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WHITE PAPER

Health Information Integration: Using Gap Analysis to Develop Relevant Solutions

Table of contents

Introduction

This third and final paper in our series on health information integration discusses how a thorough gap analysis contributes to development of creative and relevant solutions. The first paper, “An Introduction to Health Information Integration,” described the need for a method to manage the many variables involved in developing interoperable healthcare systems and highlighted CGI’s Health Information Integration Framework (HIIF) as such a method. The second paper, “Health Information Integration: Assessing the Need for Integration,” determined that an assessment enables an organization to identify the benefits of an integrated solution, validate organizational readiness to create and implement a solution, pinpoint the likely challenges, and gather evidence to support the solution.

Closing the gap to greater interoperability

An integrated health solution needs to be approached in stages. Many organizations have made progress with the standardized collection, storage, transmission and display of information. They make use of a portion of available patient health information sources via a number of useful system components, applications and standards. These include data sources such as repositories and data warehouses, system components such as health information exchanges, applications such as hospital information systems and EMRs, and standards such as HL7.

These first few stages of interoperability have laid important groundwork and provide benefits to health organizations worldwide. However, the next level of interoperability desired by many of these organizations requires closer alignment with patient and provider needs.

Right now, bringing together disparate pieces of a patient’s health record for use in clinical or business functions relies on humans to search multiple paper and electronic databases using various interfaces, dissimilar processes and multiple search techniques. Future interoperability efforts are now aimed at simplifying this search.

Aligning with patient and provider needs

As a patient deals with a health concern that relies on the services of multiple providers and entities for a variety of encounters, the patient and his or her providers need to be able to access immediate, chronological and relevant information. Such a string of encounters could happen in the course of a few hours, over the course of 18 months or over a period of years.

Access and use of information in this string of encounters allows virtual teamwork and care coordination. Providers want to be presented with a relevant starting point of patient health information that can be modified and adapted as a patient encounter progresses. This information access also prevents patients from having to repeat themselves or risk forgetting to tell subsequent providers an important piece of information from a previous encounter. The information follows the patient as a silent but powerful advocate.

The needs of providers other than clinicians are also being considered in integrated health solutions. Administrators, payers, funders, quality managers, researchers and risk managers have a need for up-to-date information about patients, their encounters with the health system and the care they receive. This information is essential for a health organization to run efficiently and effectively. Everything from back-office business functions to program evaluation data stands to improve the way healthcare is organized and delivered.

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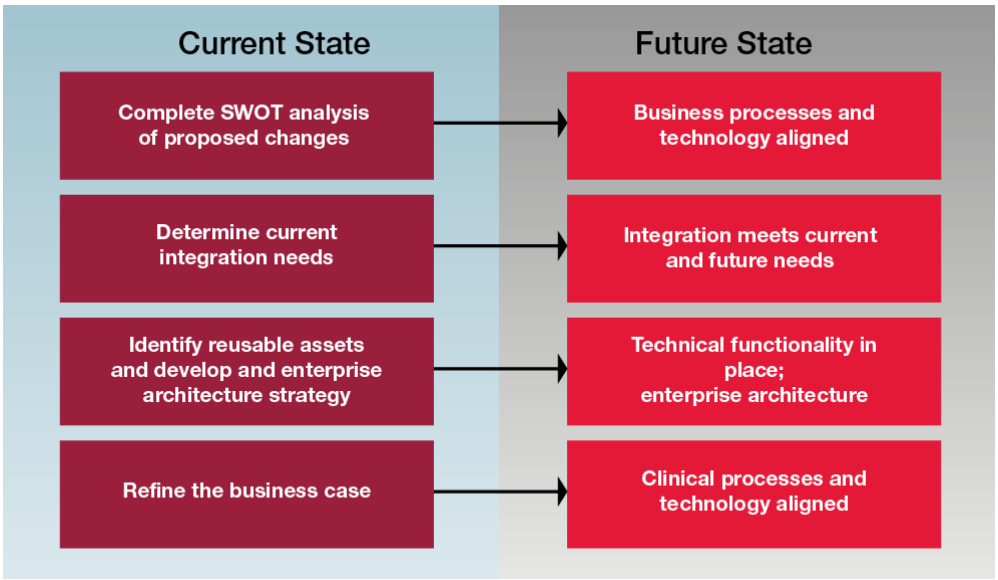
Using assessment results to identify gaps

The ability to implement a successful health integration solution requires an organization to know where it is now and understand the gaps between its current state and its desired future state. The assessment of an organization's current state was examined in the second white paper in this series. Business case, organizational readiness, business process and technology assessments were recommended prior to undertaking a health information integration initiative. Using the results of those assessments in the following planning activities will help an organization identify gaps between current and future realities:

1. Complete a SWOT analysis of proposed changes
2. Determine current integration needs
3. Confirm current enterprise architecture strategy: reusable assets versus new technology required
4. Refine the business case.



