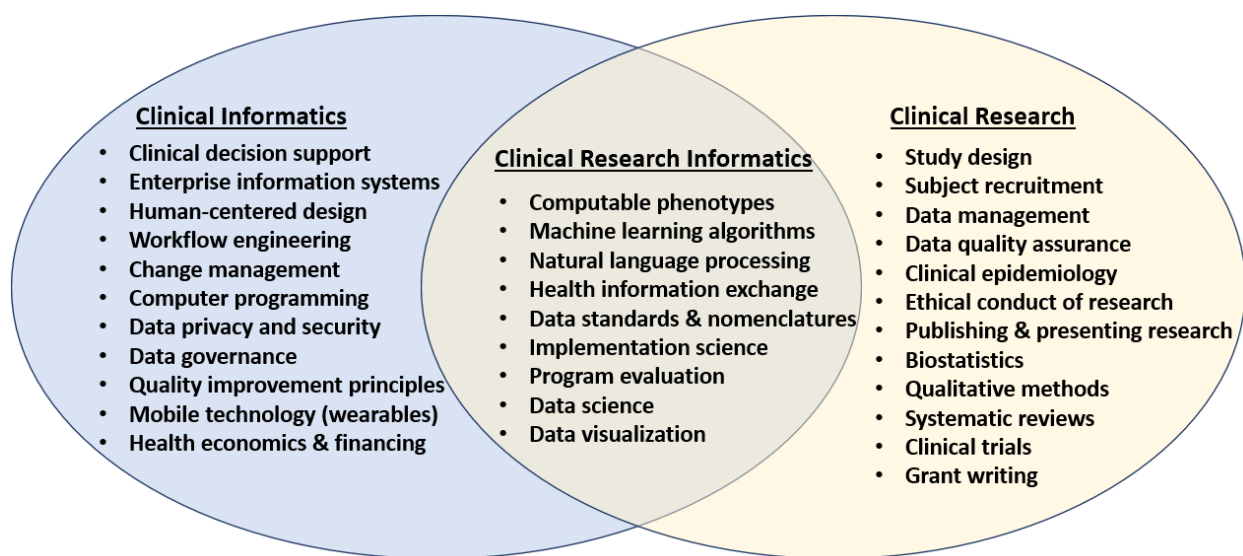# Clinical Research Informatics Postdoctoral (CRISP) Fellowship

Frequently Asked Questions (updated by Mary Whooley MD, 10/5/2022)

What is the difference between clinical research informatics and clinical informatics?

Clinical informatics and clinical research informatics are two of the five domains of biomedical informatics supported by the American Medical Informatics Society. Essentially, the difference is a focus on operations vs. research. **Clinical Informatics** is the application of informatics and information technology to deliver healthcare services. It is also referred to as applied clinical informatics or operational informatics (as might be practiced by a Chief Medical Informatics Officer). **Clinical Research Informatics** uses clinical research methods and harnesses technology to conduct studies involving human subjects and their data. It focuses more on conducting academic investigations to answer scientific questions and translate data into knowledge. This figure illustrates the overlap between the two disciplines.

Overlap between clinical informatics, clinical research informatics and clinical research

Clinical Informatics
- Clinical decision support
- Enterprise information systems
- Human-centered design
- Workflow engineering
- Change management
- Computer programming
- Data privacy and security
- Data governance
- Quality improvement principles
- Mobile technology (wearables)
- Health economics & financing

Clinical Research Informatics
- Computable phenotypes
- Machine learning algorithms
- Natural language processing
- Health information exchange
- Data standards & nomenclatures
- Implementation science
- Program evaluation
- Data science
- Data visualization

Clinical Research
- Study design
- Subject recruitment
- Data management
- Data quality assurance
- Clinical epidemiology
- Ethical conduct of research
- Publishing & presenting research
- Biostatistics
- Qualitative methods
- Systematic reviews
- Clinical trials
- Grant writing

Will the CRISP fellowship make me board eligible in clinical informatics?

The CRISP fellowship alone will not make you board eligible in Clinical Informatics. However, the CRISP fellowship could be combined with the ACGME-accredited UCSF clinical informatics fellowship to obtain board certification.

What is the postdoctoral fellow stipend?

CRISP fellow stipends are based on the on the NIH stipend scale, which is published annually and increases by about 2% per year. Your department will be responsible for covering about one third of your fellowship cost, including your housing stipend ($13,607 for 2022-23) and the difference between the NIH stipend scale and the UCSF clinical training scale.

How much must the clinical department contribute?

Most funding for the fellowship is provided by a training grant from the National Center for Advancing Translational Science. However, some costs (such as tuition expenses beyond the NIH allowance) cannot be charged to the training grant and must be covered by the applicant's home department. The exact amount varies by fellow but is estimated to be around $80,000 per year. Revenue generated from clinical activities (up to 20% effort) can be used to offset these costs.

