APPENDIX A

This Appendix presents the *Mean Frequency and Importance Ratings for Tasks* that were validated during the 2018 clinical informatics subspecialty practice analysis that was conducted by AMIA and is described in Silverman HD, Steen EB, Carpenito JC et al. Domains, tasks, and knowledge for clinical informatics subspecialty practice: results of a practice analysis. *J Am Med Inform Assoc* 2019, ocz051, https://doi.org/10.1093/jamia/ocz051.

2018 Clinical Informatics Subspecialty (CIS) Practice Analysis
Mean Frequency and Importance Ratings for Tasks

Survey Questions for each Task
How **frequently** did you perform the task during the past 12 months, on average? 1. Never 2. Rarely (less than once each month 3. Occasionally (about weekly to monthly) 4. Frequently (several times each week) 5. Very frequently (daily/many times each day) How **important** is the task to effective clinical informatics practice? 1. Not important 2. Minimally important 3. Moderately important 4. Highly important

	Frequency Mean	Importance Mean
Domain 2: Improving Care Delivery and Outcomes		
2.01 Develop, implement, evaluate, monitor, and maintain clinical decision support (CDS), in alignment with the Five Rights of CDS (information, person, intervention formats, channel, and point/time in workflow).	3.8	3.8
2.02 Analyze and identify necessary system and process changes to optimize clinical and related workflows.	4.2	3.8
2.03 Assess/evaluate and improve usability of user-facing technology for clinicians using formal methodologies (e.g., usability testing, creating personas, creating use cases)	3.2	3.4
2.04 Identify, execute, interpret, and disseminate measures and/or predictive analytics (e.g., clinical and financial benchmark data, quality performance, regulatory, pay for performance, public health surveillance, patient safety) to provide actionable feedback to improve individual and organizational performance.	3.6	3.6
2.05 Integrate knowledge of patient-specific attributes (e.g., social determinants, genetic data, patient-reported outcomes and preferences, utilization) to determine optimal management and treatment for the individual and populations.	2.9	3.2
2.06 Support the development and successful execution of new care delivery models using health information technology (e.g., IT-enabled communication, collaborative workspaces, population health tools).	3.3	3.4
2.07 Ensure continuity of communication and information across transitions of care using health information technology tools and processes.	3.6	3.6
Domain 3: Enterprise Information Systems		
3.01 Maintain awareness of healthcare and information technology (IT) landscapes including available products, innovation strategies, emerging technologies, and legal and regulatory requirements to design technical solutions to enterprise challenges.	3.7	3.4
3.02 Develop, evaluate, implement, and participate in a comprehensive system testing plan using functional testing (e.g., unit testing, integration testing, user acceptance testing, regression testing).	2.8	3.1
3.03 Develop, implement, and participate in the Health Information Technology (HIT) upgrade cycle.	3.2	3.2
3.04 Develop, implement, and participate in downtime activities, including recovery.	2.6	3.0
3.05 Determine and specify functional requirements for Electronic Health Records (EHR) and applied Health Information Technology (HIT) systems (e.g., Laboratory Information System [LIS], Picture Archiving and Communication System [PACS], Radiology Information System [RIS], vendor-neutral archive, pharmacy, revenue cycle), perform vendor evaluation, and select product(s).	3.0	3.2
3.06 Implement, integrate, monitor, evaluate, and maintain Electronic Health Records (EHR) and applied Health Information Technology (HIT) systems, in collaboration with IT staff, based on clinical expertise and best practice to support optimum clinical workflow.	4.0	3.7
3.07 Develop, implement, evaluate and/or integrate portals and other consumer-facing health informatics applications (e.g., disease management, patient education, behavior modification)	3.0	3.3
3.08 Reconcile requirements for clinical integration of data with technical constraints in order to maintain connectivity, interfacing, and validity of content between systems and clinical areas.	3.0	3.2
3.09 Balance user roles and requirements with security, privacy, and safety considerations to determine appropriate system access.	3.1	3.2

