Accountable Care Organizations: Core IT Capabilities Defined

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INTRODUCTION

There is a nationwide effort to improve healthcare quality and control costs. New models of Fee-For-Value are driving change, with Accountable Care Organizations (ACOs) as the most recognizable. ACOs necessitate health IT enabled coordination and collaboration. These technology enablers are helping providers move from siloed-care to team-based coordinated care in this new ACO paradigm.

The definition of the technology capabilities needed for a successful a successful ACO is usually driven by the originator, an example being one who is offering a technology, defining a pilot program, or creating a new value based program definition. The result is often a confusing morass of terms and ideas, leaving the information technology (IT) professional without a simple shopping list of minimum functions needed. Whether you have been asked to write a Request for Proposal (RFP), talk to partners, or sell an idea to your Board of Directors, it is critical to understand the key IT capabilities needed to move an organization from volume to value.

Contained in this document is a starter kit of IT capabilities needed and employed in an ACO. As ACOs grow and mature over time, so will the understanding of IT enablers and thus this list.

To join the ACO task force and continue development of the capability framework, contact: Shelley Price, HIMSS at sprice@himss.org.

ENABLING TECHNOLOGY	DESCRIPTION/FUNCTION
ACO CORE CAPABILITY: INFRASTRUCTURE	
CAPABILITY DEFINED Whether from best-of-breed approach or organic growth when selecting healthcare technology solutions, IT infrastructure in an ACO requires the IT department to support a variety of applications with hundreds of interfaces from multiple vendors, making it a major challenge to normalize data across systems and view information in a timely way. In order to leverage data to facilitate a fully functioning ACO, key information capture and exchange components must be incorporated. From there the infrastructure and architecture can support a strategic approach to interoperability – moving from a tactical integration engine to a more robust strategic informatics platform.	
DATA ACQUISITION, INTEGRATION & EXCHANGE	
Health Information Exchange (HIE)	HIE is the electronic movement of health-related information among organizations with the goal of facilitating the access to and retrieval of clinical data to provide safer, timelier, efficient, effective, equitable, patient-centered care. HIE facilitates the electronic movement of clinical information between disparate health care information systems while maintaining the meaning of the information being exchanged. HIE services can enable care coordination and provide a view of each patient's longitudinal record, as well as support handoffs such as referrals and care transitions. Potentially, HIE functionality could expand significantly in the ACO setting. For example, if an HIE entity provides centralized data repository, data from the repository could be streamed into a data warehouse. In addition, HIE services could potentially support analytics (e.g., providing an ACO dashboard) and workflow transactions (e.g., transmission of care plans to all providers). HIE entities can also play a role in patient engagement. If a data repository that captures patient-centric information across various providers is part of an HIE's product suite, a patient could be provided access via a portal application. Depending on the functional capability of the repository, patients could potentially use the HIE service to access and forward specific information to selected providers.
IDENTITY MANAGEMENT	
Enterprise Master Patient Index (eMPI)	An eMPI is a series of Master Patient Indexes (MPIs) which link several smaller organization-level MPIs together. Master Patient Indexes reference all patients known to an area, enterprise, or organization. An eMPI cross-references patient identifiers across multiple information systems of an ACO to uniquely identify each patient, perform global patient searches and matching, consolidate duplicate patient records, and construct complete views of patient information. Probabilistic matching (for example, the use of DOB, SSN, last name, etc.) is often used to make a positive match between patients in two systems when unambiguous identifiers are not available. Because ACOs must track patients carefully across a number of care settings and providers, an eMPI solution is an important component of