COMPLETE A SWOT ANALYSIS OF PROPOSED CHANGES

A key area for integration solution planning is to contrast the needs identified in the assessment phase and determine how well aligned the current integration initiative is to provider and patient needs. Patients and providers rely on specific administrative and clinical processes to be carried out as care is provided; these processes need to be aligned with proposed technology inputs and expected technology functionality. Table 1 provides a sample SWOT analysis of the proposed changes. SWOT analysis can help to illuminate any gaps between technology proposed and the business it is trying to serve.

Table 1: Solution SWOT analysis

Provider Needs	Patient Needs	Proposed Technology	Proposed Business and Clinical Processes	
				Strengths
Contrast provider and patient nees with the current integration initiative →				Weaknesses
				Opportunities
				Threats

DETERMINE CURRENT INTEGRATION NEEDS

A common conundrum is often encountered by individuals participating in this stage of solution planning. Those involved in providing technological integration components tend to focus on the technologies available, sometimes allowing technologies to overshadow clinical and business needs. Those involved in assessing the fit of technology to clinical and business needs tend to rule out nearly all available technologies as unsuitable. This stalemate can have disastrous results. Great technologies can be deployed but not used, or implementations can be put on hold indefinitely because, "Nothing can possibly suit the unique clinical needs identified."

A sound knowledge of the health organization's clinical needs, business needs, enterprise architecture and available technologies is essential as clinical and technological agendas are sorted out. According to enterprise and solution architects, one of the most important aspects to examine when identifying current integration needs is to thoroughly examine enterprise architecture.

Typically, organizations either do not have or do not see the requirements, or they make their focus too narrow. This begs the question: "How can you do a gap analysis if you don't have an idea of the future state, and how can you have an idea of the future state without a solid enterprise structure?" Health organizations need to know their current integration needs and be able to explicitly convey them to a variety of stakeholders.

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CONFIRM ENTERPRISE ARCHITECTURE STRATEGY: REUSABLE ASSETS VS. NEW TECHNOLOGY

From a technological standpoint, identifying any gaps in available reusable and potential new technological assets is an important activity at this stage of the initiative. Organizations need to establish whether existing assets have been designed well enough to be reusable in meeting the needs of the health organization's future state enterprise architecture blueprint.

This analysis can identify risks in both reusing and not reusing assets. It is important to determine if reusable assets meet integration needs and whether these assets will continue to be compatible with the future state enterprise architecture. Reuse of assets that simply delay the need for inevitable replacement and put the integrated solution implementation and deployment at risk is never a wise choice. On the other hand, functionality gained in the short term by reuse of assets deemed unviable in the future may be worth the risk of rework if the short-term gains assist the organization to "buy time" or fill an interim gap that facilitates timely implementation and deployment of the integrated solution.

Another important aspect when looking at technological gaps is to determine whether new infrastructure or software investment is required. When this investment is required as part of the integrated solution, the decision to purchase is relatively easy. The organization only needs to ensure the new investment fits the organization's future state enterprise architecture blueprint and is a feasible means of meeting the organization's integration needs.

Special considerations when an integrated solution is also being developed

When a new direction for future state architecture is being envisioned at or near the same time as an integrated solution is being developed, it is important to consider the impact that each has on the other. Organizations have business and IT ecosystems comprised of sophisticated components carrying out complex interactions. The organization needs to ensure its integration technologies and infrastructure meet the future state enterprise architecture blueprint at the same time they meet current integration needs. Additionally, health organizations need to document any enterprise architecture gaps or concerns identified.

This important information will need to be considered by the business sponsor:

- Are there gaps and/or concerns with either side of the equation?
- Are they significant?
- Can they be overcome?
- What are the costs associated with remedying the situation?
- And, finally, is the timing of the integration initiative right?

These are only a few of the questions that need to be asked when looking for gaps in technology.