	Frequency Mean	Importance Mean
3.10 Inventory, evaluate, monitor, and optimize use of various channels used for internal and external messaging to ensure effective and secure communication.	2.7	2.9
3.11 Participate in ongoing security threat assessments, development of clinician facing security policy, and reinforce security training and policies with clinical staff.	2.4	3.0
3.12 Develop, curate, and maintain institutional knowledge repositories to ensure continuity of information systems knowledge across staff transitions and care settings.	2.8	3.0
3.13 Integrate, monitor, evaluate, and maintain connections to external data sources (e.g., registries, exchanges).	2.6	3.0
3.14 Provide clinical input into data matching strategies and maintain master patient index to ensure integrity of patient data sourced across multiple systems.	2.3	3.0
3.15 Assess and prioritize the integration of data from medical devices (e.g., pumps, telemetry monitors, consumer devices) into information systems.	2.2	2.9
3.16 Design and implement strategy for effective use of telehealth (e.g., clinical use cases, software, hardware, staff).	2.7	3.2
Domain 4: Data Governance and Data Analytics		
4.01 Collaborate in the establishment and maintenance of data governance structures, policies, and processes that encompass data quality, integrity, security, access, data domain management, definition of clinical and business cohorts, oversight and application of data standards, data provenance/lineage, metadata, and data dictionaries/definitions.	3.2	3.4
4.02 Develop, implement, and/or leverage data lifecycle processes for defining sources, and acquiring, storing, cleaning, and ensuring integrity of data to safeguard the availability of relevant and valid data to meet clinical, quality, research, business, and strategic objectives.	2.6	3.0
4.03 Advance/foster semantic interoperability by utilizing data taxonomies to digest, harmonize, and transform data from disparate health information systems to allow computable data availability for clinical care and analytics.	2.5	3.1
4.04 Apply data management techniques (e.g., concept mapping, extract, transform, load [ETL], and validation) to maintain meaning (concept and semantic integrity).	2.2	2.8
4.05 Access and incorporate information from emerging data sources (e.g., imaging, bioinformatics, internet of things (IoT), patient-generated, social determinants) to augment the practice of precision medicine.	2.3	3.0
4.06 Create, enhance, and/or leverage information architecture to efficiently store, query, and retrieve data from large data sets.	2.5	2.9
4.07 Interpret information and apply knowledge gained from data sets using descriptive, diagnostic, predictive, and prescriptive analytic approaches to derive actionable insights.	3.2	3.4
4.08 Employ and deploy advanced and emerging data mining and analytic techniques (including but not limited to data visualization, artificial intelligence, natural language processing, machine learning) to optimize clinical and business decision-making.	2.6	3.2
4.09 Accumulate, curate, and document knowledge bases to ensure longevity and persistence of institutional data infrastructure pertaining to data lifecycle.	2.3	2.9
4.10 Participate in regional data sharing through health information exchanges, public health reporting, or other mechanisms.	2.8	3.2
Domain 5: Leadership and Professionalism		
5.01 Identify informatics trends, best practices, and new technologies and utilize governance processes to position the organization for future opportunities.	3.8	3.6

	Frequency Mean	Importance Mean
5.02 Establish and/or participate in Health Information Technology (HIT) governance to support strategic and financial planning, including formulation, implementation, and evaluation.	3.5	3.5
5.03 Participate in the development of organizational health informatics goals, strategies and tactics in alignment with the mission and vision of the organization.	3.7	3.7
5.04 Improve care delivery and outcomes and advance the mission of the organization through effective communication, negotiation, and conflict management.	3.8	3.5
5.05 Build support and create alignment for informatics best practices to ensure all stakeholders are active, visible sponsors of informatics within their respective roles.	3.8	3.6
5.06 Leverage the processes and principles of project management to drive the successful completion of projects on time, within scope, and within budget.	3.6	3.3
5.07 Lead and manage planned and unplanned changes associated with implementing and optimizing clinical information systems to promote adoption by health professionals.	3.8	3.6
5.08 Engage, educate, supervise, and/or mentor clinicians and other healthcare team members in their use of clinical informatics tools, systems, and processes.	4.1	3.7
5.09 Manage and advance collaboration with healthcare team members, patients, members of the care community, external organizations, and vendors.	3.8	3.4