

2005 INNOVATIONS AWARDS PROGRAM

APPLICATION

Deadline: April 4, 2005

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1. Program Name

Pharmacy Service and Clinical Knowledge Enhancement System (PSYCKES)

2. Administering Agency

New York State Office of Mental Health (NYSOMH)

3. Contact Person (Name and Title)

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9. Please provide a two-sentence description of the program.

The Pharmacy Service and Clinical Knowledge Enhancement System (PSYCKES) is an innovative health information technology product designed to support decision making and information needs for physicians and other clinicians, and improve the quality and safety of medication prescribing practices in the New York State (NYS) public mental health system. PSYCKES' Web-based clinical decision support system uses state administrative databases to provide clinical data and information resources at the point of care, with drill-down and aggregation capabilities at the patient, physician, hospital, and system levels, and may serve as a model for other states, the federal government, and large payors.

10. How long has this program been operational (month and year)? **Note: the program must be between 9 months and 5 years old on May 1, 2005 to be considered.**

PSYCKES' Web-based version became operational on December 17, 2003.

11. Why was the program created? What problem[s] or issue[s] was it designed to address? **Indicate how the program applies to the "change driver" that you listed above.**

NYSOMH is New York's lead governmental agency responsible for statewide oversight and regulation of all public mental health services, a major provider of inpatient and outpatient services, and administrator of a large state-operated system of institutions. New York's public mental health system serves approximately 590,000 adults and 140,000 children and adolescents each year. NYSOMH's mission is to promote the mental health of all New Yorkers with a particular focus on providing hope and recovery for adults with serious mental illness and children with serious emotional disturbances. Its vision is to work toward a more effective public mental health system, which values recovery, hope, excellence, respect, and safety.

Over the past decade, research in the field of mental health has demonstrated that some specific practices work well in improving outcomes in the lives of individuals diagnosed with a severe mental illness. These specific practices are called 'evidence-based' and are interventions for which there is consistent, scientific evidence showing that they improve consumer outcomes. National studies have shown that a majority of individuals diagnosed with a severe mental illness do not have access to evidence-based practices. Numerous studies have documented that pharmacologic treatment of mental illnesses frequently does not conform to evidence-based practices. In the landmark federally-funded PORT study, conformance with evidence-based prescribing recommendations for schizophrenia indicated significant room for improvement; for example, only 30% of patients received doses of antipsychotics in the recommended range.

NYSOMH is committed to enhancing the quality of our state's public mental health system and has an agency-wide 'Winds of Change' campaign to introduce evidence-based practices into routine mental health care settings. Early in the campaign it became clear that success would not be achieved for the introduction of critical evidence-based medication practices, unless physicians and other clinicians had ready access to decision support tools. Decision support was considered an essential ingredient for the transfer of knowledge to practice, and PSYCKES has been developed to respond to this need.

Prior to implementation of the PSYCKES initiative, considerable work had been done to reach consensus with NYSOMH physicians on the adoption of evidence-based, industry-approved guidelines on prescribing practices which could govern the range of appropriate dosages and frequencies of medications given a person's history, diagnosis, etc. It was also understood that arming physicians with appropriate knowledge would be necessary but insufficient to effect a change in their behavior and a long-term adoption of the evidence-based practices. Therefore, PSYCKES development also included consultation with NYSOMH physicians on what would be useful to assist them in day-to-day application of the knowledge acquired.

The PSYCKES project is designed to address several important opportunities.

First, there is broad consensus on evidence-based practices for mental health, including medications. All states are currently implementing one or more of the six evidence-based practices that the federal Substance Abuse and Mental Health Services Administration (SAMHSA) has recently published toolkits for, with 21 states implementing medication guidelines for schizophrenia. However, states need more information on effective methods for implementation. NYSOMH's PSYCKES initiative is providing critically important information regarding the effective implementation of evidence-based medication guidelines that may assist participating states.

Second, physicians' psychoactive medication prescribing practices are an area of urgent public health need. Numerous studies have documented that the practices of mental health professionals are often at variance with clinical practice guidelines and many patients receive suboptimal care leading to significant societal and financial costs; such variation is best documented in the area of pharmacological treatment. NYSOMH's PSYCKES initiative is contributing toward standardizing medication practice patterns through its automated, guideline-driven performance measures that profile quality, safety, and conformance to evidence-based practices at the hospital and physician levels.