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	their IT infrastructure. **Note: Information specific to the assignment and use of patient identifiers:** If a state implements the assignment and use of a patient identifier, it could potentially become the primary identifier and the ACO identifier would be secondary, or tertiary.
Record Locator Service (RLS)	An RLS determines what records exist for a patient where the source data is located. The service includes these distinct functions: • Manage participating provider identities • Maintain and publish a patient index • Look up patient record locations (but not the records themselves) • Communicate securely and maintain an audit log • Manage patient consent to record sharing (under state laws and ARRA)
ACO CORE CAPABILITY: COLLABORATIVE CARE MANAGEMENT & COORDINATION	
CAPABILITY DEFINED Care management spans preventive care, wellness activities, chronic disease management, care coordination, and transitions of care. It is a set of evidence-based, integrated clinical care activities that are tailored to the individual patient, and ensures that each patient has his or her own coordinated plan of care and services. The care plan, which is developed collaboratively by the patient and care providers, is designed and implemented to optimize the patient's health status and quality of life. In an ACO setting, a team based health care delivery model led by a physician, physician assistant, or nurse practitioner provides comprehensive and continuous medical care to patients with the goal of obtaining maximized health outcomes. Care coordination is the deliberate organization of patient care activities between two or more participants (including the patient) involved in a patient's care to facilitate the appropriate delivery of health care services. Organizing care involves the marshaling of personnel and other resources needed to carry out all required patient care activities, and is often managed by the exchange of information. The primary goal of care coordination is to monitor, over time, the active care and treatment plan for patients and to take necessary steps to ensure that the plan is completed successfully. Health Information Technology (HIT) can greatly increase the likelihood of success. Key process points can be defined and programmed to remind care managers about crucial tasks. HIT functions can be adapted to help prioritize tasks by (1) identifying crucial elements that should be shared by members of the primary-care team, (2) ensuring that relevant information is delivered to the correct team members in the appropriate format, and (3) reminding clinicians about uncompleted tasks. To start the process, HIT using filtering and prioritized data flow, must identify all patients under care management and the state of their current treatment plans and goals.	
Enterprise EHR	A common electronic health record (EHR) in which all the patient experiences and information are integrated and supported by a common set of tools.

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Community Data Warehouse	Data warehouse that captures patient-centric longitudinal data fed by clinical systems (EHRs, lab information systems, PACS, etc.). It can be used to support quality reporting, care management, care coordination, and other ACO requirements. Robust longitudinal data repositories will likely be necessary for care coordination, analytics, and quality and financial tracking.
Member Registry	Timely and accurate dissemination of patient enrollment data is an important capability for ACOs. Meaningful ACO performance tracking will depend on such features as the ability to accurately track stop/start dates in real time. It may be possible to adapt EMPI products currently on the market to hold registry indexes and fields.
Patient Registry	Patient registries keep track of what has been done for patients and what services they need. ACOs use registries for health risk stratification, care gap identification, quality reporting, and other purposes. An essential tool for automating population heath management, these registries can be used for patient monitoring, patient outreach, point-of-care reminders, and care management. A registry can be broken down by patient age, gender, health condition, health risk category, lab values within certain ranges, or other parameters. It can be used to generate reports on subpopulations, such as out-of-control diabetic patients, or to supply care alerts about particular patients to providers and care managers. When clinical protocols are applied to registry data, they can trigger automated text, email, or phone messages to patients who need preventive or chronic care services.
Clinical Data Repository (CDR)	A CDR is a database that consolidates data from a variety of clinical sources to present a unified view of a single patient. It is optimized to allow clinicians to retrieve data for a single patient and to identify a population of patients with common characteristics or to facilitate the management of a specific clinical department. Typical data types which are often found within a CDR include patient demographics, clinical laboratory test results and pathology reports, pharmacy information (including prescription and fill history), radiology reports and images, hospital admission, discharge and transfer summary data, diagnosis and procedure codes, problem lists, and progress notes.
Master Provider Index	Captures different representations of provider data to create a master view by extracting and integrating from existing systems and data sources.
Care Management/Disease Management Applications	Technology-based disease management applications may reduce barriers to care, improve quality of care, and cut administrative costs. These applications fall into three broad categories: data capture and monitoring systems, audiovisual communication systems, and self-help, education, and training systems.
Medication History Service	A medication history service vendor provides the functional capability to compare a patient's medication orders to all of the medications that the patient has been taking. This process known as “medication reconciliation” is done to avoid medication errors such as omissions, duplications, dosing errors, or drug interactions. It should be done at every transition of care in which new medications are ordered or existing orders are rewritten. Transitions in care include changes in setting, service, practitioner, or level of care. This process comprises five steps: (1) Develop a list of current medications

