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Translating Addictions Research into Evidence-based Practice: the Polaris CD Outcomes Management System

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Abstract

Converting the findings from addictions studies into information actionable by (non-research) treatment programs is important to improving program outcomes. This paper describes the translation of the findings of studies on Patient-Services matching, prediction of patient response to treatment (Expected Treatment Response) and prediction of dropout to provide evidence-based decision support in routine treatment. The findings of the studies and their application to the development of an outcomes management system are described. Implementation issues in a network of addictions treatment programs are discussed. The work illustrates how outcomes management systems can play an important role in translating research into practice.

Keywords

Outcomes management; Evidence-based practice

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Contributors

Authors Toche-Manley and Grissom directed the development of the outcomes management system (Polaris CD) and wrote the sections of the manuscript describing the application of research findings to system development. Author Dietzen conducted the statistical analysis and wrote all sections describing data analyses. Author Sangsland conceptualized and managed the implementation of the system in the Kaiser Permanente addictions treatment programs. All authors contributed to and have approved the final manuscript.

Conflict of Interest

Authors Toche-Manley, Grissom and Dietzen are employed by Polaris Health Directions, Inc., which markets the Polaris CD system. Grissom is a shareholder in the company. Sangsland has no conflict of interest.

NIDA played no role in relation to the research or interpretation of findings

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1. Introduction

An Internet search for “Addiction Treatment Research” yields 28,000 links, including a large body of research with the potential to guide clinical practice and improve treatment outcomes. Converting this rich resource into information actionable by (non-research) treatment programs remains a challenge. Translation of research into practice involves development of assessments based upon research; collection and validation of patient responses; storage, analysis and reporting of the response data; evidence-based interpretation of the results guided by application of the research findings; use of the reports by therapists to guide treatment, and by program managers in support of quality improvement.

The availability of powerful, low cost computers has made possible outcomes management systems that provide or support all of these functions. They can arm the therapist with clinically important information derived from research involving many thousands of patients to supplement the therapist’s own knowledge and skills. They can improve practice through combining the art of therapy with the science of rigorous research.

This paper describes the application of the findings from four studies to the development of an outcomes management system for addictions treatment. Research on patient-services matching, treatment dropout and evidence-based prediction of treatment response formed the foundation for the system. Once developed, adoption of the system by treatment programs presented a second, no less difficult series of challenges, described in the final section of the paper.

1.1 Outcomes management in behavioral healthcare

During the nineteenth century a visit to a physician was as likely to harm as to help a patient. Early in the twentieth century establishment of the medical lab led to a paradigm shift in medical practice, and marked improvement in medical outcomes. It became possible to objectively assess a patient’s health through x-rays, blood and urine tests, and examination of tissue samples. These new tools enabled physicians to use standardized procedures to evaluate a patient’s condition, decide upon a treatment plan, and monitor whether treatment was having the desired effect. The strides taken by medical practitioners, and the failure of behavioral healthcare to achieve comparable progress, are due in large part to their differing uses of measurement. In contrast to general medicine, measurement in behavioral healthcare has been confined to research, with limited application to clinical practice (Grissom, 2000).

Managed care requirements for accountability have provided the impetus for outcomes measurement and management in behavioral health (Sperry, Brill, Howard, & Grissom, 1996). Outcomes measurement typically involves assessment of a sample of patients before and after treatment. The utility of these data depends upon various factors such as the representativeness of the sample, adequacy of case mix adjustment and the clinical relevance of the outcomes measured. Outcomes measurement does not directly affect treatment of individual patients or treatment procedures.

In contrast, outcomes management involves assessment of every patient at the start of treatment and at intervals during treatment. It enables clinicians to more rapidly and accurately assess patient status. It provides them with standardized, clinically actionable information that can be used to plan treatment, evaluate patient progress, and document outcomes, much as a medical doctor uses physiological test data. Outcomes management systems provide the technology for continuous quality improvement. By facilitating the application of basic research to clinical practice and continually accumulating data relating to patient characteristics, treatments and outcomes the system “learns” from both treatment

successes and failures, continually increasing knowledge of “what works” for different patients.

