**Session Title**  
S13 - Poster Session 1

**Presentation Title**  
Development and Optimization of a Critical Care Alert and Display (CCAD) System using Retrospective ICU Databases

**Session Type**  
Poster

**Axis I Classification**  
I.B.12. Visualization of data & knowledge

**Axis II Classification**  
II.6. Improving patient safety & reducing medical errors

**Axis III Classification**  
III. C. Biomedical Research (basic & clinical research)

**Topic Track Category**  
Applications of Informatics Track

**Session Time**  
10/24/2005 10:00 AM - 2:00 PM

**Session Number**  
63

**Site**  
Hilton Washington

**Room**  
Exhibit Hall

**Presenters**  
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**Abstract Synopsis**

Introduction The goal of this research project is to design and optimize a novel critical care alert and display (CCAD) system to assist decision support in the ICU using a massive temporal ICU patient research database [1]. The CCAD system will generate and display abnormal clinical values (Alerts) to the clinician through a user interface designed to allow for the efficient display of data. Background Patients admitted to ICUs are generally physiologically labile and require close monitoring, which results in the accumulation of a large amount of physiologic data. This accumulation of data can lead to an overload of information especially for young physicians caring for these patients. It is essential to have the ability to view and display this information in a concise manner to optimize patient care. Being able to review a large amount of chronological information in a short period of time might help the clinician better evaluate the state of a patient in the ICU.

System Design The CCAD system was designed using the MIMIC II database which is a robust fully de-identified temporal ICU research database recorded from patients in the MICU, SICU, and CCU at Beth Israel Deaconess Medical Center, Boston, MA [1]. The software program was written using C-sharp and compiled in the Microsoft Visual Studio .NET™ environment. The search engine accesses a set of relational databases and sends abnormal values to a Microsoft ACCESS™ database. The graphical user interface imports data from the ACCESS™ database and displays the abnormal values to the clinician. The clinician can then select an abnormal value and display the trend using a variety of different graphical tools. Results The search engine and the clinician GUI were both created off-line using the MIMIC II research database [1], which allowed clinicians to assist with the design of the system without altering real-time data or viewing protected health information. Histograms were generated to evaluate the frequency of abnormal values per ICU patient day. 2000 patients were selected from the MIMIC II database. Sixty different common ICU parameters were specified for analysis. For these parameters, there were a total of 56 abnormal values (alerts) generated per patient ICU day. For a 20 bed ICU, that would equate to 1127 total alerts per ICU patient day. When looking specifically at the complete blood count (CBC), 2.9 alerts were generated per ICU patient day. The arterial blood gas (A