Estimated Annual Cost of CRISP Program

- Applicant's home department covers $40,000
- Fellowship covers $80,000
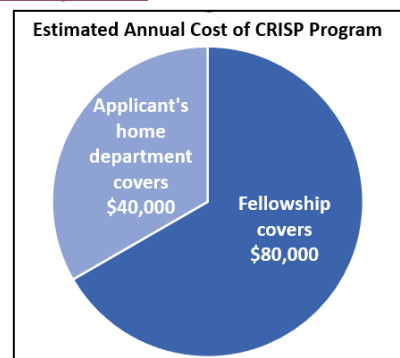
How is the CRISP fellowship structured? All CRISP fellows complete a program comprised of six central elements:

1. Mentored research project. CRISP will provide postdoctoral education in the methods of clinical research informatics within a unique environment where fellows will learn from nationally recognized faculty, seasoned investigators, and innovators. CRISP fellows will be expected to complete at least one research project (leading to a publication and presentation) during their training. Because both Zuckerberg San Francisco General (ZSFG) and SFVA are closely affiliated with UCSF, and clinical trainees are accustomed to working across all sites, CRISP fellows will have a wide range of opportunities to work with electronic health record (EHR) data from UCSF's (EPIC-based) data warehouse, ZSFG's (EPIC-based) EHR, and the VA's national standardized EHR data repository. Claims data from the Center for Medicare and Medicaid Services, including the US Renal Data System, are also available through the VA.

2. Clinical informatics didactic sessions. CRISP fellows participate in a joint weekly seminar with UCSF Clinical Informatics fellows. Topics cover the five Clinical Informatics Subspecialty Domains of Practice as published by the American Medical Informatics Association **(Appendix)**.

3. Work in progress (WIP) seminars. CRISP fellows attend weekly WIP seminars with the UCSF Quality and Informatics Lab (https://quil.ucsf.edu). The group discusses one or more works-in-progress being conducted by fellows or other local investigators who are analyzing EHR, registry, public health, administrative, and/or claims data to answer clinical research questions. Seminars highlight the challenges of using big data for research, including the lack of standardized methods for ensuring that data quality, completeness, and provenance are sufficient to assess the appropriateness of its use for research. Discussion topics include methods for linking with and integrating data from heterogeneous sources, natural language processing, use of computable phenotypes for both pragmatic clinical trials and observational investigations, data governance to control the quality and security of enterprise data, and promotion of national standards for representing and using clinical data.

4. Career development seminars. CRISP fellows participate in quarterly Fellows in Advanced Skills Training in Clinical Research (FAST CaR) seminars. FAST CaR ensures that clinical fellows pursuing a career in clinical research have foundational skills in scientific writing, evidence presentation, research dissemination, professional networking, and readiness to compete for research faculty positions. Sessions include topics such as managing time, setting priorities, balancing work-life demands, writing manuscripts, conducting peer review of manuscripts, responding to reviews, choosing a journal, deciding on authorship order, obtaining grants, negotiating for resources, and securing a job. Clinical research fellows from many other UCSF T32 programs also participate in FAST CaR, promoting workforce development and interdisciplinary collaboration.

4. Clinical experience. A key distinguishing feature of CRISP is embedding clinicians (physicians, nurses, dentists, physical therapists, pharmacists) within the health system that they are working to improve. For this reason, CRISP postdoctoral fellows must apply from within a clinical department that specifies how the fellow will be involved in clinical care. The goal is for the fellow to devote (no more or less than) 20% effort to patient care so that s/he will learn to leverage their knowledge of medicine, data systems, and analytics to identify and address pressing research questions in need of timely answers. Notably, research need not be conducted at the same site as clinical activities. For example, a dermatologist might care for melanoma patients at UCSF but conduct research on melanoma using VA data. By focusing on timely research questions, clinical research informaticians directly inform learning healthcare systems and improve quality of care.

6. Completion of ATCR Certificate or Master of Clinical Research degree, including individually tailored didactic coursework. Under the guidance of the CRISP director and the fellow's individual mentor, each CRISP fellow creates a structured career development plan tailored to their level of training. Based on this plan, an individualized trajectory of coursework and other programmatic activity is developed, including submission of at least one first-author manuscript for publication and presentation of research findings at a national meeting.

Appendix. Clinical Informatics Subspecialty Domains of Practice

Silverman et al, 2019, https://doi.org/10.1093/jamia/ocz051

Domain 1: Fundamental Knowledge and Skills
Fundamental knowledge and skills which provide clinical informaticians with a common vocabulary, basic knowledge across all Clinical Informatics domains, and understanding of the environment in which they function.

Domain 2: Improving Care Delivery and Outcomes
Develop, implement, evaluate, monitor, and maintain clinical decision support; analyze existing health processes and identify ways that health data and health information systems can enable improved outcomes; support innovation in the health system through informatics tools and processes.

Domain 3: Enterprise Information Systems
Develop and deploy health information systems that are integrated with existing information technology systems across the continuum of care, including clinical, consumer, and public health domains. Develop, curate, and maintain institutional knowledge repositories while addressing security, privacy, and safety considerations.

Domain 4: Data Governance and Data Analytics
Establish and maintain data governance structures, policies, and processes. Incorporate information from emerging data sources; acquire, manage, and analyze health-related data; ensure data quality and meaning across settings; and derive insights to optimize clinical and business decision making.

Domain 5: Leadership and Professionalism
Build support and create alignment for informatics best practices; lead health informatics initiatives and innovation through collaboration and stakeholder engagement across organizations and systems.

AMIA Position Paper

Domains, tasks, and knowledge for clinical informatics subspecialty practice: results of a practice analysis

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