Third, an increasing number of studies have examined the feasibility of using mental health administrative and pharmacy databases, which are universal among payers, to assess conformance with evidence-based practices. These studies document conformance rates in large populations and represent a methodological advance in quality improvement. Taken together, these studies suggest that administrative and pharmacy databases are inexpensive and reliable sources for determining some measures of guideline adherence, including dose and duration of medication trials, patient adherence to medication regimen, and outpatient follow-up after hospitalization.

NYSOMH's PSYCKES initiative is utilizing state administrative databases to provide clinical data and information resources at the point of care. PSYCKES capitalizes on the already existing data NYSOMH maintains for billing, pharmacy, budgeting, and clinical information. Historically, these databases have been used for day-to-day operations and planning activities associated with discrete functions (for example, the pharmacy database is routinely used to monitor cost and quantity of medications). These databases also have the potential to support a broad range of clinical management needs at the state, facility, provider, and individual client level, but integrating and making them broadly available for decision support had not been done prior to PSYCKES.

Finally, health information technologies present promising and rapidly evolving approaches to accessing and sharing health care information, with profound implications for health care service

and delivery. Recent examples of such applications include: 1) a managed care company that offers physicians information regarding medication refills, a measure of medication adherence; 2) private insurers that offer patients real-time access to their medical billing records; and 3) Medicare piloting an application that provides patients with access to their claims.

As described below, PSYCKES' novel Web-based clinical decision support system utilizes advances in health information technologies to support decision making and information needs for physicians and other clinicians and to improve the quality and safety of medication prescribing practices in the NYS public mental health system. Through its unique integration of patient data, clinical practice guidelines and information resources, PSYCKES addresses the information dissemination change driver identified in this application.

Description of PSYCKES

PSYCKES provides access to medication guidelines and medical information that clinicians can review and assess in order to prescribe an appropriate and effective medication regimen. Often physicians do not have access to the information they need in order to formulate an effective plan of care, which begins with medication prescription. Early studies associated with the PSYCKES project found that physicians were using between two to 11 sources of information to conduct a medication review, and on average, consulted six different sources. When asked about the most important types of information needed in a decision support tool to conduct a medication assessment, participating clinicians identified information on past medications, dose and duration of trials, and efficacy of past trials.

While they rated this type of information as being the most useful, they also rated it as being difficult to obtain. Difficulties cited included the inability to locate information from outpatient clinics, other inpatient facilities, and from the patients and families themselves. Therefore, participating physicians first wanted access to information on the client's history with medications to the extent possible. PSYCKES was then designed to consolidate information from 15 years of a person's history in the state-operated system to give the clinician and others access to data on location of service, length of service, types of medications received, adequacy of dose and duration (against consensus guideline recommendations), and use of Clozapine trials (a recommended medication for treatment resistant conditions).

PSYCKES contains two types of information: 1) all available patient treatment history data for the past 15 years for all patients currently served in New York's 26 adult, child, and forensic state psychiatric hospitals, and 2) context based links to information resources including RxList, PubMed, and clinical practice guidelines. PSYCKES pulls data from many state administrative databases to coalesce 15 years of history of prescribing, admissions, and diagnoses. All data processing and reports are written in SAS (SAS Institute, Inc., Cary, NC) and the timelines graphs are written in Ploticus (ploticus.sourceforge.net). For each patient and hospital, PSYCKES includes over 1,000 database queries, and generates over 140 customized links. PSYCKES is a secure, HIPAA compliant application: users need to obtain a security clearance with three levels of approval and use a password to log on. State level users have access to all data in the system. Hospital level users have access to performance data at the state and hospital level, system wide, and can view historical data from any hospital for their current patients, but cannot view data for patients at other hospitals.

PSYCKES organizes clinical data into two linked categories: 1) clinical reports, designed to support clinical decision making, and 2) management reports, designed to support quality improvement

(Table 1). Clinical reports have been developed with feedback from users to ensure that reports do not contain more or less information than physicians need to quickly review a patient’s history to make a clinical judgment. PSYCKES includes six sets of patient-detail *clinical* reports that offer access to 15 years of psychotropic data.