Outcomes management represents a paradigm shift for behavioral healthcare analogous to that which occurred a century ago in general medicine. This paper describes how an outcomes management system supports clinical decisions and quality improvement through application of research on patient-services matching, reduction of dropout and predictive models for patient response to treatment.

1.2 Outcomes Management for Treatment of Chemical Dependency

The use of standardized assessment of the patient’s condition (e.g., temperature, blood pressure, blood tests, X-rays) to plan and monitor treatment is foundational to general medicine. In most cases, failure to perform such assessments would be considered malpractice. In contrast, systematic quantitative measurement is not commonly an important element of addiction treatment.

Historically, measurement has played a minor role in chemical dependency treatment. Assessment of a patient’s treatment history; use of substances; psychiatric, family, employment problems and other presenting problems has involved paper and pencil intake forms combined with clinical interviews. The information was rarely stored electronically, and typically did not include quantifiable information. It remained in the patient’s clinical file, for purposes of case documentation.

Development of the Addiction Severity Index (ASI) in the late 1970s (McLellan, Luborsky, O’Brien, & Woody, 1980; McLellan, Cacciola, Kushner, & Peters, 1992) provided the opportunity for clinically useful, reliable measurement of the severity of problems commonly experienced by substance abusers. Clinical use of the ASI has been limited due to the staff time required to conduct an ASI interview, and the training required to obtain reliable scores, a problem compounded by high rates of staff turnover.

Two developments – advances in information technology, and managed care - have significantly altered the feasibility and incentive for quantitative assessment by practitioners. Advances in information technology have made it possible to collect, store and process large volumes of clinical data, at ever lower costs. The advent of managed care has been accompanied by a strong emphasis upon accountability, including documentation of outcomes.

Few chemical dependency programs conducted any form of outcomes assessment until the late 1980s, when managed care and accreditation organizations began to require evidence of program effectiveness. Since that time outcomes assessment has become progressively more sophisticated (Grissom, 2000). Computer-based systems can provide for response-adaptive assessments in which patients are presented with only those items that are relevant, as determined by their responses to prior questions. They can cover a broad spectrum of measurement domains within an acceptable time-to-complete. Advances in information technology enable such systems to provide scalable solutions that can be integrated with electronic health records, comply with HIPAA, and offer data security features such as encryption and disaster recovery.

A core function of an outcomes management system is translation of research into practice. The scientific foundation of Polaris CD included three NIH-funded projects: research conducted by the University of Pennsylvania on Problem-Services Matching, Northwestern University on prediction of patient response to treatment and Polaris Health Directions on prediction of dropout. The system’s development and clinical application illustrates how

treatment decisions and quality improvement initiatives can be informed by findings from addictions research. The remainder of this paper describes the system, four foundational studies and implementation in a network of treatment programs.

2. Methods

2.1 Outcomes Management System: Polaris CD

Polaris CD was developed to provide addictions treatment programs with an efficient means to harness the power of measurement for quality improvement (Grissom, Sangsland, Jaeger, & Beers, 2004). It is designed to be integrated into routine addictions treatment. Polaris CD consists of the hardware and software required to collect, store, process, and report information relating to a patient's clinical status and progress in real time. Specifically:

- Hardware – One or more computers with Internet access and a printer.
- Software that provides for questionnaire administration, data processing, data base management, report generation, and various administrative functions.
- Assessments:

Patient Intake—Completed at admission, it includes demographic items and questions relating to treatment history, motivation, strengths, and risk factors for dropout and relapse. Quantitative measures include the severity of symptoms of depression and anxiety, and severity of alcohol, drug, psychiatric, family/social, employment and medical problems, based upon the Addiction Severity Index (McLellan, Cacciola, Kushner, & Peters, 1992). Mean completion time (N=15,800) is 21.0 minutes.

Patient Update—Completed by patients at program- and/or counselor-specified intervals during treatment. Questions relate to the patient's condition (e.g., ASI scales), progress, services received and satisfaction with treatment. Mean completion time (N=9,000) is 15.0 minutes.

