



- **Lessons on data quality:**
- **What health IT can learn**
- **from 5 peer industries**

The data consequences of the technological revolution

In the initial stages of the technological revolution, electronic information was exciting – no matter what industry was using it. The ability to digitize data and share it with colleagues around the world at lightning speed was unprecedented.

But over time, computerized data became too much of a good thing. While it was initially novel to share information across institutions, industries, and even countries, many sectors eventually hit a point where so much data was being shared so easily that it became nearly impossible for humans to process it in a timely fashion – or even at all.

Which begs the question: With all this data available at our fingertips, how do we effectively share important information with our colleagues without overloading them? What's more, how do we productively use and share data so that it aids in decision-making while also factoring in any potential risks stemming from imperfect or incomplete information?

In healthcare, it's a question that hasn't quite been answered.

Indeed, issues with interoperability, data quality, and risk management remain top-of-mind for many in the industry. But that doesn't mean there isn't a solution. On the contrary, health IT can benefit greatly by learning from other industries that have had success improving data quality for immediate and downstream uses.

From aerospace to the military, aviation, law enforcement, and national security, here's a look at five different industries that tackled a data quality dilemma – and what health IT can learn from their approaches.



Aerospace

Data quality challenge

Disconnected data – or information that was siloed across individual teams and systems – meant that NASA couldn't consolidate its wealth of knowledge among different departments to further inform and refine large-scale organizational goals.¹

How the challenge was addressed

In January 2021,² NASA outlined a new data strategy that focused on ensuring interoperability and minimizing data silos. While multi-pronged, the overarching emphasis of the plan involved a mindset shift within the organization. Referred to as a *one data* approach,³ this model allowed NASA to emphasize the importance of shifting away from a legacy *need-to-know* mindset that limited information exchange. Now, under a more structured, agency-wide data governance plan, a Chief Data Officer is responsible for cultivating a proactive attitude around data creation and sharing.^{2,3}

What healthcare can learn from the fix

The impact of a mindset shift. Instead of being reactive – generating data and then figuring out what to do with it – NASA's new strategy is much more proactive. Under the new approach, data is viewed as a critical part of infrastructure and data generation is more deliberate, consolidated, and accessible. This fosters greater trust in the accuracy and validity of NASA's information, increasing employee buy-in on the importance of proactively generating high-quality data that serves a purpose.

Healthcare could also benefit from reframing how it thinks about data collection. Currently, much of what's documented in EHRs is useful only for a single-purpose due to the influence of quality measures reporting tied to factors like revenue, fee-for-service billing, and defensive medicine. As a result, busy clinicians often copy and paste clinical notes from previous encounters or pre-existing templates so that all required data points are documented. However, these shortcuts can omit details about a patient's conditions, treatments, and outcomes, which limits the data's utility.

Rather than focus on single-purpose data collection, healthcare would benefit from a more holistic approach that considers the multitude of downstream uses of patient information. This would enable optimal use of high-impact and high-quality clinical data not only for patient care, but throughout the healthcare ecosystem.



The military

Data quality challenge

The US Army's legacy acquisition and modernization processes were unable to keep up with current threat levels and ensure soldiers' safety. The Army needed a better way of managing battlefield threats and maximizing the efficiency of medical evacuation and treatment of those on the front lines.⁴

How the challenge was addressed

The Army's Medical Modernization Plan⁵ responded to the Army's need to be more nimble and adaptable on the battlefield. Realizing the value of interoperability and communication, the Army developed a universal digital medical record for soldiers and others on the front lines. This strategy mandated the use of common data standards, message formats, and clinical terminologies throughout the organization – from on the ground responders to administrative staff working on the other side of the globe.⁶

What healthcare can learn from the fix

Data is only valuable if it can be used, and the key to usability is understanding the message it communicates. Much like in healthcare, when Army data wasn't normalized to a common, clinical terminology, it became less and less useful – or meaningful – the farther it traveled from the initial source.

The Army's focus on a universal digital medical record highlighted the importance of ensuring that data was readable and actionable for all – from the provider at the point of the incident to the administrator who may need to facilitate a medical evacuation. But in the US healthcare system, sharing a message through data exchange standards such as HL7, C-CDA, FHIR, and OMOP* is only the beginning. The next step requires ensuring that the language and content in those messages and models is useful – that they contain accurate descriptions of patient conditions, treatments, and outcomes; are meaningful to both clinicians and patients; and support machine readability.

As a growing number of industry stakeholders – including patients, providers, and payers – require access to medical information, the importance of a universally understandable language cannot be underestimated.

*Health Level 7, Consolidated-Clinical Document Architecture, Fast Healthcare Interoperability Resources, Observational Medical Outcomes Partnership



Aviation

Data quality challenge

The airline industry has historically been one of the most complex systems ever created by humans. But when airplanes began to generate terabytes upon terabytes of data with every flight, the ability to proactively access the information in a way that allowed for real-time feedback and improvements lagged behind.⁷

How the challenge was addressed

With Order 1375.1F,⁸ the Federal Aviation Administration (FAA) established overarching standards for all FAA data. The order also created the position of Chief Data Officer, a Chief Data Office, and an Enterprise Information Management Steering Committee (EIMSC). Together, these stakeholders are responsible for managing data as a strategic asset. The EIMSC, specifically, is designed to be a cross-organizational group led by executives who can provide strategic decision-making authority throughout the FAA and the aviation industry as a whole.⁸

What healthcare can learn from the fix

The importance of data governance. The airline industry is one of the best examples of an entire sector cooperating on data standards to improve customer service and reduce operating costs, all while remaining competitive. And, not unlike the healthcare industry, airline data is aggregated from a myriad of sources and systems. With multiple companies and a variety of different aircraft models generating so much information, a strategic plan for centralizing and managing this material is key. Creating defined and specific roles that serve a cross-functional purpose also helps ensure data collection is deliberate and useful.

