KONTIKI STRATEGIC HEALTH ADVISORS

Access Integrity: Revenue Loss, Operational Design, and End-to-End Performance

A Combined Framework Quantifying the Financial Cost of Scheduling Delays and Referral Leakage,

Alongside End-to-End Revenue Integrity Operational Design Across the Healthcare Financial Journey

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Executive Summary

Healthcare organizations consistently underestimate the financial consequences of two interconnected operational failures: access delays that drive patients out of the network before care is delivered, and revenue integrity gaps that allow money to leak out of the organization after care is delivered. These failures are not independent. They share the same root cause: the absence of a disciplined, end-to-end operating model that connects scheduling through collections with measurable standard work.

This white paper addresses both failures in sequence. Part One quantifies the downstream revenue loss produced by scheduling delays and referral leakage across four high-revenue specialties, using MGMA and HFMA benchmark data. Part Two presents the operational framework for designing and executing an end-to-end revenue integrity model that prevents losses and recovers revenue where gaps already exist.

The Two Financial Bookends

Revenue integrity must be evaluated through two definitive operational bookends. Bookend One is access and scheduling — where demand is converted into opportunity. Bookend Two is confirmation that gross collections were achieved. Everything between these two bookends determines whether the financial journey is completed successfully or is operationally broken.

$47K	**$112K**	**18%**	**2.4×**
Est. revenue lost per delayed orthopedic MRI when surgical case migrates	Est. revenue lost per delayed cardiology new patient across downstream cascade	Average out-migration rate when new patient wait time exceeds 14 days	Higher duplicate test rate in fragmented vs. integrated systems

PART ONE

Access Delay Impact

Downstream Revenue Loss Per Specialty — MGMA + HFMA Combined Benchmark

Section 1: Referral Leakage by Specialty — Integrated vs. Fragmented Systems

The following data presents referral leakage rates across four specialties, comparing integrated health systems against fragmented systems. These figures represent the percentage of referred patients who do not complete care within the originating network, either because they are lost to follow-up, self-refer externally, or experience delays that redirect them to competitors.

Specialty	Integrated Leakage	Fragmented Leakage	Leakage Multiplier	Primary Driver
Orthopedics	8%	**29%**	3.6×	MRI/imaging delays, surgical wait time
Cardiology	6%	**32%**	5.3×	New patient access, stress test delays
Primary Care	4%	**18%**	4.5×	Panel access, PCP attribution drift
Neurosurgery	9%	**35%**	3.9×	Consult delays, imaging coordination

Source: MGMA Practice Operations Report 2024; HFMA Value-Based Care Performance Survey 2024

Section 2: Specialty-Level Revenue Impact of Access Delays

2.1 Orthopedics — The Surgical Case at Risk

The $47K Access Failure Scenario

A patient with knee pain cannot obtain an MRI within 10–14 days. The patient self-refers to a competing orthopedic group. The originating practice loses not only the MRI read but the follow-up consultation, the surgical booking, facility fees, anesthesia coordination, post-operative care, physical therapy referral, pharmacy, and potential DME billing. Estimated aggregate downstream loss: $47,000.

Access Point	Revenue at Risk	Leakage Trigger	Preventive Action
Diagnostic MRI booking	$350–$500	Wait > 10 days	Same-week imaging slots reserved
Orthopedic consultation	$180–$290	New patient wait > 14 days	Dedicated new patient template
Surgical case booking (PB and HB)	$8,000–22,000	Downstream of imaging loss	Pre-authorization at MRI stage
Post-op physical therapy/ancillary	$1,200–4,800	External referral at discharge	Closed-loop PT scheduling at checkout
Total downstream surgical case	**$47,000+ estimated**	Single imaging delay	**Access management standard**

2.2 Cardiology — The $112K New Patient Cascade

The $112K Access Failure Scenario

A PCP refers a patient with exertional chest pain to cardiology. The cardiologist's next available new patient appointment is 21 days out. The patient seeks care at a competing system and is seen within 5 days; this may include APP triage. The originating system loses the consultation, stress testing, echocardiography, possible catheterization, possible PCI or EP procedure, and longitudinal management. Estimated aggregate downstream loss: $112,000.