Table 1. PSYCKES Reports

<p>Clinical Reports:</p> <p><u>Attending Caseload Summary and Ward Caseload Summary</u> Summarize 15 years of pharmacy data for the caseload, with one patient per row. Current medications are listed and flagged if out of range, and past medications are identified by type of exposure (e.g. adequate (A) or inadequate (I) past trial according to recommendations for dose and duration).</p> <p><u>The Prescribing Summary</u> Details of a single patient’s history, where each medication trial is a row in the table. Medications trials are sorted by medication class, hospital, and chronologically by start date. This includes all historical medical and mental health diagnoses, and details of aspects of each trial: start/stop date, duration, maximum dose, taper up, and flags of non-conforming practices.</p> <p><u>Time-line Graph</u> A graphic representation of the Prescribing Summary Table, with 13 year view, 1 year views, log or normalized scale options.</p> <p><u>Patient Profile</u> Shows quality indicators at the patient level.</p> <p><u>Raw Orders</u> Allows physician to check original orders as they were entered into the database (no summarization).</p>
<p>Management Reports: Allow drill down from performance at the state level, to hospital, clinician or ward level, to lists of individual patients sorted by degree of deviation from guideline recommendations, to all of the patient reports described above. Currently ten guideline derived performance measures are available; seven clinical and four fiscal.</p>
<p>Infobuttons: Context based links to Web-based information resources including MicroMedex, published guidelines, etc.</p>

All PSYCKES reports are hyperlinked to support rapid navigation from state overviews, down to individual patient orders. Some of the indicators summarize current data (e.g., percent of patients on higher than recommended doses). Other measures take advantage of the historical database to make more complex judgments (e.g., identifying patients who are eligible for clozapine, a medication of choice for treatment resistant schizophrenia, involves review of all data since the medication’s introduction). When appropriate each report presents performance on the indicator as measured, (e.g., number and percent of patients receiving lower, within, or higher than recommended range), as well as a break out on degree of deviation (e.g., 1.5X, 2X, 3X, 4X higher than recommended range).

There are ten sets of indicators, including seven quality and safety indicators, and three fiscal indicators showing potential savings of improved guideline compliance (Table 2).

Table 2. PSYCKES Indicators

Quality indicators:

- 1) dose of antipsychotics as thiorazine equivalents
- 2) concurrent number of psychotropics (psychotropic polypharmacy)
- 3) concurrent number of antipsychotics (antipsychotic polypharmacy)
- 4) clozapine eligibility
- 5) antipsychotic frequency, to highlight that medications should be given once a day
- 6) duration of antipsychotic trials
- 7) antipsychotic regimens (types of combinations)

Fiscal indicators:

- 1) cost savings of using cheaper dosing regimens of risperidone
- 2) cost savings of reducing high doses
- 3) cost savings if only monotherapy of antipsychotics were used

12. Describe the specific activities and operations of the program in chronological order.

Development of the PSYCKES Web-based clinical decision support tool began in 2002. Program specifications were based on earlier field tests of paper (hard copy) pharmacy reports. Physician-level PSYCKES reports were beta-tested in one hospital during the first six months of 2003. Management reports for guideline-derived quality indicators and caseload summaries were developed based on physician feedback, and the PSYCKES system went live with reports available for all hospitals on December 17, 2003. Technical development continues with a focus on adding new guidelines and data sources.

PSYCKES has been implemented in a staged rollout; full statewide implementation will be achieved as of April 30, 2005. The PSYCKES team supports implementation with training sessions, user guides, and technical assistance and support. Monthly Steering Committee meetings which include representatives from the facilities, provide user feedback on implementation and priorities for program enhancements. PSYCKES is currently being used to support quality improvement projects both at the facility level and for statewide initiatives.

13. Why is the program a new and creative approach or method?

PSYCKES is a new and creative method for using administrative and pharmacy data to support clinical decision-making at the level of the individual patient.

States are beginning to use administrative databases to develop system-level quality indicators. These measures are generally limited to aggregate state level measures of quality. Some states have used administrative databases to develop indicators at the program level, and have shared performance on process and outcomes of care with providers (e.g., Vermont, see: www.ddmhs.state.vt.us/docs/res-eval/pip-reports.html). NYSOMH has begun a process of putting these indicators on our agency Web page to support transparency of performance data.