According to enterprise and solution architects, one of the most difficult tasks in developing a solution that meets all of the organization's needs is interoperability. Because an infrastructure is built over time, sometimes without any thought to architecture, architects often encounter a "mish-mash" of components and capabilities that must be sorted through, analyzed and aligned with current integration initiatives. Date formats, data tables and check boxes may seem trivial; however, they can create monumental tasks when trying to merge systems. An inaccurate or incomplete gap analysis at this point in the planning process can pose a huge hurdle from a technological standpoint.

Tough discussions, conscientious trade-offs, and expert decisions are the hallmarks of a great technological gap analysis and can clear the path for successful integration.

REFINE THE BUSINESS CASE

As described in our second white paper, a well-designed business case needs to include:

- Rationale for pursuing the envisioned future state
- Fiscal and resource constraints within which the initiative must be pursued, including a cost-benefit analysis
- Business requirements that must be met
- Risks and associated mitigations involved in pursuing the integration initiative.

The organization can review the inherent details and components of the business case to determine if any gaps exist following the SWOT, integration and enterprise architecture analyses described above. Additional information gained in these analyses can shed new light on the proposed integration initiative. Organizations may discover new assumptions, requirements, benefits, costs, risks and considerations and take steps to deal with them in a revised business case.

In the revised business case, the relative cost and importance of the integration initiative can be reaffirmed. Or, alternatively, disinvestment in an initiative may be necessary; this can be just as positive as making a decision to proceed. Excellent reasons for disinvestment can be discovered when conditions such as these prevail:

- Technology is unavailable to meet business requirements
- Business requirements are unclear
- Business requirements are not aligned with strategic priorities
- Business infrastructure is unable to support new business processes or functions
- IT infrastructure is unable to support new business functions

Sometimes, integration initiatives are simply ahead of their time; for example, repositories or jurisdictional health information exchanges are not mature enough to support the required functionality. However, if all the conditions are right, the health organization can move into developing an integrated solution.

Forming a plan

Creating a solution requires a solid foundation and an in-depth understanding of management and IT best practices, governance and organizational change management. Without these foundational elements, solutions will lack alignment, relevance and usability. A full discussion of these foundational elements is not possible in one paper. However, a synopsis of what to watch for as organizations are developing a solution is included as a guide to ensure the following elements are considered and to stimulate discussion at this stage of planning.

BEST PRACTICES

Best practices are the industry standards that ensure an integrated solution is designed and developed in the most effective and efficient manner and that the end product is feasible, appropriate and functional.

Evaluation strategies

Simply put, health organizations need to know that any integrated solution realizes the benefits anticipated as a result of its implementation. Evaluation strategies ensure that organizations decide how they will measure these benefits and then set out to do so in a methodical way. Early development of evaluation strategies for integration solution initiatives is important. If the business case has clear and definable targets, evaluation strategies can be built to assess the solution as it is developed and deployed.

As noted in the second white paper in this series, organizations often fail to evaluate their integration initiatives. This prevents them from learning valuable lessons and sharing those with others attempting to harness the same integration benefits.

Business process redesign

In order to prevent the design and implementation of an excellent software application that no one uses, it is important to consider how clinical and business processes are currently performed and how they will be carried out using an integrated information system. Expertise in collecting, analyzing and interpreting the results of business process analysis exercises is essential when implementing an integrated information system. Careful redesign of business processes will ensure that outcomes of an integrated information solution produce value in not only process improvements but also business strategy and technical infrastructure.

Business analysis, project management and quality management

Ensuring that appropriate building blocks are in place is important in planning for a successful integration initiative. Effective business analysis will provide accurate business requirements from which to build an integrated solution. Project management discipline will provide the coordination, communication and structure required to align business objectives among a variety of stakeholders. Quality management processes will ensure that the integrated solution meets appropriate quality benchmarks from its inception to its delivery. These foundational best practices should never be overlooked; they are just good business.

Clinical or care pathways, clinical practice guidelines

Standardized pathways or guidelines may be in place in clinical programs and services; it is important that any integrated solution include these evidence based tools. An integrated solution may even be the impetus to further align and refine clinical pathways and guidelines.

Enterprise architecture management and service oriented architecture

Employing enterprise architecture management best practices is more a requirement than an option; it is important to be both stubborn and persistent in expounding the principles and benefits of architecture as a best practice. However, occasionally there may be a recognized need for a short-term solution that does not “play by the rules.”

The field of enterprise architecture is constantly changing. For the most part you have to minimize the number of technologies and platforms—a standard network of technology is simply more cost effective. Today, however, it doesn't matter what language the application is written in; the ability to integrate and share application data is what matters.