Cardiology Service	Revenue Range	Access Dependency
New patient consultation	$230–$380	Direct: first appointment access
Stress test (nuclear/echo)	$800–2,400	Ordered at consultation
Echocardiography	$400–$900	Ordered at consultation or follow-up
Cardiac catheterization	$4,000–8,500	Downstream of stress test result
PCI / stent procedure	$12,000–28,000	Downstream of catheterization
EP study/ablation	$18,000–35,000	Downstream of arrhythmia workup
Longitudinal follow-up (3 yrs)	$2,400–4,800	Retained if initial access succeeds
Total estimated cascade loss	**$112,000+**	**Single new patient access failure**

2.3 Primary Care — Attribution and the 18% Out-Migration Rate

Attribution Loss Calculation

A Medicare Advantage patient with an average RAF score of 1.2 and PMPM of $850 represents approximately $10,200 in annual risk-adjusted revenue. If 18% of a 1,750-patient panel migrates due to access delays, that represents 315 patients and approximately $3.2 million in annual at-risk revenue before accounting for quality bonus reductions.

2.4 Neurosurgery — The 35% Fragmented Leakage Rate

Access Failure Point	Leakage Risk	Downstream Revenue Loss
Neurosurgery consult > 14 days	High	$280–$420 consultation lost
MRI not coordinated pre-consult	High	Rescheduling loop → patient migrates
Spine surgical case lost	Very High	$15,000–45,000 surgical case
Cranial procedure lost	Very High	$35,000–95,000 procedure
Post-surgical rehab referral lost	Moderate	$3,000–8,000 downstream

Important Note: Timely access to specialty care within hospital system medical groups is a critical driver of patient retention, downstream revenue preservation, network integrity, and value-based performance. When access delays occur, patients frequently seek care at external emergency departments, urgent care centers, and competing specialty networks, resulting in permanent outmigration of diagnostics, procedures, admissions, and longitudinal care. This risk is amplified within Medicare Advantage, MSSP, ACO, and other risk-based Medicare populations, where attributed patient leakage directly impacts continuity of care within a clinically integrated network, acuity capture, total cost of care, quality outcomes, and shared savings performance. Transitional Care Management (TCM) capture is therefore paramount. Real-time discharge visibility platforms such as Bamboo Health, formerly PatientPing, provide organizations with the ability to identify attributed patients immediately following ED visits, hospitalizations, and post-acute events, enabling rapid outreach, triage, and reintegration into the health system. High-performing organizations operationalize TCM not simply as a billing opportunity but as a strategic retention and care-coordination function designed to preserve patient loyalty, strengthen the PCP-patient relationship, enable SDoH intervention, improve continuity of care, reduce leakage, and strengthen both fee-for-service and value-based financial performance.

Section 3: The 2.4× Duplicate Test Problem

When patients navigate across unconnected systems due to access delays, out-migration, or poor care coordination, they frequently receive identical or overlapping diagnostic workups at each new point of contact. Duplicate test rates in fragmented systems are 2.4 times higher than in integrated systems. The originating organization bears the cost of access failure and/or attribution loss, while a competitor captures the diagnostic revenue.

Duplicate Test Category	Fragmented Rate	Integrated Rate	Financial Impact
Repeat MRI (musculoskeletal)	34% of referred patients	12% of referred patients	$800–2,200 per duplicate
Duplicate cardiac stress test	28% of referred patients	9% of referred patients	$800–2,400 per duplicate
Repeat laboratory panel	41% of referred patients	17% of referred patients	$180–$420 per duplicate
Duplicate cardiology echo	22% of referred patients	8% of referred patients	$400–$900 per duplicate
Repeat specialist consultation	31% of referred patients	11% of referred patients	$230–$490 per duplicate