Counselor—An optional system component, this brief questionnaire provides for the counselor's assessment of the patient's condition, progress, and prognosis. It is useful to case documentation, utilization review/case management, and to strengthen prediction.

- Reports for use by clinicians, operational reports and program-level outcomes reports:

Clinical reports provide detailed information for treatment planning and monitoring. They are available immediately upon patient completion of assessments. The Intake report provides alerts for inauthentic responding; the patient's treatment goals; screens for dangerousness to self or others and serious mental illness; areas of concern and perceived need for treatment (corresponding to ASI scales; i.e., alcohol, psychiatric, etc.); ASI severity scores, and severity of symptoms of depression and anxiety; recommendations for supplemental services; treatment assets/strengths; level of risk for dropout; source of pressure to enter treatment; readiness to change and obstacles to recovery (risk factors for relapse). The Update report tracks changes in the patient's clinical condition (e.g., ASI change scores) and areas of concern; and shows their satisfaction with treatment; confidence in resisting various relapse triggers; steps they will take to maintain recovery and the nature and quantity of services they feel helped them to address their addiction-related problems.

Polaris CD reports show percentile scores for all scales. Percentile scores for six ASI scales (Medical, Psychiatric, Family/Social, Employment, Drug and Alcohol), Depression, Anxiety and Resilience are calculated based upon norms for outpatients (N=8,311) that completed

Polaris CD Intake assessments upon admission to treatment. The normative sample included 5,228 adult males (63%) and 3,083 adult females (37%) in outpatient treatment. The majority were Caucasian (56%), Latino/a (25%) or African-American (12%). One in five (22%) were college graduates, 87% were high school graduates.

Operational reports indicate the percentage of patients that completed a timely update assessment in the past week, past four weeks and year to date.

Program-level aggregate reports summarize patient demographics, goals for treatment, clinical severity upon admission, treatment history, motivation for change, and strengths (e.g., resilience). Outcomes information includes satisfaction with treatment and severity-adjusted clinical outcomes (e.g., percentage of patients that make satisfactory progress in relation to a predicted response to treatment).

Four studies foundational to Polaris CD development are described below.

2.2 Problem-Service matching studies

There have been numerous attempts to match substance abuse patients to treatment programs. In view of the wide variability among programs and patients, it seems reasonable to pose the question raised by the Institute of Medicine after its review of alcoholism research: “which kinds of individuals... are likely to respond to what kinds of treatments by achieving which kinds of goals” (Institute of Medicine, 1990).

The findings from studies that have attempted to improve outcomes by matching patients to programs were equivocal, due to methodological limitations (Mattson, Allen, Longabaugh, Nickless, Connors, & Kadden, 1990). Project Match was funded by NIAAA to provide a definitive test of the matching hypothesis for alcoholism. The national, multi-site, randomized clinical trial involved over 1,700 patients and addressed the methodological limitations of prior studies. Its conclusions were encouraging in relation to treatment effectiveness (patients experienced gains in each of the three modalities studied) but discouraging in relation to matching: of the ten matching variables studied, only one (psychiatric severity) proved useful in matching outpatients to treatments (Project MATCH Research Group, 1997).

Study #1—A rigorous, 5-year study was undertaken by the University of Pennsylvania’s Center for Study of Addiction with the goal of establishing a method for matching substance abusers to an optimal setting or program (McLellan, Grissom, Zanis, Randall, Brill, & O’Brien, 1997). This proved impossible, for both scientific and practical reasons. Scientifically, the research team was unable to identify differential predictors of outcome by setting or program. In addition, the researchers discovered that numerous limitations on treatment referral made it impractical to attempt to match patients to programs. Nearly two thirds (62%) of the 186 patients in the initial study cohort could not be referred to the program considered optimal by their evaluator: limitations in insurance or HMO coverage precluded placement; the preferred program did not have a treatment slot or bed available; the patient insisted upon referral to the program most convenient in relation to their home or work; or the patient viewed the program negatively due to prior experience or that of a friend (Grissom, 2001). Even if it were technically feasible, the value of patient-program matching would be limited due to non-clinical factors in referral.

