An Intelligent Knowledge Base for Cancer Pain Treatment
Grant Number: R44CA78101-02

Abbreviated Abstract
This Fast-Track SBIR grant application proposes to determine the feasibility of building a computerized decision support system for cancer pain treatment. The NCI investigators previously developed and tested a pharmacologic algorithm method, based on the Agency for Health Care Policy and Research Guideline for Cancer Pain Management, in the outpatient setting. The pharmacologic algorithm utilizes an efficacy versus toxicity decision point to funnel comprehensive assessment data into a treatment recommendations flow chart. Reassessment parameters guide followup care dependent upon the severity of pain intensity for patients randomized to the algorithm process during a controlled trial. The Phase I project will convert the assessment components of the “paper and pencil” algorithm into a health care workflow software application. The assessment elements, embedded in the workflow, will undergo data modeling against actual data sets from the original algorithm study. Feasibility and feature limitations to the workflow model will be assessed. The long-term objective will be to utilize the optimized assessment workflow application to launch a rapid prototyping of the complete algorithm into a knowledge-based decision support system.

Primary Investigator
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Research Team & Affiliations
Du Pen, Inc.

Total Budget
$1,975,924

Research Objectives
AIMS
1. Design a systems architecture that will optimize the workflow technology while meeting the decision support requirements necessary to implement the treatment recommendations function.
2. Complete data modeling with the proposed system, utilizing the database from the investigator’s previous algorithm research.
3. Develop a prototype model of the algorithm system.
4. Test the prototype in an oncology clinic.

Theory/Hypothesis
Experimental Design
Final Sample Size & Study Demographics

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<tr>
<th>Role in Development</th>
<th>Discipline</th>
<th>N</th>
<th>M</th>
<th>F</th>
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<td>Consultants/Case Modeling Reviewers</td>
<td>Oncology Physicians</td>
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<td>Initial Beta Testers</td>
<td>Oncology Physicians (not the same as consultants)</td>
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<td>7</td>
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<tr>
<td>Cases</td>
<td>Patients</td>
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<td>Pain Management Physicians</td>
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*Patients were from VA Medical Center, hence mostly male.

Data Collection Methods

Outcome Measures
Outcome improvement, time management, and cost reduction

Evaluation Methods

Research Results
User feedback has been enthusiastically positive, particularly in three areas: outcome improvement, time management, and cost reduction. Almost universally, our users appreciate the fact that systematic use of “reminding” about pain treatment assists them in doing a better job of managing pain. A second frequent category of comments pertains to the use of pain management summarization specific to the patient that the system provides as a means of saving time and “cutting to the chase” in the shrinking time available for clinic visits. One of the criticisms of the system, and a current focus of development, is how to simplify the data entry screens further so that 80 percent of the time the patient alone, or with the help of a clerical attendant, can input all the required data, instead of nursing staff having to perform or assist in entry of the pain assessment data.

Another significant finding that directed further work was that the system was developed for ambulatory care, although the patients and physicians “floated” back and forth between the outpatient and inpatient condition. This created a demand among users for a mobile-type access portal for use when patients were admitted to the inpatient setting. We developed a wireless networked system using PC tablets to give clinicians access to the decision support system for inpatient use. This was accomplished through supplemental funding.

Barriers & Solutions

Product(s) Developed from This Research

Cancer Pain Decision Support System