

## OUR SCHOLARS

### **Spotting Trends in Side Effects and Drug Interactions: Data Visualization Tools Can Supplement Decision Making for Medical Prescribers**

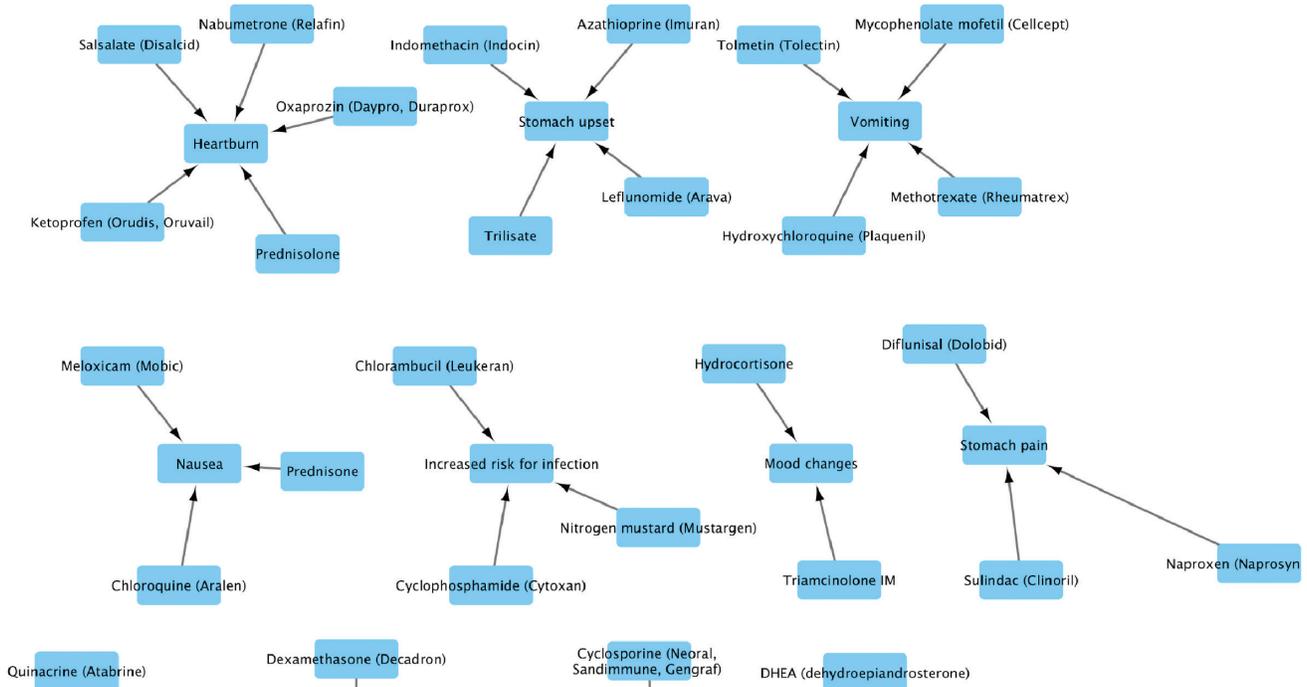
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Most Americans today are prescribed at least one prescription medication, and many take two or more. Pharmaceutical drug combinations greatly increase the risk for an adverse reaction and an assortment of differing side effects. Doctors today are faced with deciding which drugs to prescribe to their patients that will result in the greatest outcome to the patient with the least possible harm.

The purpose of this project is to identify patterns and possible links between side effects and the medications used to treat various diseases. Using a medical database that contains an index of human diseases and medications as well as side effect data from the Internet, an interactive visualization was created using Cytoscape, an open source software for visualizing interaction networks. While working on the

technique of this visualization process, the treatment of systemic lupus erythematosus (otherwise known as lupus), was the focus to test the approach. Lupus is difficult to diagnose because its symptoms mimic symptoms common to other diseases. Lupus patients are prescribed a combination of different drugs to combat the symptoms of the disease, and symptoms sometimes mirror the side effects of some drugs used to treat it. Using lupus as a starting point will provide the basis to expand the project to cover more diseases and pharmaceutical drugs in the future, with the goal of creating a tool doctors can reference when considering prescribing options for their patients. This tool could provide insight to patients and medical prescribers wanting to understand specific drug interactions and side effects.

*Byrd writes: "Jacklyn's work has far-reaching impact. Physician-prescribed drug combinations and concurrent side-effects can become complicated and hard to keep track of as the number of prescribed medications increases. A visual representation of prescribed drug combinations will help to inform treatment and which drugs should not be taken in combination."*



This network shows in-progress work creating an interactive visualization using Cytoscape and lupus medication side effect data. Each shared side effect is listed with linked pharmaceutical drugs used to treat lupus patients. This visualization would help with showing links between common side effects for multiple drugs, as well as how commonly each side effect is listed in total for the given data.