shaping Social Norms and Behaviors

Corruption is not just a governance issue—it is also a social phenomenon influenced by workplace culture, leadership, and peer behaviour. When individuals enter a corrupt system, they internalise existing norms and justifications for unethical behaviour. Conversely, in environments where integrity is valued, individuals are more likely to resist corrupt practices.

Key strategies to shift social norms include:

- Leadership and role modelling – Senior officials (e.g., hospital directors and ministers) should regularly reinforce integrity messages through speeches, campaigns, and public actions that demonstrate commitment to ethical behaviour (Vian, Savedoff, & Mathisen, 2010).
- Professionalisation at entry-level – New staff should undergo training on integrity standards, including simulated scenarios, to prepare them for ethical challenges.
- Rotating personnel – Periodic staff reassignments can disrupt networks of collusion and prevent entrenched corruption.
- Visible consequences for good and bad behaviour – Integrity can be incentivised through recognition programs, while sanctions for corruption should be consistently enforced and publicly communicated.
- Team-based motivation – Building pride and collective responsibility around ethical service delivery fosters a workplace culture that discourages corruption.

2. Strengthening Accountability Mechanisms

At its core, accountability means ensuring that people and institutions answer for their actions. Corruption thrives when rules exist on paper but are not enforced.

Effective accountability frameworks include:

- Multi-level reporting and oversight – Health agencies should be answerable to multiple actors, such as health ministries, finance ministries, parliaments, regulators, and public watchdog groups (Savedoff & Gottret, 2008).

- Clear performance expectations and consequences – Staff should be held accountable for timely service delivery, patient safety, and financial stewardship.
- Proportionate penalties for misconduct – Sanctions should range from corrective measures (e.g., retraining, additional supervision) to punitive actions (e.g., dismissal, legal action) depending on the severity of the violation.
- Alternative accountability measures in weak governance settings – In countries where law enforcement is ineffective, creative deterrents may be required. For example, Nigeria's anti-falsified drug initiative publicly exposed criminal networks and impounded vehicles and warehouses used in the illicit drug trade (Akunyili, 2006).

3. Implementing Systemic Checks and Balances

Checks and balances prevent abuse by ensuring that no single entity has unchecked power. However, poorly designed controls can be ineffective or even counterproductive if they create bureaucratic bottlenecks without enhancing oversight.

Key systemic measures include:

- Separation of duties – Financial controls should require that different individuals authorise, process, and verify transactions to prevent embezzlement.
- Electronic procurement and expenditure tracking – Digital systems can reduce human discretion and limit opportunities for manipulation.
- Independent auditing and cross-checking – In Colombia, a national insurance database eliminated duplicate payments for individuals enrolled in multiple health plans. Similarly, Estonia's public health fund reporting system to Parliament strengthened public accountability (Habicht, 2008).
- Restructuring workflows to reduce vulnerabilities – A hospital reduced theft by introducing cash registers, but the change only became effective after replacing cashiers who had colluded in previous fraud schemes (Vian, Savedoff, & Mathisen, 2010).

4. Developing Intelligence and Monitoring Systems

Corrupt actors do not passively accept anti-corruption reforms. They adapt by finding new ways to exploit loopholes. To stay ahead, healthcare organisations need proactive intelligence mechanisms to identify emerging risks and fraudulent schemes.

Effective intelligence systems include:

- Whistleblower protections – Encouraging frontline workers to report corruption without fear of retaliation.

- Hotlines for reporting abuse – Allowing patients, staff, and the public to submit complaints anonymously.
- Randomised forensic audits – Regularly investigating expenditures, contracts, and service delivery to detect fraud.
- Cross-validation of records – Matching reported service outputs with patient records, medical supply chains, and financial data to flag inconsistencies.

5. Focusing on Results-Based Oversight

One of the strongest anti-corruption tools is the rigorous monitoring of healthcare performance and outcomes. Well-functioning organisations consistently deliver results, while those experiencing persistent inefficiencies are more likely to suffer from corruption.

Results-based oversight includes:

- Comparing budgets to service delivery outcomes – A hospital may have complete financial documentation proving it was built, yet a surprise visit could reveal that it is non-operational (World Bank, 2007).
- Tracking performance indicators – Disparities in treatment success rates, medication usage, or patient flow may signal inefficiencies or fraud.
- Zero tolerance for inaction – Overly aggressive anti-corruption messaging can cause paralysis, with staff avoiding financial decisions out of fear of accusations. Instead, performance-based approaches motivate staff to focus on effective service delivery.

Conclusion: Integrating Measurement into Action

Successful anti-corruption strategies do not rely on a single approach—they integrate multiple reinforcing measures:

- Changing workplace culture to discourage corruption.
- Holding individuals accountable through reporting and enforcement.
- Establishing strong checks and balances to prevent fraud.
- Proactively monitoring corruption risks with intelligence tools.
- Evaluating healthcare results to detect inefficiencies and abuses.