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	(2) Develop a list of medications to be prescribed (3) Compare the medications on the two lists (4) Make clinical decisions based on the comparison (5) Communicate the new list to appropriate caregivers and to the patient A medication history service can help hospitals, Emergency Departments, and ambulatory providers perform a more complete, accurate and efficient medication reconciliation process. The service provides real-time access to the medication claims and pharmacy fill data available.
Mobile Health (mHealth)	The practice of medicine, supported by mobile devices is a term most commonly used in reference to using mobile communication devices, such as mobile phones, tablet computers and PDAs, for health services and information. Mobile medical applications range from communication between individuals and health systems (such as call centers, appointment reminders, and treatment compliance messages to health monitoring and surveillance (including surveys and patient monitoring devices), to information access at the point of care (health records, decision support). Mobile health applications include the use of mobile devices in collecting community and clinical health data, delivery of healthcare information to practitioners, researchers, and patients, real-time monitoring of patient vital signs, and direct provision of care (via mobile telemedicine). Mobile health can be segmented into eight application areas: (1) Education and awareness systems are those that provide information about health promotion and disease prevention (2) Point-of-care support and diagnostics are used to provide the clinician with reference information for clinical care as well as decision support for diagnostics (3) Patient monitoring provides patients with support for treatment adherence (4) Disease and epidemic outbreak surveillance provides real-time tracking of infectious diseases (5) Emergency medical response systems provide alerts for accidents and disasters (6) Health information systems manage data used in clinical care (7) mLearning provides mobile platforms for educational support for health professionals (8) Health financing applications are those that facilitate the use of smart cards or vouchers for mobile payments
Discharge Planning & Management Applications	These applications enable hospitals to fully automate and streamline the discharge planning process. Typically, they can be interfaced with a hospital's ADT system, and provide tools to guide a case manager through the discharge planning process.
ACO CORE CAPABILITY: PATIENT ENGAGEMENT	

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CAPABILITY DEFINED Patient engagement can be defined as *a person's sustained participation in managing their health in a way that creates the necessary self-efficacy to achieve physical, mental and social well-being.* This means that healthcare delivery must entice a person to actively participate *over the long-term* while fostering health related self-efficacy which yields meaningful physical, mental or social benefit. Only in this way can healthcare organizations depend on the active and sustained participation required to improve clinical outcomes. This definition clearly differentiates the patient experience from patient engagement. Whereas the patient experience is based on the patient's perception of quality, patient engagement is based on the patient's active and sustained participation in managing their health. The patient experience is about perceptions and patient engagement is about actions and behaviors. A patient can conceivably be satisfied with their healthcare experience while having minimal engagement.	
Patient Portals	Patient portals are healthcare-related web-based applications which allow patients to access their health information, interact and communicate with their healthcare providers, as well as perform specific tasks such as appointment scheduling or accessing diagnostic test results such as lab reports. Patient portal applications can exist as stand-alone web sites provided by third party vendors who sell their services to healthcare providers or as applications which can be integrated into the existing web site of a healthcare provider. Patient portal applications are often provided by EMR vendors as part of their product suite. In addition, a patient portal application may be provided by a HIE entity. Functional capabilities of patient portal applications may include: • Patient access (total or partial) to their medical record which is part of an Electronic Health Record system, owned and maintained by their provider. Depending on the functional capability of the provider's system, a patient may have the ability to correct errors or add data to their record, as well as share their information with other providers. • Capability to schedule appointments, request medication refills, pay bills or complete pre-visit documents. • Provider to patient communication or online patient-provider consultation. • Access relevant educational and resource materials.
Personal Health Record (PHR)	A PHR is a health record where health data and information related to the care of a patient is maintained by the patient. This contrasts with the more widely used electronic medical record, operated by a provider or institutions (such as a hospital), and contains data entered by clinicians or billing data to support insurance claims. The intention of a PHR is to provide a complete and accurate summary of an individual's medical history which is accessible online. The health data on a PHR can be collected from a variety of sources such as health care providers, pharmacies, labs, self-reported data such as fitness and wellness information, patient-reported outcome data, as well as data from devices such as wireless electronic weighing scales. Often, PHR applications also offer a set of tools for patients to manage their health and wellness. Tools can include fitness tracking, assistance with creating healthy meals, and self-management of chronic conditions.

