# Deploying Informatics Tools to Improve an Interactive Medical Education Experience

Timothy D. Imler, M.D., M.S.[1-3], and Jason Cadwallader, M.D., M.S.[2,4]

1. Division of Gastroenterology and Hepatology, Indiana University School of Medicine, Indianapolis, IN.
2. Department of Medicine, Indiana University School of Medicine, Indianapolis, IN.
3. Division of Biomedical Informatics, Regenstrief Institute, Inc., Indianapolis, IN.
4. Richard L. Roudebush VA Medical Center, Indianapolis, IN.

## Problem Addressed

The morning report session can be anxiety provoking in many learners as they are often put on the spot (pimped) during the session to extract their understanding of the case. This often leads to learners either avoiding the interaction, or not submitting their excellent contributions for fear of public humiliation.

## Informatics System Solution

Morning report has been a staple of medical education dating back to Sir William Osler at John Hopkins in the early 20th century. The style of morning report differs quite significantly around the country with some academic centers using cases admitted from the previous night, while others utilize interesting cases discovered during the course of a month's clinical rotation. Almost universally the case is run by a "facilitator" (faculty member or chief resident) while the "learners" consist of medical students, residents, and sometimes fellows.

We hypothesized that "learners" would prefer a model that allowed a crowdsourcing of learning with the ability to share their knowledge without risk of public humiliation. After discussion with key stakeholders within the medical education system a framework was devised in order to support a dynamic, mobile enabled system that allowed direct interaction with the case in an anonymous form.

The system (From the Case Files) was developed to allow a "facilitator" to have a mobile device that enables them to directly place information both on a projected screen, and on the "learners" mobile device (Figure 1). This information could then be utilized to dynamically generate a differential diagnosis using SNOMED-CT concepts (Figure 2) and orders using LOINC concepts (Figure 3). Differential diagnosis generation and order entry are crowdsourced to allow information generated by other learners to be anonymously added for ranking by an individual learner.

Additional features such as Medicare based reimbursement costs, laboratory based result questioning, and group ranked differential (probable, possible, and unlikely) were all involved in the system creation. A demo video of the participants' interaction during a case presentation is available at https://www.youtube.com/watch?v=pqIvO5nGP5U.

The system is undergoing further development to provide individualized feedback to learners and facilitators while adding additional features of gamification. It is being beta tested at a single large academic institution for morning report with plans to release for general use.
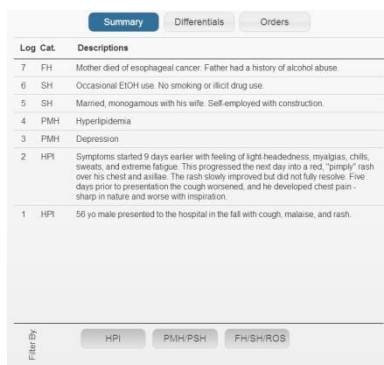


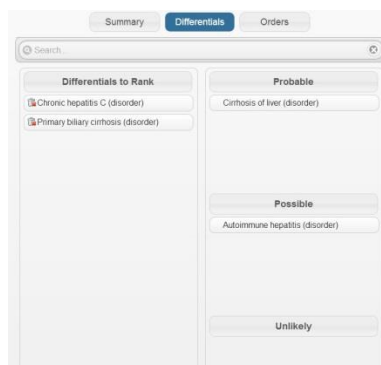**Figure 1:** Learner screen showing elements from history enabled by facilitator.



**Figure 2:** Learner screen showing dynamic and crowd sourced differential diagnosis ranking.
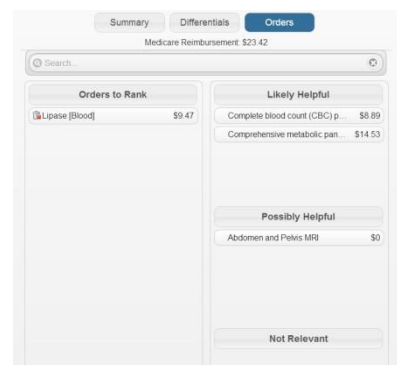


**Figure 3:** Learner screen showing dynamic and crowd sourced ordering and ranking.