With this in mind, consider the problem list. What was intended to be the front page of the EHR too often becomes a jumbled collection of duplicative, redundant, or irrelevant entries. But ad hoc problem list cleanup isn't enough to address these issues. A detailed governance strategy is essential. Much like the FAA created clear roles and responsibilities for those in charge of data management, outlining a plan that assigns responsibility for problem list governance and maintenance can help make patient information more accurate and useful at the point of care and beyond.



Federal law enforcement

Data quality challenge

The Federal Bureau of Investigation (FBI) started collecting national statistics about crime starting in the 1920s. However, with today's rapidly changing technology its legacy Summary Reporting System (SRS)⁹ didn't provide specific enough information to generate actionable statistics for law enforcement to act upon.

How the challenge was addressed

The FBI transitioned from the SRS to the NIBRS,¹⁰ or National Incident-Based Reporting System, in 2021. The legacy system consisted of surveys with general questions, resulting in a lack of specificity in data and consequently limiting the actionable value of crime reporting on a national level. The NIBRS' goal was to address the SRS' lack of relevant details about crimes by replacing the old surveys. Switching to the new model meant more questions were asked, and more specific information would be collected and submitted to the national database.

What healthcare can learn from the fix

The value of specificity in data collection. The data collection strategy in law enforcement is fundamentally motivated by the ability to understand and mitigate risk – that is, to solve crimes that happened and to use that data to predict crimes that *might* happen. To achieve this goal, the data from SRS surveys was ultimately too general to be useful. The NIBRS changed that with its more comprehensive survey.

The data collection strategy in healthcare should also be more focused on understanding and minimizing risks – in this case, to a patient's health. But leveraging detailed, actionable information gleaned from the EHR means starting with the deliberate and purposeful collection of specific data at the point of care.

Today, risk management goals are often obscured by the need to generate revenue; defend against malpractice; support the memory of the caregiver; and communicate to other caregivers. An industry-wide emphasis on documenting relevant and actionable patient data with greater specificity can help shift the focus away from competing risks and back to optimal patient care.



National intelligence

Data quality challenge

National security agencies are adept at gathering intelligence. However, in the wake of 9/11, and again after the Iraq War, these organizations needed a better way to communicate confidence levels in their intelligence data.

How the challenge was addressed

The intelligence sector underwent a massive overhaul and developed a framework for communicating relative certainty in the data they gathered. In 2015, Intelligence Community Directive 203¹¹ was updated, requiring all intelligence agency reports to implement and exhibit specific analytic standards. This framework emphasizes assessing the credibility of information and its sources; acknowledging any uncertainties about the insights gleaned from data; and incorporating an analysis of possible alternative options before making a high-stakes decision.

What healthcare can learn from the fix

The value of incorporating formal decision science strategies into data-based decision-making. Just like physicians, those making tough choices in the national intelligence community rarely have all the information they need. But difficult decisions must be made despite the uncertainty. The key difference? In healthcare, the art of decision science is not a routine part of training.

By contrast, in the absence of precise, high-quality data the national intelligence community has not only embraced the teaching of decision science, but also has adopted a framework of principles to help reduce the risk and uncertainty faced when making decisions based on data that is, quite often, less than perfect.

Healthcare can learn from this model by incorporating decision strategy into clinical training as early as possible – even in medical school. However, exposing providers to this sort of framework and education *at any point in their career* can help them integrate a more formal, strategic, and standardized approach to assessing data quality during the decision-making process – a win for patients and providers alike.



Lessons learned

When it comes to ensuring data quality, healthcare is not the only industry facing obstacles. A wide range of organizations that work in high-risk situations continue to grapple with the question of how to collect, process, and use data more effectively.

And although data management is not a one size fits all endeavor, the high cost of low-quality data is a common thread throughout the industries mentioned. What's more, there are overarching themes – like the value of a proactive data governance plan, the benefit of specific, granular information, and the impact of changing limiting mindsets – that can help pave the path toward generating high-quality, useable information.

To learn more about IMO's approach to enhancing data quality, visit imohealth.com/imo-precision-normalize.



About Intelligent Medical Objects

Intelligent Medical Objects is a healthcare data enablement company that ensures clinical data integrity and quality — making patient information fit-for-purpose across the healthcare ecosystem, from hospitals to health information exchanges to payers, and beyond.

IMO's vast footprint in EHRs powers our ability to capture and preserve clinical intent at the highest level of specificity. Our secure technology platform and products then help our clients to transform and extract the greatest value from their data. In short, IMO is the catalyst that enables accurate documentation, precise population cohorting, optimized reimbursements, robust analytics, and better care decisions to optimize patient outcomes.

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⁹Uniform Crime Reporting System (UCR). Department of Justice, Federal Bureau of Investigation. Accessed via: <https://health.gov/healthypeople/objectives-and-data/data-sources-and-methods/data-sources/uniform-crime-reporting-system-ucr#:~:text=The%20UCR%20Program%20consists%20of,the%20Hate%20Crime%20Statistics%20Program>

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¹¹Analytic Standards. Intelligence Community Directive 203. 2 Jan 2015. Accessed via: <https://www.dni.gov/files/documents/ICD/ICD%20203%20Analytic%20Standards.pdf>

