



A Survey of Imaging Informatics Fellowships and their Curricula: Current State Assessment

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Introduction

In the early 2000s, a suggested “standardized” curriculum for an Imaging Informatics Fellowship was published by the Society for Computer Applications in Radiology (SCAR). SCAR has since transitioned into the Society for Imaging Informatics in Medicine (SIIM), and no further modifications to the curriculum have been proposed. There are many suggested educational resources and program structures for biomedical and clinical informatics available when conducting a literature review, but Imaging Informatics updates have been limited. In a 2016 survey of Imaging Informatics (II) fellowship graduates, the surveyed graduates expressed the opinion that “II fellowships needed further formalization and standardization”. With an original published curriculum that is about 15 years old, this suggests an opportunity for curriculum change. To provide improved structural and content suggestions for fellowships, we completed a current state assessment of how each fellowship organizes their education and what requirements they have for completion.

Hypothesis

A survey of the II fellowship curricula will identify a significant area of overlap, with additional smaller areas of divergence.

Methods

To assess the existing curricula guidelines for fellowships, we directly contacted the Fellowship Directors of existing fellowships listed on the SIIM website who have graduated at least one fellow. We focused exclusively on Imaging Informatics, rather than biomedical or clinical informatics fellowships or graduate programs. The authors administered a survey by phone with recording software to capture demographic data and curriculum details. Additionally, we collected existing documentation that outlined the curriculum in use at that institution for the fellowship. The data was reviewed and organized to identify overlapping trends and institutional differences in structure and content.

Results

Six Imaging Informatics Fellowship Directors were interviewed, for programs that graduated between one and fifty MD fellows. All fellowships were built into fellows’ clinical time, had required didactics, and a project. All had some form of guidelines or curriculum, but only two had the formal curriculum published. Every fellowship had suggested reading lists, and these lists varied between journal articles, texts, and National Imaging Informatics Curriculum (NIIC) readings. Half accept non-MD applicants. Four fellowships have a mandatory publication requirement for the fellow’s project, while the remaining two ‘strongly suggest’ publication. Each fellowship allows fellows to pick their projects either from a list of pre-existing options or to pursue their own idea. Two fellowships had additional ‘practicum’ requirements, and two had a required teaching experience. Only one fellowship required a final certification (e.g. Certified Imaging Informatics Professional) to graduate, while two additional fellowships strongly encouraged it.

Table 1

	Curriculum Topics (<i>Examples</i>)	Total (of 6)
Business and Management	Business Analytics	4
	Communications <i>Communication Strategy, Tools</i>	4
	Education	1
	Finance <i>Informatics Funding, Purchasing, Procurement, Revenue Cycle</i>	3

	Meaningful Use	3
	PMO <i>Requirements, Usability Analysis, Workflow Modeling/Optimization, Change Management</i>	5
	Business Management Skills <i>Negotiation, Leadership, Human Resources, Organizational Design</i>	5
	System Implementation <i>Implementation/Upgrades of Clinical Systems, System Evaluations</i>	5
Technical Informatics	Data Science <i>Information visualization, ETL, Database Design</i>	5
	Department Infrastructure <i>Image Acquisition Process, Critical Results, Tech Feedback, Protocols, Peer Review</i>	2
	Enterprise Imaging	5
	Infrastructure (Computers, Networking) <i>Storage Area Networks, Server Architecture, High-Availability Design, CMM</i>	5
	Other <i>3D Printing, Ergonomics, Human Factors Engineering, Social Media, Specialty PACs</i>	4
	PACs/RIS/Reporting	6
	Programming/Development/Software <i>Web Services, Machine Learning, Scripting, PHP, System Design, NLP, Image Segmentation</i>	6
	Security	2
	Standards <i>HL7, DICOM, IHE, ITIL, System Interoperability</i>	6
	Study Management	1
Quality and Safety	Compliance/Regulatory	3
	Decision Support	4
	HIPAA	3
	Patient Safety	2
	Quality	3
	Radiation Dose	2
Research	Evaluation Models/Methods	2
	Honest broker architectures	2
	IRB implications on informatics	4
	Quasi-experimental Study Design	4
	Surveying methods	3

Table 1: Curricula Topics Covered by the Six Surveyed Fellowships]

Conclusion

In completing an assessment of the current state of the Imaging Informatics Fellowships, we determined graduation requirements and found many commonalities, in addition to some topics addressed by only a few fellowships. We plan to re-engage the Fellowship Directors to develop a core curriculum that can be utilized across the country, which is part of the current SIIM Strategic Plan.

Statement of Impact

By identifying the current state of fellowship curricula, this will allow us to develop a common standard for Imaging Informatics Fellowships across the country to improve educational consistency and scope across fellowships.

Keywords

fellowship