A remaining challenge is to examine the feasibility and impact of using administrative and pharmacy data to support clinical decision-making at the level of the individual patient. For chronic illnesses in particular, such as schizophrenia and other mental illnesses, these data contain a wealth of information including history and adequacy of medication trials, level of adherence to medications,

changes in psychiatric and medical diagnoses over time, dates and duration of hospitalizations, and identification of all treating providers.

To date, sharing of administrative data with clinicians exists in some form in all states, but in an extremely limited way through the Drug Utilization and Review (DUR) process. In the Medicaid system all 50 states conduct DUR or other quality and cost management programs that involve outreach to clinicians based on review of state pharmacy data. In mental health, primary care physicians have been provided with information derived from an HMO pharmacy database (antidepressant dose and prescription refills) to effectively support implementation of AHRQ guidelines for depression. Private insurers have begun to offer patients Web-based access to their medical billing records, but these are often limited to recent history (e.g., the past year). The federal government recently announced the intent to pilot test Web-based applications to offer Medicare recipients access to their billing records. However, little is known about users' informational needs and the associated strengths and weaknesses of informational delivery formats, and even less is known about the impact of these applications on quality of care.

In addition, there are limitations to the traditional DUR approach utilized by most states.

- *First*, the information is generally mailed to clinicians whether they want it or not and is consequently not available to them when and where they need it.
- *Second*, the data offered is generally extremely limited in scope. Typically, only a small percentage of physicians statewide are offered information, and the information concerns only a small number of their patients (typically 1-4), even though other patients may also have quality issues. The false implication is that patients for whom information is not supplied do not have quality problems. In addition, the information offered tends to be limited in time frames; (e.g., medication adherence in the past quarter only, rather than all available information for the individual patient).
- *Third*, information is often not summarized in clinically helpful ways. Data may be presented in a condensed form that does not allow clinicians to interpret the data for themselves or to determine whether it indicates a clinically significant problem. For example, a physician may be sent information that two patients were non-compliant over the prior quarter, but not be able to tell for how long or when. Alternatively, information is sometimes not summarized at all, but is a "data dump" from the administrative database over the past year for one individual patient.
- *Fourth*, many physicians believe that current DUR data sharing focuses on cost, not quality, and intrudes upon rather than supports clinical decision making.
- *Fifth*, a recent study found that the Medicaid DUR has not been shown to improve clinical outcomes or reduce the rate of potential prescribing errors.

In summary, all states share some clinically relevant patient-specific state database generated information with treating physicians in a limited paper-based fashion. To the best of our knowledge, no state has developed a Web-based application for sharing all clinically relevant data with treating physicians in a flexible, point of service manner. PSYCKES offers this model. The key distinctions between PSYCKES and other existing medication management systems are:

- 1) Aggregation of 15 years of history into clinically usable form.
- 2) Focus on providing the details of those data to front-line clinicians, and through them, patients and families.

(3) Ability to drill-down into data at the levels of state, hospital, clinician, ward, patient, and finally raw orders, allowing all users maximum flexibility to evaluate the data for themselves.

14. What were the program's start-up costs? (Provide details about specific purchases for this program, staffing needs and other financial expenditures, as well as existing materials, technology and staff already in place.)

PSYCKES Staffing Needs:

- (1) 1 FTE of a Physician/Informatician specializing in Informatics, usability, SAS, Perl, data warehouse and application design and development, statistical and systems analysis, and project management – to design, build, test, and deploy the application.
- (2) 1 FTE of a SAS programmer to prototype reports.
- (3) 1 FTE of a project manager to provide implementation planning, training, evaluation, and user support.

Existing Staff, Materials, & Technology already in Place:

(1) Staff: 2 FTE years of an advanced SAS analyst to extract administrative data from the source systems monthly, and clean, organize and transform it into the Institutional Research Database (IRDB). Extracts from the IRDB are used to generate the PSYCKES databases and reports.

(2) Materials/technology required and associated costs:

Hardware

Application server	\$15,000
Fiber card	\$2,000
Storage area network-based (SAN) disk storage	\$24,000

Software

SAS 8.2 servers:	\$42,000
Windows 2003 Server	\$1,000
Citrix Metaframe XP	\$5,000
Netvision	\$500

Total \$89,500

15. What are the program's annual operational costs?

Staff

20% FTE of Programmer Analyst to conduct monthly runs.

