

The CSI (Clinical Scholars in Informatics): A novel Internal Medicine (IM) resident-driven applied informatics pathway

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Needs and Objective: In the changing landscape of healthcare, applied informatics shapes clinical workflows and decision making. It is important to train physicians leaders in applied informatics allowing for novel locally-relevant workflows targeted to improve healthcare effectiveness, efficiency, equity, and patient engagement.

Setting and Participants: A single academic medical center, IM residency program. All IM residents PGY1 residents were eligible for application. Each year, two PGY1 residents are selected for the pathway to begin their PGY2 year.

Description: The CSI is a two-year applied educational and mentorship pathway for IM residents to develop skills in applied informatics. At residency completion, CSI residents are prepared to tackle most health-system challenges with additional comprehensive understanding of informatics (CDS, workflow, change management, IT systems, EHR, database structures, SQL, regulatory issues, Security/Privacy, etc.). The pathway translates a resident derived project (addressing system pain points) into reality. The presenter will elucidate details of the CSI curriculum, timeline considerations, resources required, budgetary considerations and journal club structure in the presentation (please see online resource URL).

Evaluation: Of our inaugural class of CSI residents, both completed EHR certification, IRB protocol, workflow analysis, intervention design, baseline data analysis and intervention implementation. One CSI project has been presented at a national meeting. Projects range in scope from predictive analytics to clinical decision support to alert systems to data visualization (please see online resource URL for project details). Of our second class of CSI residents, both are in the design phase. Additionally, we received the following message excerpt from a CSI resident: *“I am blown away by the enthusiasm fellowship programs have shown learning about CSI. They are excited about the skill set a potential future fellow has developed and are all amazed by the structure of the CSI pathway. When I applied for CSI, I had no idea the training received would be this valuable to my career, both now and long-term. Interviewers have been very impressed by the project that we have implemented. All-in-all, Informatics has dominated the conversation in almost all of my interviews.”* **Table 1** below depicts CSI Resident Outcomes.

Discussion/Reflection/Lessons Learned:

One resident has continued informatics-related work in the Hem-Onc domain and one resident has joined the general IM faculty to pursue the practice pathway clinical informatics board certification. The CSI has been cited as successful by residents, mentoring faculty, and residency/departmental leadership. We continue to evaluate the impact of these projects and draft and disseminate CSI resident-driven innovations. The CSI is overall low-cost with \$20,000 in direct costs. Personnel considerations include collaboration with ITS and faculty time. The CSI can be leveraged as a residency resident recruitment tool.

Impact: The CSI is a low-cost, novel applied clinical informatics resident pathway broadly applicable to most IM programs across the US. Furthermore, the CSI yields bid-directional net benefits for the resident physicians (learning the mechanisms for completing an applied clinical informatics project

end-to-end with academic capital) and for the health system (implementation of a locally relevant project with robust evaluation). The CSI also functions as a pathway for internal development of broad-based informatics expertise.

Online Resource URL: <https://school.wakehealth.edu/Education-and-Training/Residencies-and-Fellowships/Internal-Medicine-Residency/Curriculum-Overview/Clinical-Scholars-in-Informatics-Pathway>

Table 1: CSI Resident Outcomes

CSI Year	Resident	Project Title	Phase	Posters/Presentations	Publications	CSI Resident Career Plans	Mentors	
2017-2019	Resident 1 Focus: <i>Oncology</i>	"The Impact of an Automated Alert System to Primary Oncologists on Inpatient Goals-of-Care Conversations and End-of-Life Care"	Evaluation Maintenance	Yes 1) Epic XGM 2019 2) AMIA CIC 2019 (Accepted, withdrawn due to family emergency)	Drafting	Wake Forest General Internal Medicine Faculty Pursing Clinical Informatics Practice Pathway	Informatics: Ajay Dharod Specialty: Heidi Klepin	
	Resident 2 Focus: <i>Internal Medicine</i>	"Improving Social Determinants of Health through the Delivery of Community Resources"	Maintenance	Yes 1) Epic UGM 2018 2) AMIA CIC 2019	Drafting	Wake Forest Heme-Onc Fellow Pursing Cancer Informatics Research Career	Informatics: Ajay Dharod Specialty: Nancy Denizard-Thompson	
2018-2020	Resident 3 Focus: <i>Geriatrics</i>	"Implementing Predictive Modeling to Increase Advance Care Planning Completion in Outpatient IM Resident Clinics"	Implementation Evaluation	Yes 1) Oral Presentation Accepted to NC Epic Users Group Meeting	TBD	Wake Forest Chief Resident, 2020-2021 Plans to apply for Cardiology Fellowship	Informatics: Ajay Dharod Specialty: Carl Grey	
	Resident 4 Focus: <i>Gastroenterology</i>	"Design and Development of Clinical Decision Support Tools for Chronic Gastroenterological Disease Management"	Design Workflow Analysis Baseline Data	No	TBD	Plans to apply for Gastroenterology Fellowship	Informatics: Ajay Dharod Specialty: Sean Rudnick	
2019-2021	Resident 5 Focus: <i>Internal Medicine</i>	Title TBD	Design Workflow Analysis Baseline Data	No	TBD	Undecided	Informatics: Ajay Dharod Specialty: Deepak Palakshappa	
	Resident 6 Focus: <i>Precision Medicine+ Gastroenterology</i>	Title TBD	Design Workflow Analysis Baseline Data	No	TBD	Plans to apply for Gastroenterology Fellowship	Informatics: Ajay Dharod, Sean Hernandez Specialty: Michael Olivier	