By embedding corruption measurement into broader governance strategies, healthcare systems can reduce fraud, improve service delivery, and strengthen public trust in health institutions.

Hindrances to Implementing Anti-Corruption Measures

With a wide array of corruption measurement techniques and anti-corruption strategies available, why does corruption in healthcare remain so pervasive? While the full explanation is beyond the scope of this paper, two critical obstacles hinder the accurate estimation of corruption costs and the effective implementation of anti-corruption initiatives:

1. There is a lack of systematic corruption measurement through direct investigation and representative sampling.
2. The absence of reliable, accessible data for assessing financial flows and health system performance.

1. The Absence of Systematic Corruption Measurement

Most healthcare institutions have internal audits, external financial reviews, and forensic investigations to detect and respond to fraud. However, these efforts are reactive—they only investigate corruption when a specific problem is flagged.

Few health agencies engage in proactive, systematic investigations using representative sampling to estimate corruption prevalence and financial losses across the entire health system.

Why Is Routine Representative Sampling Essential?

Regularly conducting randomised forensic audits and corruption risk assessments provides numerous advantages over traditional financial controls:

- Provides reliable national estimates – Without systematic sampling, it is impossible to accurately determine the scale of corruption losses in the healthcare system.
- Supports effective prioritisation – Governments can allocate resources more efficiently by targeting the most costly or harmful corrupt practices.
- Enables monitoring of anti-corruption impact – Periodic corruption measurement allows governments to track progress and evaluate the cost-effectiveness of ACTA initiatives over time.

Without routine representative corruption assessments, corruption remains underestimated and inadequately addressed, allowing inefficiencies, fraud, and abuse to persist.

2. The Lack of Reliable, Accessible Data

Another major challenge in estimating corruption costs is poor data availability and quality.

- In some countries, budgetary data is available, but detailed information on fund authorisation, disbursement, and expenditure tracking is incomplete, inconsistent, or significantly delayed.

- Other countries lack reliable performance data, even for basic health indicators such as immunisation coverage, patient outcomes, or staff attendance rates.

Why Is Health System Data Often Poor?

- Lack of incentives for accurate reporting – Health workers and administrators may view data collection as bureaucratic and irrelevant if they do not receive feedback on how the information is used.
- Data manipulation for self-preservation – Individuals or institutions with poor performance records may intentionally suppress, falsify, or obstruct data collection to conceal inefficiencies or illicit activity.
- Weak digital infrastructure – Many countries still rely on paper records, making data collection slow, prone to human error, and difficult to analyse at scale.

Because of these challenges, standard corruption measurement tools—such as financial audits or expenditure tracking—often fail to detect deeply embedded fraud. This underscores the need for alternative data collection methods, such as:

- Surprise facility inspections to verify that documented services were actually provided.
- GPS and digital tracking of medical supplies to identify missing stock and diverted shipments.
- AI-driven anomaly detection in billing and procurement records to flag suspicious transactions.
- Citizen feedback mechanisms (e.g., hotlines, digital surveys) to capture informal payments and service denials.

Corruption Measurement as a Tool for Advocacy and Prevention

Despite these challenges, measuring corruption remains one of the most powerful tools for both exposing abuses and preventing future corruption.

- As an advocacy tool, corruption cost estimates highlight the urgency of action, mobilising public, political, and institutional commitment to reform.
- As a prevention tool, transparency and accountability mechanisms deter corruption by making fraudulent activities easier to detect and penalise.

By prioritising data transparency, independent audits, and systematic corruption assessments, governments can strengthen accountability, reduce fraud, and build more resilient healthcare systems that serve the public interest rather than private gain.

Conclusion: Strengthening Anti-Corruption Efforts in Healthcare

Corruption in healthcare is a global challenge with profound financial and health consequences. Estimates suggest that between 3% and 25% of health expenditures are lost to corruption, with this discussion document estimating global losses of approximately 7% of government health spending, or

US$ 441 billion annually. These diverted funds contribute to unmet healthcare needs, resulting in an estimated 7.6 million people losing 10 years of healthy life.

Given the uncertainty in key parameters, this paper also provides upper and lower bound estimates, with corruption losses ranging from US$ 317 billion to US$ 882 billion and the corresponding health impact varying between 3.4 million and 15.2 million people losing a decade of healthy life. Refining these estimates and reducing uncertainty will require better national-level data and more systematic country studies to improve global extrapolations.