5% FTE of Physician/Informatician to resolve operational issues.

10% FTE of project manager to provide ongoing user support and training.

Materials/technology

Citrix Metaframe XP: \$750

SAS 8.2: \$33,758

Data backup (tape costs): \$2,000

Total: \$36,508

16. How is the program funded?

Staffing costs for PSYCKES are funded via state lines.

Technology and materials are funded by NYSOMH.

17. Did this program require the passage of legislation, executive order or regulations? If YES, please indicate the citation number.

No.

18. What equipment, technology and software are used to operate and administer this program?

Equipment:

SAN-based disk storage

INTEL server running

Windows 2003 Server

Software:

Perl for data cleaning

SAS 8.2 for data transformation and report development

Ploticus for timeline graphs

NetVision (for logging)

Oracle 9i

Technologies:

Source databases/systems:

Pharmakon

Med Solution

Meds Manager

DMHIS (NYSOMH database)

Intermediate databases:

NKI IRDB (NYSOMH database)

19. To the best of your knowledge, did this program originate in your state? If YES, please indicate the innovator's name, present address, telephone number and e-mail address.

The PSYCKES project originated in New York State and was developed internally within NYSOMH.

Co-directors of the PSYCKES project are:

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20. Are you aware of similar programs in other states? If YES, which ones and how does this program differ?

To the best of our knowledge, no other state has developed a mechanism for sharing all clinically relevant data with treating physicians in a flexible, point of service, Web-based manner. PSYCKES offers this model and, to the best of our knowledge, is the first example of an integrated, guideline-driven, clinical and fiscal decision support system for psychiatry.

Please also see response to question 14.

21. Has the program been fully implemented? If NO, what actions remain to be taken?

PSYCKES is being implemented in a staged rollout, with 17 out of 20 state adult psychiatric facilities trained as of March 31, 2005. Implementation at the remaining adult facilities is scheduled to take place by April 30, 2005.

The implementation process includes registering users for access, providing interactive training and user materials, and offering follow-up technical support and assistance via phone and email.

22. Briefly evaluate (pro and con) the program's effectiveness in addressing the defined problem[s] or issue[s]. Provide tangible examples.

PSYCKES is impacting the defined problem[s] or issue[s] in the following areas:

Quality of Care and Safety: PSYCKES is designed to increase quality of care and improve patient safety by improving clinician access to patient information and relevant clinical practice guidelines and medical information. It is contributing toward standardizing practice patterns through automated, guideline-driven performance measures that profile quality, safety, and conformance to evidence-based practice at the hospital and physician levels. For example, in a preliminary study of PSYCKES' impact over the period January– November 2004, hospitals with access to PSYCKES reports showed a statistically significant decrease in the percentage of patients on two or more antipsychotics (a quality indicator), while hospitals without PSYCKES access did not.

PSYCKES responds to the need for transparency in health care information by making the same data available to all users, describing the system's performance on safety and evidence-based practice, and supporting clinicians by making patient education information available to patients and families that allow them to make informed decisions when selecting a clinical practice or choosing among alternative treatments. The development and implementation of PSYCKES is a step toward achieving the national goal of developing evidence-based, clinical decision support systems tailored for priority chronic conditions that are designed to improve the safety, quality, and efficiency of health care.

Relevance of PSYCKES for a Broad Population: Based on the success of its pilot phase, NYSOMH Commissioner Sharon Carpinello has committed to PSYCKES implementation in all NYSOMH psychiatric centers. However, there are broader implications for the value of this project. PSYCKES was initially developed to support clinical decision making in the treatment of adults with mental illness, with a particular focus on antipsychotic prescribing. In the future, the PSYCKES project plans to expand the application to a broader range of diagnoses, and two special populations: children and forensic populations. The project will be collecting qualitative data about information needs and adaptations required for these settings, allowing for continual improvement in PSYCKES, for example by incorporating the Treatment Recommendations for Use of Antipsychotics for Aggressive Youth (TRAAY).