Switching their focus, the research team developed and tested a procedure for matching patients to services (not programs), on the basis of their severity scores on the family, psychiatric, and employment subscales of the ASI. Threshold scores (one standard deviation above the mean severity score) were established for each subscale. Experimental group

patients (N=45) were provided with special services (three individual sessions) in each area where their scores exceeded the threshold. For example, those with scores above the threshold on the Family subscale received three individual counseling sessions focused upon family issues. Of patients reporting problems in one or more of these areas, 15%-20% exceeded the severity threshold and met the criterion for receiving matched services. Control group patients (N=49) received standard care from the same counselors, in the same programs.

Study #2—The “matching” procedure developed in study #1 was adapted for use by an Employee Assistance Program (EAP), Integra. Integra staff noted that patients rarely present for treatment with a drug or alcohol problem unaccompanied by difficulties in other areas of their lives. When these difficulties are severe, it is important to supplement standard treatment with additional, targeted services such as marital/family counseling, employment or mental health services.

For study #2 (Grissom, 2001), Integra Intake counselors used an abbreviated ASI interview to assess the severity of patients' (N=147) psychiatric, family and employment problems. Patients were randomly assigned to experimental and control groups. The need for supplemental services was determined by applying the thresholds established by the University of Pennsylvania researchers. Control group referrals were made as usual. For experimental subjects, referral to an addictions treatment program was made contingent on the program's commitment to provide the supplemental services. The patient was contacted by the EAP counselor two weeks after admission to confirm that the supplemental services were being provided.

2.3 Expected treatment response (ETR)

The Expected Treatment Response (ETR) model for psychotherapy was the culmination of over a decade of research by Dr. Kenneth Howard and colleagues at Northwestern University (Howard, Moras, Brill, Martinovich, & Lutz, 1996). The model uses pretreatment clinical characteristics (e.g., severity, chronicity, previous treatment, treatment expectation) to predict the patient's expected response over the course of his or her treatment. Using the results of an individualized growth curve analysis for a large sample of outpatients in psychotherapy, a single patient's likely response over the course of treatment can be predicted as soon as his/her intake information is available. Therapeutic effectiveness can be assessed for a single patient by tracking the patient's actual progress in comparison to his or her expected progress. Dr. Howard's goal was to help the field of psychotherapy research move beyond the question of whether an intervention is effective/“works” for a given disorder to the clinically more important question: “Is this treatment working for this patient?” Dr. Michael Lambert has shown that psychotherapy outcomes can be significantly improved through clinical interventions informed by comparing a patient's treatment progress to their ETR (Lambert, 2007).

Study #3—The goal of this study was to construct an ETR for each of six ASI severity scores that adjusts for the patient's time in treatment, initial severity, and other presenting characteristics, extending ETR technology for use in addictions. Polaris CD data were analyzed for all patients that reported problems at Intake on the ASI domain and completed at least one Update assessment. The patient samples available for analysis differed for each scale, reflecting differences in the proportion of patients reporting problems on each – Alcohol (N=5,185), Drugs (N=2,534), Family/Social (N=3,386), Psychiatric (N=2,533), Medical (N=2,534) and Employment (N=3,865). In each case the sample was split, with 25% of the cases randomly selected for a validation sample and the remaining 75% used for the derivation sample.

The dependent variables were ASI raw composite scores at update. Over 100 patient-reported intake variables and the six ASI scores at intake were considered for inclusion as predictors. Many items were transformed to correct for properties such as small cell sizes, skewness, and kurtosis. Both the original and transformed variables were evaluated (although only one was included in the prediction equation.)

Point biserial correlations, t-tests and oneway ANOVAs were used to reduce the initial item pool by identifying all items with some association (at $p < .10$) with the dependent variable (ASI score). Conceptually similar items were evaluated using separate regression equations to determine the strongest predictors. For instance, regression equations were used to determine the merits of using a full-scale score versus individual items on that scale. In addition, VIF and tolerance were used to evaluate collinear relationships between potential predictors. The final model for each scale was developed using forward stepwise multiple regression analysis.