Advancing Corruption Cost Estimation

Current country-level studies, such as those conducted in the UK and Uganda, illustrate how diverse methodologies—including direct investigations, extrapolations, and indirect assessments—can be used to estimate corruption costs. However, most existing studies cover only a fraction of corrupt transactions in healthcare. Governments seeking to better quantify corruption losses can draw from a wider range of methodologies discussed in this paper to develop more accurate national estimates.

Additionally, advancements in computing and digital tools present new opportunities to improve corruption detection and estimation. Technologies such as Artificial Intelligence (AI), Big Data, blockchain, Network Analysis, Social Network Analysis, and Natural Language Processing allow forensic investigators and auditors to process and analyse vast amounts of data far beyond human capacity. These tools can help detect fraud in claims data, procurement records, service utilisation, and financial transactions, flagging patterns indicative of collusion, bribery, or falsified reporting. While these technologies cannot replace human expertise, they enhance efficiency, scalability, and accuracy in corruption detection.

Expanding the Scope: Beyond Diverted Funds

A major conclusion of this discussion document is that corruption measurement must go beyond financial diversion to include the health impact of corruption and its distributional consequences. While diverted funds reduce overall health sector resources, some forms of corruption disproportionately harm vulnerable populations, worsening inequities in access to care.

To fully capture corruption's effects, future research should explore:

Foregone benefits – Understanding the missed health improvements due to corruption-related inefficiencies.

Health impact estimation – Measuring how different forms of corruption (e.g., substandard medicines, informal payments, absenteeism) affect disease outcomes, treatment success rates, and patient mortality.

Equity considerations – Analysing how corruption shifts financial burdens onto patients, particularly low-income groups, further impeding Universal Health Coverage (UHC) and Sustainable Development Goal (SDG) 3.

The Role of Corruption Cost Estimates in Policy Action

Corruption cost estimates are not just theoretical calculations—they are essential tools for action. Their main value lies in:

Advocacy – Quantifying corruption raises public awareness and pressures governments to act. Financial loss estimates appeal to taxpayer concerns, while health impact estimates resonate with solidarity and equity narratives.

Prioritisation of Anti-Corruption Efforts (ACTA) – Governments and policymakers must allocate resources efficiently. Cost estimates help identify high-risk areas, ensuring that anti-corruption interventions target the most damaging forms of abuse.

Monitoring and Evaluation – Regular cost assessments allow for tracking progress, testing ACTA effectiveness, and adjusting strategies based on measurable impact.

Because ACTA interventions are not cost-free, they must be proportional to the scale of corruption to remain sustainable and effective. Without a data-driven approach, governments risk misallocating resources or implementing ineffective measures.

Embedding Corruption Cost Measurement into Governance Systems

To make corruption measurement an effective policy tool, countries should integrate cost estimation into routine governance processes. This requires:

✓ Establishing routine, statistically representative corruption assessments to ensure accurate and reliable data.
✓ Leveraging new technologies (AI, blockchain, Big Data) to enhance fraud detection and strengthen oversight.
✓ Aligning measurement efforts with UHC and SDG 3 goals to ensure anti-corruption initiatives promote health equity and improved service delivery.

By embedding cost measurement into governance, countries can build stronger accountability systems, enhance public trust, and drive meaningful anti-corruption reforms.

Next steps

The discussion document was prepared as a scoping exercise to support the development of improved methodologies for measuring corruption in healthcare. The next step for this work is to set up a technical working group (TWG) with GNACTA partners to:

1. **Review and refine the proposed framework** – This paper presents definitions, methodologies, and key focus areas for measuring corruption costs. The TWG should evaluate these proposals and determine how to integrate them into its strategy.
2. **Develop a detailed corruption costing guide** – Contracting a group of experts to design a comprehensive methodology guide would provide standardised tools for estimating corruption costs at national and global levels (see Annex 1 for draft terms of reference).
3. **Conduct national pilot studies** – The TWG should commission at least three national-level corruption cost estimation studies using existing and new methodologies. These case studies would generate practical insights and serve as models for broader implementation (see Annex 2 for pilot study ideas).
4. **Expand research areas** – The TWG may also consider additional research on:

- Evaluating performance monitoring systems for corruption detection.
- Identifying data gaps that hinder the application of new computational tools.
- Analysing how corruption weakens health data systems and its broader impact on governance.
- Investigating the link between corruption and health system absorption capacity (i.e., how corruption affects funding utilisation and service delivery).

Final Thoughts: The Path Forward

Corruption in healthcare will not disappear overnight. However, systematic, data-driven efforts to quantify and track corruption costs will provide governments with powerful tools to promote integrity, transparency, and accountability.

Through advocacy, evidence-based ACTA interventions, and continuous monitoring, countries can minimise financial losses, reduce health inequities, and accelerate progress toward Universal Health Coverage and SDG commitments.

By investing in corruption cost measurement, the global health community can move beyond reactive enforcement to proactively strengthen healthcare systems, ensuring public funds are used efficiently and ultimately saving lives.