Service oriented architecture (SOA) means different things to different people. The key is to start at the business level and treat each business as a service. Applications can be developed with a top-down approach to provide solutions for each business service. In the end, you have to consider trade-offs, costs, benefits, timing and risk.

GOVERNANCE

Providing a comprehensive, integrated view of patient information is not enough to ensure the benefits of sharing that information are realized. Strong governance is required to ensure that decisions regarding the integrated solution are made in a consistent manner, then communicated, implemented, monitored and evaluated. Negative outcomes can occur if end users are given additional patient information without first considering the effect on the patient and, second, the needs of the clinician or administrator serving the patient.

Consider the providers that suddenly start receiving lab value alert messages related to patients seen in a hospital setting as part of routine weekday and weekend coverage. The patient is admitted under one physician, sees a second physician at the hospital on the weekend, and receives medical care from a third physician in the community. Who should be responsible for responding to the alert?

Those involved in governance hold the responsibility for anticipating possible problems with sharing health information. Health organizations need to deal with unanticipated problems that could arise during implementation of an integrated solution. Determining access to and accuracy of data sources in an integrated solution is an important governance function. Further, governance takes into account how the integrated solution affects the quality and accuracy of the source data it is using, who is responsible for data sources and how information is published, distributed, reviewed and pushed to an integrated solution.

A healthcare organization that has planned and established good program and data governance in preparation for deployment of an integrated solution should be able to answer the following questions:

- Who is funding and implementing the integrated solution?
- Who monitors how the solution is working on an ongoing basis? Who evaluates its effectiveness? Who maintains and improves it?
- Have all stakeholders been engaged in decision-making, development and implementation planning?
- Have feedback mechanisms been developed for stakeholders to contribute to ongoing solution improvement?
- Has the impact of other currently planned technological, care coordination and system access initiatives on the integrated solution been considered? What about the reverse?
- Has knowledge transfer to operational stakeholders and governance structures been set up for steady state operations?
- Who are the data "owners"? What processes and mechanisms exist to support decisions regarding data access and use?
- Have new stakeholder responsibilities emerged due to the enhanced information sharing offered by the integrated solution?
- What organization or system will be the "source of truth"? Who is responsible for data integrity?

ORGANIZATIONAL CHANGE MANAGEMENT

Considerable time and attention is required to review potential gaps in the organization's strategies concerning people and processes. If the requisite time and attention is not provided, the integrated solution being developed could have serious holes in its design and structure. Ensuring that the current and proposed business and clinical processes are understood is essential to a successful implementation and deployment strategy. The people involved in using and maintaining the integrated solution must be aware of its benefits and adequately prepared through communication, training and practice to truly realize the intended benefits.

Organizations must assess the gaps in these areas in order to plan to address them. The following questions provide a starting point to move from the assessment phase of the HIIF to creating a solution:

- Do all stakeholders understand the need for developing and implementing an integrated solution?
- Have all stakeholder groups been provided an opportunity to contribute to the design and development of the integrated solution?
- Have business and clinical processes been assessed within the context of the new integrated solution?
- Are current business processes standardized and mature?
- How will the organization drive access and adoption?
- What is required to ensure success for all involved?

Creating a solution

Creating a solution moves health organizations from ideal and theoretical discussions into real, tangible solution design and implementation. This is where creativity, compromise, self-awareness and expertise need to be employed and drawn upon.

Solutions need to be considered as more than just technology. Often, a project is built around a solution that is represented as a commercial off-the-shelf (COTS) product or a locally developed application. Rather than limiting their definition of an integration initiative to the technology that is going to connect sources of data together, healthcare organizations need to view a solution as a holistic answer to a current problem or opportunity they are facing in their clinical and/or business worlds. The solution needs to include people, processes and technology in equal parts.

Creating a solution is an individualized process using information gained in the key planning areas of SWOT analysis, current integration needs, current enterprise architecture strategy and refined business case, as described above.

Solutions will vary from one organization and jurisdiction to another. If we were to build two houses, one close to a beach and the other at the top of a mountain, we would not expect the houses to be built in the same manner or to have the same features and functions. Yet each house would have certain attributes that make it a house. In the same way, we cannot expect integrated health solutions to be cookie-cutter versions of each other.

A solution in one organization may have similarities to another organization and be supported by similar standards and best practices. However, key differences in business functions, processes, governance, funding mechanisms, strategic priorities and patient needs will make each solution unique. For this reason, it is not possible to give an overview of what a perfect or best solution looks like. Instead, the information gained in the gap analyses activities and the foundational elements identified earlier must be used to create a dynamic, useful solution. Parallel short- and long-term processes must be considered and employed simultaneously.