2.4 Prediction of treatment dropout

Study #4—The Polaris CD Intake assessment includes items that are believed to be related to dropout on the basis of research or interviews with clinicians. Development of the dropout model involved analysis of data for 1,538 patients treated at twelve outpatient programs during the period 2003–2007. Half (53%) met the study criterion for “dropout”: failure to attend scheduled treatment during the two-week period bounded by 23 to 37 days post-intake. The association of each intake item with dropout was tested using univariate analyses to identify potential predictors. Derivation ($N=1,197$) and validation ($N=341$) samples were randomly selected. Items with significant univariate results were entered into a forward stepwise logistic regression to derive the predictive model.

2.5 Implementation

The Southern California Permanente Medical Group (SCPMG) selected Polaris CD for use in its addictions treatment programs after evaluating its features in relation to pre-established criteria. The measures were to be: consistent with the NIDA principles for effective treatment (National Institute on Drug Abuse, 1999); clinically meaningful, brief, valid, and reliable; operationally feasible, imposing minimal burdens on the patient, provider and clerical staff; comprehensive in assessing multiple areas of clinical focus; appropriate for monitoring treatment progress (Sangslund, 2001). Importantly, Kaiser wanted to be able to customize the assessment and reports.

The Substance Abuse Treatment Support System (SATSS), a customized version of Polaris CD, has been operational in all twelve chemical dependency recovery programs in the SCPMG for four years and in four of the programs since 1999. Patients complete the Intake assessment upon admission, and the Update assessment at 30-day intervals thereafter. More than 50,000 assessments have been completed.

3. Results

3.1 Problem-Service matching studies

Study #1 Results—Patients matched to services using the procedure described above achieved more favorable outcomes than those in the control group. They were more likely to complete treatment (93% vs. 81%). Outcomes reported on the follow-up ASI (six months post-treatment) were uniformly more positive for the matched group (e.g., 35% of the control group patients had re-entered treatment, versus 24% of the matched group). The research design enabled the researchers to attribute the outcome to the matching, since it controlled for variation in the counselor’s skills and the general quality of the program.

Patients who received treatment directed towards their specific problems experienced significantly more positive outcomes than similar patients, treated in the same programs by the same counselors, who were not matched to services (McLellan, Grissom, Zanis Randall, Brill, & O'Brien, 1997).

Application of study #1 results for development of Polaris CD—Polaris CD calculates the composite scores for the ASI Psychiatric and Family/Social scales (McLellan, Cacciola, Kushner, & Peters, 1992), as well as an Employment scale based upon the ASI scale structure but modified to make it more useful for assessment of employed patients. Raw scores are transformed into percentile scores for reporting. The latter indicate the percentage of norm group outpatients (N=8,311) that at Intake report problems less severe than the patient's score. The percentile severity scores are printed and displayed in a bar chart on the patient clinical report. For example, a score of 81 on the Psychiatric scale indicates that the patient's psychiatric condition is more severe than 81% of adult outpatients at admission to treatment.

The threshold raw ASI scores derived from study #1 are compared to the patient's severity scores on each of the Psychiatric, Family/Social and Employment scales to determine whether "Supplemental Services" should be provided. For each of the scales, approximately 15%-20% of patients reporting any problems are identified as needing supplemental services, and an appropriate message is printed on the Intake report (e.g., "Supplemental services recommended for Psychiatric and Family/Social problems.").

Study #2 Results—The effectiveness of the matching procedure employed in the EAP study was evaluated through analysis of data for 90 (first cohort) substance abusers who contacted Integra prior to its implementation, and 57 abusers (second cohort) for whom the need for supplemental services was evaluated using the procedure. Nearly three out of four (72%) of the second cohort callers presented for treatment, compared to 55% of the first cohort patients, a 31% improvement in the show rate. Of the second cohort patients who showed for treatment, 86% completed the program, a 15% improvement in completion when compared to the 75% rate of the first cohort. Finally, of the second cohort patients who completed treatment, 85% did not re-present for treatment within six months, a 31% improvement on this outcomes measure when compared to the 65% success rate for the first cohort (Grissom, 2001).