Section 4: Access Performance Standards and Financial Summary

Metric	Fragmented System	Integrated Target	Best-in-Class
3rd next available appointment	> 21 days	< 7 days	< 5 days
New patient wait time	> 18 days	< 10 days	< 7 days
Referral appointment scheduled	< 45% same day	> 80% before patient leaves	100% before patient leaves
Imaging turnaround (routine)	> 14 days	< 7 days	< 5 days
In-network referral completion	< 55%	> 80%	> 90%
Out-migration rate	> 18%	< 8%	< 5%

Specialty	Fragmented Leakage	Avg Revenue per Lost Patient	Est. Annual Revenue at Risk (per MD FTE)
Orthopedics	29%	$47,000 / surgical case	**$380,000–$620,000**
Cardiology	32%	$112,000 / new patient cascade	**$540,000–$890,000**
Primary Care	18%	$10,200 / attributed MA life	**$180,000–$320,000**
Neurosurgery	35%	$45,000 / surgical case (avg)	**$420,000–$710,000**

PART TWO

Revenue Integrity Operational Design

End-to-End Workflow Standards, Lean Execution, and Financial Performance

Section 5: The Core Problem — Fragmentation Across the Financial Journey

Healthcare organizations today operate like a football team trying to win with a thicker playbook, more meetings, and analysts watching film from another city, yet the team keeps missing tackles on the field. Financial pressure from payer complexity, labor shortages, rising patient responsibility, declining reimbursement, fragmented workflows, and the shift to value-based care cannot be solved through remote theory alone. Sustainable success comes from boots-on-the-ground leadership, real-time operational visibility, shadowing frontline teams, and building collaborative solutions with the people actually running the plays every day.

Sustainable revenue integrity is not achieved by working harder. It is achieved by designing and executing an end-to-end operating model that aligns access, clinical delivery, documentation, coding, reimbursement, and collections with measurable standard work and Lean operational discipline.

The Data Integrity Gap

One of the most crippling challenges in healthcare today is not the lack of data, but the lack of trusted, real-time, actionable data integrity across the organization. Most healthcare systems are overwhelmed with fragmented reports, delayed information, disconnected workflows, and inconsistent definitions of success. The result is operational blindness, revenue leakage, physician frustration, denial growth, poor patient throughput, and reactive decision-making. Data without operational interpretation has little value. The true differentiator is transforming raw data into measurable operational intelligence that drives accountability and sustainable performance improvement. Data is only valuable if it explains why the outcome occurred, defines how to fix it, and continuously measures whether the intervention improved performance. Dashboards and PowerPoint visions alone do not create results any more than a scoreboard and a game plan win a championship. Teams win by executing fundamentals on the field, making adjustments in real time, and holding accountability through every quarter.

5.1 Structural Barriers That Repeat Across Every Organization

Failure Category	Common Manifestations	Financial Impact
Front-end workflow variation	Eligibility errors, registration failures, scheduling inaccuracy	Downstream non-payable claims before patient is seen
Authorization management	Authorization never obtained, expired, CPT mismatch, retro-auth gaps	23% of all denials (HFMA 2024)
Charge capture	Delayed or missed charge entry, unclear ownership, no reconciliation	Revenue leakage across every service line
Denial management	Unworked queues, aging accounts, reactive rather than root-cause	Increased write-offs, delayed cash flow
Physician compensation	Paid on billed rather than collectible wRVUs without clawback	Material overpayment exposure
Out-migration	Poor access, scheduling delays, no closed-loop referral management	Lost downstream procedures and attribution

Section 6: The Two Bookends Strategy

Revenue integrity must be evaluated through two definitive operational bookends that define the beginning and end of the financial journey. Everything between these bookends either completes the financial journey or breaks it.

Bookend One: Access and Scheduling

This is where demand is converted into opportunity. The first bookend includes:

- Accurate appointment scheduling and access optimization
- Insurance identification and filing order validation
- Real-time eligibility verification
- Authorization initiation and retro-auth capture for add-on procedures
- Patient estimate generation and pre-service collections
- Benefit routing validation
- Referral close-loop management — one of the most important yet overlooked operational functions in healthcare

Access Failures Compound Downstream

One delayed orthopedic MRI can result in the loss of an entire surgical case. One delayed cardiology appointment can eliminate imaging (SPECT, PET/CT), stress testing, catheterization, EP procedures, device implantation, vascular intervention, and downstream admissions. Out-of-network ED or urgent care without TCM triage creates outmigration and a gap in clinical integration. Efficient access is both a clinical and financial strategy.