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	PHR applications can be offered by individual providers as a value-added service to patients or provided by an HIE service, as well as by a third party vendor. Some PHR applications offer various customer interaction points such as mobile or tablet devices.
Mobile Health Applications	Mobile health applications specific to patient engagement span multiple functional domains including patient-provider communication, appointment scheduling and reminders, treatment compliance, and information about health promotion and disease prevention.
Telehealth & Telemedicine	**Telehealth:** The electronic provision of health care and information services for the direct benefit of individual patients and their families. It includes actual physician-patient interactions via telemedicine, and the provision of education and information services designed to increase awareness of (and where applicable, compliance with) diagnoses and medical conditions, treatments, and good health practices. **Telemedicine:** The provision of health care and education over a distance, using telecommunications technology. The focus of telemedicine thus far has been mainly consultative. Telemedicine encompasses the following services: specialist and primary care consultations, imaging services, remote patient monitoring, and remote medical education and consumer information. Many interactions between patients and providers can be efficiently handled via e-mail or over the phone; however, because providers have not been traditionally reimbursed for these interactions, they have little incentive to use them. By contrast, “e-visits” and other forms of telehealth will be a fundamental component in controlling costs and improving productivity in an ACO. In-home videoconferencing is likely to become one of the most important avenues for patient-provider communication. **Remote Patient Monitoring (RPM)**: RPM is a technology that enables monitoring of patients outside of conventional clinical settings (e.g. in the home). This may increase access to care and decrease healthcare delivery costs. The diverse applications of RPM lead to numerous variations of RPM technology architecture. However, most RPM technologies follow a general architecture that consists of four components: • Sensors on a device that is enabled by wireless communications to measure physiological parameters • Local data storage at the patient site that interfaces between sensors and other centralized data repository and/or healthcare providers • Centralized repository to store data sent from sensors, local data storage, diagnostic applications, and/or healthcare providers • Diagnostic application software that develops treatment recommendations and intervention alerts based on the analysis of collected data Depending on the disease and the parameters that are monitored, different combinations of sensors, storage, and applications may be deployed.

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Secure Messaging **(Provider-Provider Communication)**	A server based approach to protect sensitive data when sent outside of an organization and provides compliance with industry regulations such as HIPAA. Advantages over classical secure email are that confidential and authenticated exchanges can be started immediately by any internet user worldwide since there is no requirement to install any software nor to obtain or to distribute cryptographic keys beforehand. Secure messages provide non-repudiation as the recipients (similar to online banking) are personally identified and transactions are logged by the secure email platform.
Social Media	The use of social media by health professionals and companies is not a new concept, but it is constantly evolving. Social media offers another way to connect with patients in a relaxed setting and provide them with relevant information. For example, the American Medical Association has an active Twitter account that has posts ranging from its own blogs to recent studies. However, large medical organizations are not the only ones using social media to reach more people. Bridges to Recovery, a residential treatment center, is using Google+ pages as a hub to list its social network links and connect with others. Even nonprofit organizations like Until There's A Cure are using Facebook to reach people. Social media is allowing health professionals and companies to increase engagement with their networks while providing current medical information.
Health Risk Assessment Tools	Health risk assessments are a reliable and valid tool used to assess a person's health risks according to lifestyle behaviors with regard to physical activity, nutritional choices, tobacco use, weight, and stress management.
Digital Coaching	Digital coaching tools are web-based programs that emulate face-to-face or telephonic sessions between providers and patients.