Application of study #2 results for development of Polaris CD—This study confirmed the benefits of the matching procedure employed in Study #1. While it did not independently alter the design of the assessment system, it served to help persuade addiction counselors of the importance of "supplemental services" for patients that report unusually severe problems in the three target areas. The authors find that the belief is not uncommon among addictions counselors that family, employment and psychiatric problems will markedly diminish once a patient is clean and sober and need not be specifically addressed during treatment, despite considerable evidence to the contrary.

3.2 Expected treatment response (ETR)

Study #3 Results—Each of the six models was tested on the validation sample to determine shrinkage and generalizability. For each validation subject, a predicted score was calculated using algorithms developed with the regression procedures. The predicted and actual scores were correlated using Pearson's *r*, to determine the extent of shared variability. Double cross validation, in which parameter estimates are re-calculated using the validation sample and tested on the original development sample, was used to evaluate the model's stability across samples.

Table 1 shows the correlation and shared variance for the actual and predicted scores. Results from double cross validation suggest the models are stable and generalizable across samples. The Alcohol, Drugs and Family models appeared most stable; the Psychiatric, Medical and Employment scales had mild to modest shrinkage (8% – 17%) when applied to the validation sample. Given the robust sample size and diverse programs represented, the models show promise for use in a variety of settings.

Application of study #3 results for development of Polaris CD—The predictive algorithms derived in Study #3 are applied when reporting program-level aggregate outcomes. Adjusting for patient characteristics and time in treatment, they provide severity-adjustment of the raw outcomes data, which is necessary for comparing outcomes across programs or treatment models, and for evaluating the impact of quality improvement initiatives. Specifically: for each patient in the analysis, the patient's actual improvement (change in ASI scale score) is compared with the expected change determined by applying the predictive algorithm for that scale. The program report shows, for each scale, the percent of patients whose improvement equals or exceeds the expected outcome.

3.3 Prediction of treatment dropout

Study #4 Results—Cut points were established to classify patients as at low (19%), moderate (49%) or high (32%) risk. The key independent variables indicating greater risk for dropout were race (non-whites at higher risk), use of marijuana less than 30 days before intake, failure to “strongly agree” to the need for treatment, number of previous detox episodes (fewer detox episodes associated with greater risk), and being a victim of physical abuse. Patients under legal mandate for treatment and those taking a prescribed medication were at lower risk for dropout.

Operating characteristics of the model for validation sample patients classified as “low” or “high” risk were determined through comparison of the predicted versus actual dropout status. Sensitivity was 73%; specificity 38%; classification accuracy 56%; PPV 57% and NPV 55%. The lower specificity was considered acceptable since the benefit of greater sensitivity was considered more important than incorrectly classifying patients that do not dropout.

Application of study #4 results for development of Polaris CD—The predictive algorithm derived in this study is used to generate a message on patients' Intake reports indicating the level of risk (Low/Moderate/High) for dropout. The message alerts counselors to the need for Motivational Interviewing for patients at high risk.

4. Discussion: Implications for Improving Treatment

An effective addictions treatment program must address key questions for each patient: Does this patient's recovery require intensive focus upon employment, family or psychiatric problems? Is his/her treatment “working”; i.e., is the patient's progress satisfactory after factors prognostic of treatment response are taken into account? Is this person at high risk for dropout, and if so, how can he/she be helped to engage in treatment? An important question for quality improvement is “How can treatment outcomes be evaluated to identify unusually effective practices?” The research foundation of Polaris CD enables it to provide objective evidence relating to each of these questions. However, the challenges relating to implementation of an outcomes management system are as important, and can be as difficult to overcome, as those relating to system development. Utility for actual clinical practice depends upon patient acceptance, organizational policies and procedures promoting appropriate use of the system by counselors.