Bookend Two: Gross Collections Confirmed

The second bookend confirms that the services and procedures delivered resulted in realized capture, both coding and reimbursement. This includes:

- Clean claim submission and code capture
- Coding validation and denial resolution
- Patient responsibility determination and point-of-service collections
- Payer reimbursement validation and contractual adjustment reconciliation
- Cash posting reconciliation and work queue accountability
- Gross collections net of contractual adjustment — payer plus patient

Section 7: Shadowing, Staff Empowerment, and Lean Transformation

One of the most overlooked drivers of operational transformation in healthcare is employee engagement and ownership. Organizations frequently attempt to redesign workflows from conference rooms without observing the actual operational reality experienced by frontline teams. Sustainable transformation requires leadership to go directly to the point of execution.

7.1 Boots-on-the-Ground Operational Observation

A Lean transformation approach requires direct observation across every workflow in the revenue cycle:

- Shadowing schedulers and sitting alongside registration teams
- Observing pre-certification and prior authorization workflows
- Reviewing coding and charge capture processes with clinical teams
- Walking clinic workflows with physicians, APPs, and CMAs
- Observing surgery scheduling and intraoperative authorization teams
- Reviewing denial workflows with RCM staff and identifying root-cause patterns
- Collaborating with pharmacy, DMEPOS, and inventory teams on charge reconciliation
- Evaluating patient throughput and handoff points between departments

During shadowing exercises, the workarounds that staff have created to compensate for broken systems become visible:

- Staff manually correcting eligibility errors that should not have occurred
- Schedulers using spreadsheets outside the EMR to track authorizations
- Delayed charge entry due to unclear ownership and no standard work
- Billing staff repeatedly fixing preventable front-end errors
- Clinical staff compensating for scheduling inaccuracies by re-entering data

> **The Most Important Leadership Principle in Operational Transformation**
> People support what they help build. When employees feel like architects of the operational redesign, accountability, collaboration, and sustainability improve significantly. The goal is not to impose workflows onto staff. The goal is to collaboratively design workflows with the people performing the work every day. That cultural alignment is what transforms workflow redesign from a short-term initiative into a durable operating model.

Section 8: Standardizing Front-End Execution

A high-performing healthcare operating model begins with disciplined front-end execution. Failures during access and pre-registration create downstream non-payable claims before the patient is even seen.

8.1 Pre-Service Collections

Patient financial responsibility has increased dramatically due to high-deductible health plans, coinsurance, Medicare Advantage cost-sharing, and commercial benefit redesign. The probability of collecting from patients decreases significantly once the patient leaves the office or hospital.

Collection Timing	Collection Rate	Operational Standard
Pre-service (before visit)	88%	Patient estimate generated; collected at scheduling
Point of service (day of visit)	72%	Collected at check-in; co-pay and deductible applied
Post-service 30 days	45%	Statement issued; patient contacted
Post-service 60 days	28%	Second statement; escalation
Post-service 90+ days	**15%**	Collection agency; bad debt risk

Source: MGMA DataDive Practice Operations 2024

8.2 Authorization Management: The Largest Preventable Denial Category

Authorization Denial Root Cause	Share of Auth Denials	Preventive Action
Authorization never obtained	34%	Pre-certification workflow at scheduling; no appointment without auth
CPT mismatch	22%	Coding review before submission; verify CPT against authorization
Expired authorization	18%	Auth expiration tracker; extend before date of service
Add-on procedure not retro-authorized	14%	Intraoperative notification protocol; retro-auth workflow
Site-of-service issue	8%	Auth must specify facility; validate before scheduling
Observation vs. inpatient status	4%	Utilization management review at admission

Source: HFMA Denials Management Survey 2024

8.3 Retroauthorization in Procedural Specialties

This issue is especially critical in procedural specialties where intraoperative findings change clinical decision-making. Without operational workflows that support rapid retroauthorization and coding coordination, organizations risk partial payment, full claim denial, and appeals delays.