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Annexes

Annex 1: Draft Terms of Reference to produce a detailed guide for estimating corruption costs

This discussion document has provided a typology of corruption, a summary of existing empirical approaches to measuring corruption, and an overview of ACTA strategies.

Proposed Tasks for a Detailed Guide

As a next step, the TWG might consider commissioning a detailed guide to estimate corruption costs. The tasks to be specified in terms of references for such a study might include work to:

- Conduct a systematic review of empirical studies measuring diverted funds and foregone health benefits.
- Classify the studies by type of corruption.
- Classify the studies by characteristics of the methodology, including the type of data collection, the methods of inference, and an assessment of the associated representativity, rigour, precision and robustness of results.
- Select a sample of methods that look particularly promising for costing corruption at the national or global level, followed by research into the costs and implementation issues associated with those methods.

As part of drafting the terms of reference, the TWG will have to reach an agreement on a number of important issues regarding the scope and content of the guide, such as:

- Will the guide focus on diverted funds or also include foregone benefits?
- What are the criteria for assessing the quality of the methodologies?
- How comprehensive should the guide be in terms of different types of health sector corruption?
- What is the appropriate level of expenditure for such studies, given the expected benefits in terms of the information generated?
- What will be the protocol for people or firms contracted to conduct the pilot studies if they find information indicating criminal activity, especially with regard to requirements to report to local, national, or international authorities?
- How will the people or firms contracted to conduct the pilot studies be protected from potential threats or violence?

Annex 2: Additional ideas for the TWG work program

1. **Country pilot studies to estimate costs of corruption**

- Three countries were chosen, which vary by data availability (paper records, paper medical/digitised finances, all digitised), in order to explore the difficulties and methods of working in different contexts.

- Conduct household surveys for health status, health-seeking behaviour, and medical facility experiences (informal payments, waiting times, quality of care, availability of supplies and medications, availability of medical staff).

- Random sampling of supplies, medications, financial transactions, procurement prices, and medical records

- Random sampling of large transactions (e.g., hospital construction, high-cost medical equipment)

- Statistical analyses and testing of new AI approaches

- Documentation of internal fiduciary control systems and testing for effectiveness relative to corruption findings

2. **Availability of data in LMICs**. A study to assess the forms in which data is needed to monitor the integrity of health systems is available in low- and middle-income countries.

3. **Corruption surveys**. Guide to conducting surveys to assess corruption, building upon existing approaches such as Transparency International's Global Corruption Barometer.

4. **Guide to analysing corruption in procurement systems.** This would require a detailed analysis of how corruption occurs during procurement in the health systems with reference to complexities introduced by monopolies (e.g., patented drugs or diagnostics), oligopolies (e.g., few manufacturers of high-cost medications), and high costs of obtaining quality information (e.g., assessing quality of medications delivered to a primary care facility). It would also involve assessing the extent to which "red flags" typically used to assess the risk of corruption are actually effective. It would evaluate low-cost methods of using procurement data by comparing their findings to the results of detailed

investigations. Finally, it would draft a guide to calculating corruption costs in health procurement.

5. **Effectiveness of checks and balances**. Case studies could be conducted to analyse which checks and balances are effective at preventing and detecting corruption, along with which checks and balances create more opportunities for corruption (e.g., bribing officials not to monitor transactions).

6. **Effectiveness of performance monitoring**. A series of studies to determine whether closely monitoring performance (i.e., service delivery and health outcomes) without strict controls on input reporting can effectively flag corruption and be used to estimate foregone benefits.

7. **Data requirements for new computational tools**. A study of the data requirements for using AI, Big Data, or Data Fusion to develop estimates of the costs of corruption at a national and global level.

8. **Research on causes of weak data.** Case studies on countries with weak data reporting to determine the extent to which a major hindrance might be resistance by people who enrich themselves from the health system and do not want their activities to be visible to others.

9. **Research on the relation between absorption capacity and corruption**. Case studies on the absorption problem and whether corruption could be contributing to it directly (e.g., holding off spending until kickbacks can be negotiated) or indirectly (e.g., leading officials to be overly cautious about authorising expenditures for fear of being accused of corruption).

10. **ACTA resource guide**. An annotated list of guides for studying, measuring, and taking action to prevent, detect, or mitigate corruption based on a systematic search of the literature. Examples of such guides which are cited in this discussion document include: U4 Anti-Corruption Resource Centre http://www.u4.no/themes/health-sector/ ; Curbing Corruption https://curbingcorruption.com/; AFDB, 2021; J-PAL, 2012; OECD, 2017; Reinikka & Svensson, 2003; W. Savedoff, 2016; Van Stolk & Tesliuc, 2010; Vian et al., 2010.