CSI related Peer Reviewed Presentations, Posters, and Manuscripts:

Poster Presentation(s):

Poster: **Benfield, A**, Denizard-Thompson N, Moses A, Dharod A. Improving Social Determinants of Health through the Delivery of Community Resources. Poster presented at 2019 WFBMC QI Showcase. Winston-Salem, NC.

Poster: **Hernandez S**, Klepin H, Moses A, Dharod A. *Facilitating Inpatient Goals of Care Conversations: Developing An Automated Alert System to Promote Inpatient End-Of-Life Discussions Between Primary Oncologists and Patients*. Poster presented at 2019 Wake Forest School of Medicine Internal Medicine Research Symposium. Winston-Salem, NC. May 2019. Winston-Salem, NC. *1st Place Winner: QI category*.

Oral Presentation(s):

Presentation: **Benfield A**, Moses A, Dharod A. *Improving Social Determinants of Health through the Delivery of Community Resources, Social Care Forum*. Oral presentation at: Annual Epic Users Group Meeting (UGM); August; 2018. Verona, WI.

Presentation: **Benfield A**, Moses A, Dharod A. *Improving Social Determinants of Health through the Delivery of Community Resources, Social Care Forum*. Oral presentation at: AMIA Clinical Informatics Conference (CIC); May; 2019. Atlanta, GA.

Presentation: **Hernandez S**, Klepin H, Moses A, Dharod A. Admission Notices: A Novel Way to Promote Inpatient Goals of Care Conversations with Cancer Patients. Oral presentation at 2019 Epic Expert Group Meeting (XGM) May 2019. Verona, WI.

Peer Reviewed Publication(s):

Dharod A, Atkinson H, Rosenthal G. "The CSI (Clinical Scholars in Informatics): A Novel Internal Medicine (IM) Resident-Driven Applied Informatics Pathway". *Journal of General Internal Medicine* 2019;34(2 Suppl):S852.

Internal Grant(s)/Funding related to CSI projects:

Unassigned Palakshappa (PI) 07/01/2018-06/30/2019

Wake Forest Learning Health System Pilot Grant Award

Using Digital Technologies to Identify and Address Patients' Unmet Social Needs

The goal of this study is to develop and pilot test a tablet-based social determinants of health screening process that identifies patients with unmet social needs at the time of care delivery, seamlessly integrates with the electronic health record, and automatically alerts providers.

Co-Investigators: **Andrew Benfield**, David Miller, Alysha Jo Taxter, Nancy Denizard-Thompson, Petro Gniji, Daisy Valdovinos

External Grant(s)/Funding related to CSI projects:

Unassigned Palakshappa (PI) 07/01/2019-06/30/2020

American Medical Association Practice Transformation Initiative

Addressing Social Determinants of Health to Reduce Physician Burnout

Although clinicians recognize the impact of the social determinants of health (SDH) on patient care, clinicians feel they do not have the time or knowledge to effectively address patients' unmet social needs in the clinic. This can lead to feelings of distress and helplessness. The objective of this study is to test the impact of a tablet-based platform that enhances the role of support staff to address SDH on clinician burnout.

Co-Investigators: Ajay Dharod, **Andrew Benfield**, Kirsten Feiereisel, Nancy Denizard Thompson, Claudia Campos, David Miller, Justin Moore