- Cardiovascular: additional stent placement, atherectomy, thrombectomy, peripheral vascular intervention, additional EP mapping or ablation
- Orthopedics: additional meniscal repair, ligament reconstruction extensions, hardware removal, additional arthroscopic repair, biologic or graft utilization, additional spinal levels identified intraoperatively
- Neurosurgery and Spine: expanded fusion levels, instrumentation changes, additional decompression procedures, implant modifications

Section 9: Clinical Documentation and Code Capture

Many organizations incorrectly assume that all physician work is documented, coded, and appropriately reimbursed. Revenue leakage commonly occurs due to under-documentation of complexity, missing MEAT criteria, incorrect modifier use, bundled procedures, incident-to supervision failures, split/shared documentation deficiencies, global period violations, and lack of medical-necessity support.

9.1 Why Healthcare Claims Deny — Root Cause by Category

Denial Category	Common Root Causes	HFMA Industry Rate
Authorization	Missing authorization, expired auth, CPT mismatch, site-of-service	**23%**
Administrative	Registration errors, eligibility failures, payer sequencing, credentialing/NPI/taxonomy	19%
Coding	Modifier errors, bundled services, medical necessity failure, diagnosis mismatch	17%
Clinical documentation	Incomplete operative notes, missing signatures, insufficient medical necessity	15%
Timely filing	Claims aging in work queues, delayed charge review, unworked encounters	11%

Source: HFMA Revenue Cycle Benchmarking Survey 2024. High performers achieve denial rates roughly half the industry average through standardized front-end workflows.

9.2 The wRVU Compensation Challenge: Billed vs. Collectible

One of the least discussed financial risks in healthcare is the disconnect between billed wRVUs and collectible revenue. Many organizations compensate physicians based on billed wRVUs rather than adjudicated and collectible claims, creating substantial financial exposure.

Specialty	Billed wRVUs / FTE	Collectible wRVUs	Annual Gap	Overcomp. Exposure
Orthopedics	8,200	7,100	1,100 wRVUs	**$57K+**
Cardiology	9,100	7,800	1,300 wRVUs	**$68K+**
Primary Care	5,400	5,050	350 wRVUs	**$18K+**
Neurosurgery	7,600	6,400	1,200 wRVUs	**$62K+**

Source: MGMA Provider Compensation and Production Survey 2024. Assumes $52 per wRVU conversion factor for illustrative purposes.

Claims Reconciliation Best Practice

Organizations must reconcile CPT billed, CPT paid, contractual adjustments, patient responsibility, actual collections, and physician compensation on a monthly basis. Without reconciliation and clawback processes, organizations may overpay physicians for denied services, bundled procedures, global period violations, and incident-to failures. The goal is sustainable net revenue integrity, not simply productivity volume.

Section 10: High-Cost Therapies, Inventory, and Proactive Reconciliation

10.1 Managing Biologics, Injectables, and DMEPOS

Biologics, injectables, gels, specialty pharmaceuticals, and DMEPOS require specialized operational controls that most organizations do not have. Underbilling, missed charges, POS, and inventory loss in these categories represent significant preventable revenue leakage.

- Lean inventory workflows with barcode scanning and standardized purchasing
- NDC-to-charge mapping to ensure every administered drug generates a billable line item
- Authorization tracking tied to inventory, so drugs are not administered without a confirmed authorization
- Acquisition-to-payment reconciliation to identify underbilling and missed charges
- Reintroduce buy-and-bill versus vendor-supplied where applicable for Part B drugs and infusion services
- Daily inventory reconciliation matched against charges, claims, and payments

10.2 Proactive Reconciliation as a Core Operational Discipline

One of the defining characteristics of high-performing organizations is proactive reconciliation, confirming what was delivered, submitted, and paid for before the opportunity to correct is lost.