Short-term processes ensure current integration functionality is designed, developed, implemented and deployed as per the organization's requirements while long-term processes ensure the envisioned enterprise architecture foundation is aligned with the organization's vision and supports its strategic and operational plans. If the "big picture" is considered by all involved at each step of the way, an effective "house" can be built and used by all stakeholders.

Taking integration to the next level

We have presented the key activities to undertake in the gap analysis, identified foundational elements required for successful solution creation and brought those activities and elements together to illustrate how health organizations can use them to create unique solutions. But to what should health organizations really pay attention? Key to developing a good solution is a thorough understanding of the needs of the stakeholders involved. Central to these are the patient and provider; however, administrators, payers, policy makers, funders and delivery agencies also have business needs that must be met and business processes that must be evaluated and understood within the context of the proposed integration initiative. The key planning aspects below need to be considered when designing an advanced integrated solution.

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FACILITATE CLOSE PLANNING COLLABORATION AMONG IT, CLINICAL AND BUSINESS RESOURCES

The goal of creating a solution may be to meet administrator, provider and patient needs related to information sharing. However, the current capability and maturity of available technological components in connecting data from disparate IT systems may only partially meet these goals. In these cases, the trade-offs between the groups need to be explicitly stated and agreed-upon.

ESTABLISH PROVIDER INFORMATION NEEDS

Different providers have different information needs. Different events require different kinds of information (e.g., ER visit vs. annual checkup). The following requirements need to be determined when creating a solution:

- The kind of information required and relevant to the business or clinical process
- The core information that should be visible to users at all times as well as the criterion used to determine core information displayed
- The need for ad hoc information to be retrieved
- The acceptable amount of time required to look up patient information
- The need for links to historical patient data
- Information required for teams to collaborate virtually
- Inclusion of critical care information such as allergies, advanced care directives and specialized treatments, medications and care instructions
- Decision support tools that rely on multiple data points from integrated data sources

CONSIDER HOW THE SOLUTION AFFECTS RELATIONSHIPS

Patient – Provider

The possibility of providing patients access to their personal health information through a patient health portal is a future state that is easily supported by an integrated solution. However, the design and implementation of a project to grant patient access to personal health information requires careful planning to ensure that related health system impacts are anticipated and controlled. This includes addressing challenges related to patient and provider actual and perceived concerns regarding changing relationships. Both patients and providers may perceive and/or experience risk related to changes in roles and responsibilities. A complicated matrix of new workflows will become evident; these workflows need to reflect a multitude of patient ages and levels of wellness/illness, provider specialties and work environments as well as location and the types of services being offered.

Provider – Provider

When information is shared in new ways, there can be unanticipated consequences. These include both positive and negative consequences. Careful attention to the type of information required by all involved stakeholders and the upstream and downstream impacts of associated processes is important. For example, an administrator that is seeking to gain new patient data related to hospital discharge procedures to assist in reporting to national databases may require data points that are not currently provided as a by-product of the organization's clinical or business processes. If the new information requires changes to a clinical workflow for inclusion of these data points, it can create additional work for frontline staff. If this additional work occurs in a workflow that occurs tens or hundreds of times during a single day, the impact can be significant.

System – Patient

Patients are often unaware of how their health information is shared or accessed. While most patients note more sharing to be a good thing, there are, again, possible unanticipated consequences with integrated solutions. Consider the patient with multiple health concerns who does not want certain details regarding his or her health history shared with all providers. If the information in question is not required to provide safe, effective care, how can the patient tailor the information to meet his or her own personal privacy standards?

System – Provider

How information is used by an organization for purposes beyond patient encounters can both provide benefits and create concerns for all involved. While business intelligence, analytics and other secondary data processing can provide significant advantages to health organizations, they can also represent sources of risk if they are used out of context or in isolation without fully considering the complexity of the health system.

Ultimately, the solution developed needs to respect local best practices and cultures. However, by keeping the future state in mind, setting up a business case, integrating good governance practices and fostering organizational change, theoretical examples can be converted into very real solutions that are based on more than just technology.

Next steps

This white paper series was designed to provide a business-oriented introduction to integrating health information and serve as a guide when considering implementation of an integrated health information system. We have presented and discussed a number of factors that are critical when analyzing the gap between the current and future state of an integrated information system. For further information on integrated solution best practices, implementation and deployment considerations and achieving a steady state, contact CGI at HealthIT@cgi.com.

cgi.com/health

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