ANALYTICS

CAPABILITY DEFINED

Analytics is the systematic use of data and related business insights developed through applied analytical disciplines (e.g. statistical, contextual, quantitative, predictive, cognitive, and other emerging models) to drive fact-based decision making for planning, management, measurement and learning. Analytics may be descriptive, predictive or prescriptive. Health analytics enables comparative performance review and management that can improve the quality of care and the coordination of disease management along the continuum of care. The ability to harness and mine data that has been integrated from disparate sources across the ACO ecosystem can drive improvement in healthcare delivery, management of patient populations, and operational efficiency.

Financial analysis is specific to the exploration of operational and financial data, and using that information to develop statistical models that predict financial performances. Examples of various financial analyses specific to ACOs include:

- Determining and modeling the total cost of care across all settings by population or individual
- Modeling the cost tied to the care of chronic populations in order to support payments and allocation
- Creating rates for risk groups and the developing underwriting criteria
- Predicting financial margins for each type of accountable care model and the populations served

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BI/Analytics Platform	An analytic platform is an integrated and complete solution for managing data and generating business analytics from that data. It supports a range of powerful analytic applications. The solution can be delivered as a complete hardware and software package, and integrated software package or cloud-based offerings with deployment in either a public or private cloud and/or a cloud-based "software-as-a-service" (SaaS). Gartner defines a business intelligence (BI) platform as a software platform that delivers the twelve capabilities listed below. These capabilities are organized into three categories of functionality: integration, information delivery, and analysis. ***Integration*** • **BI infrastructure:** All tools in the platform should use the same security, metadata, administration, portal integration, object model, and query engine. • **Metadata management:** All tools leverage the same metadata, with a robust way to search, capture, store, reuse, and publish metadata objects such as dimensions, hierarchies, measures, performance metrics, and report layout objects. • **Development tools:** A set of programmatic development tools and a visual development environment, coupled with a software developer's kit for creating BI applications, integrating them into a business process, and/or embedding them in another application. The BI platform also enables developers to build BI applications without coding by using wizard-like components for a graphical assembly process. • **Collaboration:** Enables BI users to share and discuss information and/or manage hierarchies and metrics via discussion threads, chat and annotations, either embedded in the BI platform or through integration with collaboration, analytical master data management (MDM), and social software. ***Information Delivery*** • **Reporting:** Reporting provides the ability to create formatted and interactive reports (parameterized) with highly scalable distribution and scheduling capabilities. • **Dashboards:** Ability to publish formal, web-based reports with intuitive interactive displays of information, including dials, gauges, sliders, check boxes and traffic lights. These displays indicate the state of the performance metric compared with a goal or target value. • **Ad hoc query:** Enables users to ask their own questions of the data, without relying on IT to create a report. In particular, the tools must have a robust semantic layer to allow users to navigate available data sources. • **Search-based BI:** This applies a search index to both structured and unstructured data sources and maps them into a classification structure of dimensions and measures (often leveraging the BI semantic layer) that users can easily navigate and explore using a search (Google-like) interface. This capability extends beyond keyword searching of BI platform content and metadata. ***Analysis*** • **OLAP:** Enables end users to analyze data with extremely fast query and calculation performance, enabling

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	a style of analysis known as “slicing and dicing." Users are (often) able to easily navigate multidimensional drill paths. • **Interactive visualization:** Ability to display numerous aspects of the data more efficiently by using interactive pictures and charts instead of rows and columns. Over time, advanced visualization will go beyond just slicing and dicing data to include more process-driven BI projects, allowing all stakeholders to better understand the workflow through a visual representation. • **Predictive modeling and data mining:** Enables organizations to classify categorical variables and to estimate continuous variables using advanced mathematical techniques. BI developers are able to integrate models easily into BI reports, dashboards and analysis. • **Scorecards:** These take the metrics displayed in a dashboard a step further by applying them to a strategy map that aligns Key Performance Indicators (KPIs) with a strategic objective.

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