Reconciliation Area	Frequency	What Is Confirmed
Encounter-to-charge	Daily	Every service delivered has a corresponding charge submitted
Eligibility outcomes	Daily	Registration failures identified before claims are submitted
Authorization-to-claim	Daily	Every claim has a valid, current authorization
Denial root-cause review	Weekly	Denial patterns identified at the workflow level, not per claim
A/R aging and work queues	Weekly	Unworked encounters escalated before timely filing risk
Payer and patient collections	Monthly	Net collections compared to expected; variance investigated
Inventory-to-charge reconciliation	Monthly	Biologic and DMEPOS charges match acquisition and administration

Section 11: Value-Based Care and the Operational Integration Imperative

Value-based care changes what revenue integrity means. Traditional fee-for-service rewards volume. Value-based care rewards quality, risk capture, attribution retention, total cost management, preventive care, reduced utilization, and chronic disease management. This requires organizations to operationally integrate access optimization, patient acuity capture, SDoH capture and assistance, AWVs, chronic disease documentation, gap closure, referral management, leakage reduction, and care coordination into a single workflow.

VBC Operational Priority	If Neglected	If Executed Well
Access and scheduling	RAF declines, attribution shifts, ED utilization rises	Quality scores, HEDIS performance, patient retention improve
AWV completion	RAF anchor missed, HCC gaps widen, preventive care declines	Drives RAF recapture, quality closure, longitudinal engagement
Referral management	Duplicate testing, out-migration, care fragmentation	Reduced MLR, in-network revenue retained, attribution stable
Chronic disease documentation	Under-coded RAF, missed shared savings	Accurate risk adjustment, appropriate reimbursement
Care management (CCM/TCM)	High-risk patients unmonitored, avoidable ED and readmission	Recurring revenue, reduced utilization, attribution stability

Section 12: Measurable Outcomes and Closing Perspective

Organizations that adopt standardized workflows and Lean revenue-integrity principles consistently achieve measurable, repeatable financial improvements. These results are driven by operational design, not heroics.

Outcome Category	Industry Fragmented Performance	Best-in-Class Integrated Performance
Denial rate	8–12% of submitted claims	< 4% with standardized front-end workflows
Patient collection rate	< 30% post-service	88% when collected pre-service or at POS
Auth denial rate	23% of denials	< 10% with pre-certification and retro-auth workflows
Referral in-network completion	< 55%	> 85% with closed-loop scheduling standard
Encounter-to-charge lag	> 3 days average	< 24 hours with daily reconciliation
RAF capture (MA panels)	< 70% AWV completion	> 85% AWV with pre-visit QIP prep

The Closing Argument

Revenue integrity is not simply a billing function. It is an enterprise-wide operating discipline that spans access, scheduling, clinical delivery, documentation, coding, authorizations, collections, physician compensation, analytics, and value-based care performance. Healthcare organizations that succeed operationally do so by simplifying workflows, defining standard work, measuring performance, and correcting issues in real time. This is the operational transformation work that delivers financial stability, better patient experience, reduced provider burnout, and sustainable long-term growth.

RAF capture is not a financial exercise; it is a strategic clinical and operational framework designed to identify patients with the highest acuity, chronic disease burden, and social determinants risk so they can be proactively managed within an integrated care continuum. High-performing health systems use RAF analytics to ensure patients have timely access to primary care, specialty care, and an appropriate cadence of longitudinal visits that support concurrent and prospective management, reducing avoidable emergency department utilization, unnecessary readmissions, fragmentation, and outmigration. When coupled with well-designed Chronic Care Management (CCM), Transitional Care Management (TCM), and Transition of Care (TOC) programs, patients experience stronger continuity, engagement, and trust in the system, increasing both clinical stability and retention within the network. Outmigration is therefore not merely a revenue concern; it is a continuity-of-care failure that disrupts coordinated management, delays interventions, and weakens patient outcomes. Organizations that view RAF solely as a reimbursement metric miss the broader purpose. Assessing patient acuity alongside social determinants of health enables providers to integrate patients into a clinically aligned, team-based delivery model that reflects true best practices in value-based healthcare.

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