Utility of PSYCKES for Other State Agencies: NYSOMH will be using the PSYCKES project to inform a separate, collaborative project with the NYS Department of Health (DOH) that will adapt PSYCKES for use with Medicaid data, which is ubiquitous among states. We believe that PSYCKES may be able to provide support to several state administrative and quality improvement efforts including: review of program medication practices as part of the licensing and certification process of 2,500 community-based programs statewide, and quality improvement and Drug Utilization Review efforts in collaboration with NYSDOH.

Impact on Employee and Union Relations: Initially, there was some concern expressed that the use of PSYCKES might unduly diminish clinical latitude in decision making. This concern has proven to be groundless. PSYCKES has been widely accepted during the pilot phase and beyond. Results of a user satisfaction scale developed as part of the pilot show users rated PSYCKES as the single most useful source of medication information. As PSYCKES has evolved into a statewide

application, its use is monitored and rates of usage continue to show that physicians are using PSYCKES routinely.

Replicability: The PSYCKES methodology of integrating data from existing sources, adding industry guidelines, and then making multi-level reports available is something that may be replicated and transported to areas other than medication prescribing practices. The steps in developing PSYCKES—reaching consensus on a policy to improve quality, responding to felt need that new knowledge alone is insufficient without an ongoing decision-support tool, and pilot testing—are all functions that can be utilized in other areas where existing data may be readily translated into use by front line staff, supervisors, and managers to improve quality. In addition, PSYCKES is a software application that can be used by others in state government interested in quality health care.

Based on all of NYSOMH studies of PSYCKES to date, preliminary data suggests the following:

- In the course of chronic, long-term illnesses, patients are seen by a large number of physicians over time, and communication and information sharing across inpatient and outpatient settings can be poor.
- Physicians do not have ready access to complete historical pharmacological data about their patients to support patient evaluation.
- Physicians generally agree with quality and safety recommendations, believe that their implementation will improve patient outcomes, and that barriers to implementation are not prohibitive.
- Physicians over estimate their conformance on quality and safety indicators, and rate their own level of conformance as high relative to their estimation of ideal conformance rates.
- Physicians report that they would use computer-based resources if available to help with their practice, even those physicians who had relatively low computer comfort ratings.
- Physicians can benefit from expanded access to important medication information at point of care, such as drug-drug interaction resources and patient education materials.
- Improved conformance to quality indicators, such as those included in PSYCKES, can result in cost savings (thus improved quality and lower costs are not incompatible).
- After the PSYCKES pilot training protocol, physicians were proficient in its use regardless of computer use prior to training.
- PSYCKES was rated among the most useful sources of medication information and had high usefulness and usability ratings.
- Physicians and administrators offered access to PSYCKES use it for an average of two hours and 11 patients per month.
- Physicians were able to use PSYCKES effectively with minimal exposure to adjust patients' therapeutic regimens.
- Physicians given access to PSYCKES had fewer errors and improved efficiency in medication review.

23. How has the program grown and/or changed since its inception?

The initial version of PSYCKES was field-tested at one hospital in the summer of 2003. In response to user feedback, several additional features, including guideline-derived management reports, caseload summaries, and timeline graphs were developed and incorporated into the system prior to the initial statewide run on December 17, 2003.

NYSOMH continues to evaluate suggestions for enhancements to PSYCKES based on user feedback from the PSYCKES Steering Committee and individual users. The most recent upgrade to PSYCKES is an archive that provides users with access to historical PSYCKES reports.

24. What limitations or obstacles might other states expect to encounter if they attempt to adopt this program?

The PSYCKES model may be adapted by any state. The ease of adaptation will depend on several factors, including:

- Data issues
 - Architecture of state pharmacy and medical records database(s).
 - Data quality.
- Organizational issues
 - Need to coordinate development and implementation centrally and among facilities.
 - Interaction with other quality improvement and information technology initiatives.
- Workforce issues
 - Staff access to computers.
 - Staff use of computers.
 - Staff support of quality improvement initiatives.
- Technical issues
 - Availability of enterprise-wide unique identifiers for patients, doctors, facilities, and locations.
 - Development of interfaces from the new states' data to the schema expected by PSYCKES, which includes harmonization of identifiers for drugs, diseases, doctors, patients, and locations.
 - Security policy for granting and monitoring access to reports.