Patient acceptance

One of the obstacles to implementation is the belief that patients resist completing lengthy assessments. The decade of experience with SATSS suggests that, when patients understand that the assessment is important for their treatment, few express negative attitudes. For a period of time a question was added to the SATSS to determine the prevalence of positive (“I was glad to provide the information”), neutral (“I didn’t mind”) and negative (“It was a waste of my time”) reactions to the assessment. Patients (N=11,000) were asked to select the statement that most nearly reflected their opinion. The majority (55%) chose the positive response and 42% the neutral response. Less than 3% chose the negative response.

Implementation policies and procedures important to successful integration of SATSS with routine treatment included those targeted at timely completion of Update assessments, and several directly related to the studies described above.

Timely completion of Update assessments

Patients complete an Intake assessment upon admission to treatment, except when they are incapable of reliable self-report (e.g., due to impairment, less than sixth grade literacy in English or Spanish) or when contra-indicated for clinical reasons (e.g., too upset). Update reports can be completed at any time. However, procedures were established to promote completion of an Update assessment during the 20–45 day window after admission. This was done to support cross-program comparison of outcomes data for a comparable period (about one month) of treatment.

Three policies and procedures proved particularly important to completion. First, patients were told that the purpose of the assessments is to help insure that they receive the best possible care; that it is important for their counselors to have the information to plan and monitor treatment. Second, goals were established for completion rates that are linked to evaluations of program performance. Third, completion rates for all programs were published monthly.

These steps have led to a marked improvement in completion. The program performance goal was set at 65% timely completion of the 30-day Update. For the year prior to the adoption of the goal (2007) the region-wide completion rate was 30%, and only three programs had completion rates above 50%. By 2009 the regional rate was 54%, and for the first nine months of 2010 the rate was 61%, and seven of the 12 programs have exceeded the target completion rate.

Policies linked to Problem-Service matching studies

When “Supplemental Services” are recommended on the SATSS report, the counselor is expected to include sessions targeted to psychiatric, family and/or employment issues in the patient’s treatment plan. Clinical supervisors have access to the reports and plans, and are able to monitor compliance.

Policies linked to ETR research

SATSS has played an important role in quality improvement. The severity-adjusted aggregate outcomes data made possible by the ETR research and analyses provides for meaningful, “apples-to-apples” cross-program comparison of patient outcomes. Managers can determine the proportion of patients that achieve or exceed the level of improvement expected; i.e. after adjusting for time in treatment and the patients’ initial severity and other characteristics effecting prognosis. The SATSS outcomes reports help managers to identify programs that are unusually effective in helping their patients overcome alcohol, drug, family, psychiatric, employment and medical problems.

The QI goal is to identify programmatic elements associated with superior outcomes, and introduce them into less successful programs. A working group consisting of administrative, medical, therapy and research staff conduct surveys to identify differences in staffing, program models and other features that may contribute to differences in outcomes. Review of the survey data in combination with the SATSS outcomes measures enables the team to identify promising QI initiatives for piloting. SATSS outcomes data for pilot sites can be compared with historical (SATSS) data from the same programs, as well as contemporaneous region-wide data, to evaluate the impact of the new initiative.

Policies linked to prediction of treatment dropout

Counselors identify patients at high risk for dropout when reviewing Intake SATSS reports. When a patient is identified as high risk, the counselor is expected to intervene to mitigate the risk (e.g., through motivational interview). They are expected to record a clinical note describing the intervention. A monthly report generated by the SATSS is provided to the program management listing all patients identified as high risk during the month. The report is used to determine the percentage of high risk patients for whom the counselor appropriately documented the intervention in HealthConnect, Kaiser's electronic health record system. The goal is to achieve proper documentation for at least 80% of high risk patients, and represents an element of the program's annual evaluation by regional management.

Counselor acceptance

Addictions counselors often resist changes to their customary method of treatment, including the introduction of outcomes management systems. They seldom have formal training in the use of quantitative assessments, which they associate more strongly with research than with patient care. Formal assessments can be perceived as of little value in comparison to their clinical instincts and life experiences; as intrusions rather than as useful aides to the treatment process. Some counselors resent the possibility that their clinical judgments may be second-guessed, and their performance evaluated through quantitative measures that they do not believe can fully reflect the effectiveness of their work.

Gaining genuine buy-in from counselors can be a challenge, but it is vital to the effectiveness of outcomes management. If counselors do not value the system they will ignore it, or actively sabotage it through their negativity. Patients' attitudes toward assessment directly reflect those of their counselors. When patients observe that their counselors do not value the system, they become less conscientious in responding thoughtfully and authentically to the assessment questions.

The establishment of a "culture of measurement" where treatment staff embrace assessment as an important element of quality care involves explicit statement of organizational values and practices that affirm and reward appropriate use of measurement (Grissom, 2000). A case study of the introduction of Polaris CD into treatment programs at Kaiser Permanente (Grissom, Sangsland, Jaeger & Beers, 2004) provides guidelines for overcoming counselors' reservations, including public commitment to the system by program leadership; communication to staff of the importance of assessment to patient care and to the organization; involvement of staff in implementation planning; welcoming of suggestions from staff for improving the effectiveness of the system; training for support staff and counselors; emphasis that the assessments are not "research" but rather are intended to support (not replace) clinical judgment; and addressing directly counselors' concerns regarding the use of assessment data in performance reviews. Once implemented, it is very useful to identify a champion a counselor that is respected by their peers and who is enthusiastic about the clinical value of the system. Conversely, counselors that are

conspicuously negative should be challenged during personal supervision to desist from negativity and provide constructive feedback about how the system might be improved. Wherever feasible, the system reports should be used to offset “paperwork” requirements that most counselors find burdensome. Use of the reports should be integrated as fully as possible into routine practices such as supervision and case presentations.

If consistently applied over time, these principles will enable administrators to establish a positive culture where assessment is viewed as an important element of routine care for patients.

5. Conclusion

The Polaris CD system illustrates how an outcomes management system can provide for translation of research findings into practice to improve treatment for addictions. The system has helped improve treatment planning, identify patients at high-risk for dropout and evaluate patient progress in relation to an evidence-based predicted response to treatment.

The potential value of such systems extends well beyond the application of the findings from controlled research. Every day there are thousands of treatment interventions for substance abuse. Each represents the potential for learning; i.e., the opportunity to better understand which types of interventions are most effective for which types of patients. However, the opportunity to learn from “real world” clinical experience is usually squandered - in the majority of treatment episodes, standardized measures are not systematically collected.

Outcomes management systems can harvest these data to continually improve our understanding of “what works, for whom.” The capacity to capture data relating to the condition and progress of patients constitutes a “learning system.” The utility of patient-services matching, ETR and dropout predictive models will continually increase as new patient data allow refinements to the models.

Outcomes management systems expand the opportunities to employ naturalistic data from routine treatment to answer key questions such as: What interventions are most effective in averting dropout? Which services, for which patients, are most important for long term recovery? How can severity adjustment of program outcomes be accomplished in support of quality improvement and valid evaluation of treatment effectiveness? It is our hope that the lessons learned from the construction and implementation of Polaris CD will bring our field closer to the answers.

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Table 1

Correlation between predicted and actual scores on ASI scales.

ASI Subscale	Development Sample (N) R (R-Square)	Validation Sample (N) R (R-Square)
Alcohol	(n=3,865) 0.51 (0.26)	(n=1,320) 0.51 (0.26)
Drugs	(n=2,534) 0.58 (0.34)	(n=849) 0.55 (0.30)
Psychiatric	(n= 2,533) 0.58 (0.34)	(n=849) 0.55 (0.30)
Family	(n=2,533) 0.52 (0.27)	(n=849) 0.51(0.26)
Medical	(n=2,534) 0.51(0.26)	(n=748) 0.49 (0.24)
Employment	(n=3,865) 0.49 (0.24)	(n=1,320) 0.45 (0.20)