

# TheraSim<sup>®</sup>

Improving the Quality of Clinical Practice

## The TheraSim CPM Clinical Performance Management System



## TheraSim CPM – Clinical Performance Management

Is a suite of proven software tools to help your healthcare practice;

- Measure clinical performance and adherence to guidelines and EBM,
- Predict error rates and their financial impact into the future then institute preventative measures, and
- Improve clinician performance through an advanced simulation-based training system and state-of-the-art point-of-care decision support.

TheraSim CPM will help you meet and exceed clinical reporting and performance standards in a marketplace that is becoming more performance-driven and quality-oriented. TheraSim CPM provides the industries most advanced set of quality assessment, reporting and improvement tools.

TheraSim CPM helps healthcare practices reduce medical error and optimize performance-dependant reimbursement models such as “pay for performance” (P4P). Studies show that billions in direct clinical costs are spent each year in the US to mitigate the effects of medical error (hospitalizations, additional doctor visits, additional medication, etc.) and tens of thousands of preventable deaths occur. 49% of these errors originate from the initial physician order<sup>1</sup> and 44% of physician-originated errors are the result of knowledge or skill deficit<sup>2</sup>.

TheraSim CPM consists of the following tools which can be integrated with legacy medical information systems or used as a standalone, all-inclusive structure:

### TheraSim Clinical Rules engine (TheraSim CR):

The TheraSim CR – Clinical Rules engine is the technology heart of the TheraSim CPM tool suite. TheraSim CR is a medical rules processing engine and authoring system. It captures and maps medical concepts related to drug interactions, dosing, medical treatment guidelines, and medical business rules such as clinical policy, vital to the successful delivery of patient care and effective healthcare operations.

The TheraSim CR is more than a clinical decision support rules engine. In addition to linear rules processing for functions such as drug interactions and clinical guidelines, the clinical rules engine captures clinician choices and measures behavior by comparing those choices with its best practices knowledgebase. These clinical

performance metrics are processed in the engine and then passed to the TheraSim Health Metrics Dashboard for analysis and presentation to key stakeholders, managers and decision makers.

TheraSim CR offers the industries most flexible, powerful and easy to use online clinical rules authoring system. No one set of clinical rules are adequate to the decision support needs of every practice. TheraSim CR enables healthcare professionals to author their own clinical rules and pass resulting warnings to either the TheraSim Electronic Medical Record or other 3rd party electronic health records systems though HL7. TheraSim CR also contains a library of guidelines for most major diseases. TheraSim CR alerts can reference specific tables from guidelines, drug monographs and clinical citations from trials and other sources.



- Robust clinical decision support system
- Online authoring system enables custom clinical rules
- Rules fire on combinations of patient conditions, drugs and HL7 messages
- Extensive library of guidelines, drug monographs and citations
- Compares clinician decisions to best practices and produces retrospective clinical performance metrics.

<sup>1</sup>Bates et al., 1995, Studies at Massachusetts General and Brigham and Women's Hospitals

<sup>2</sup>Retrospective Analysis of Mortalities Associated With Medication Errors: Am J Health-Syst Pharm 58(19):1824-1829, 2001. Leape LL, Bates DW, Cullen DJ, et al.: Systems analysis of adverse drug events. JAMA 1995.274(1): 35-43. Phillips et al., CDER

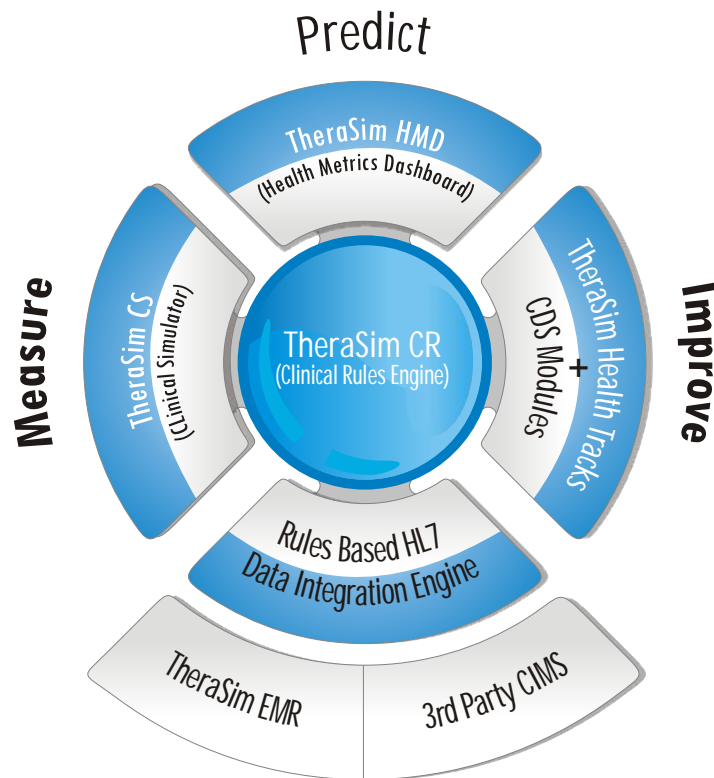


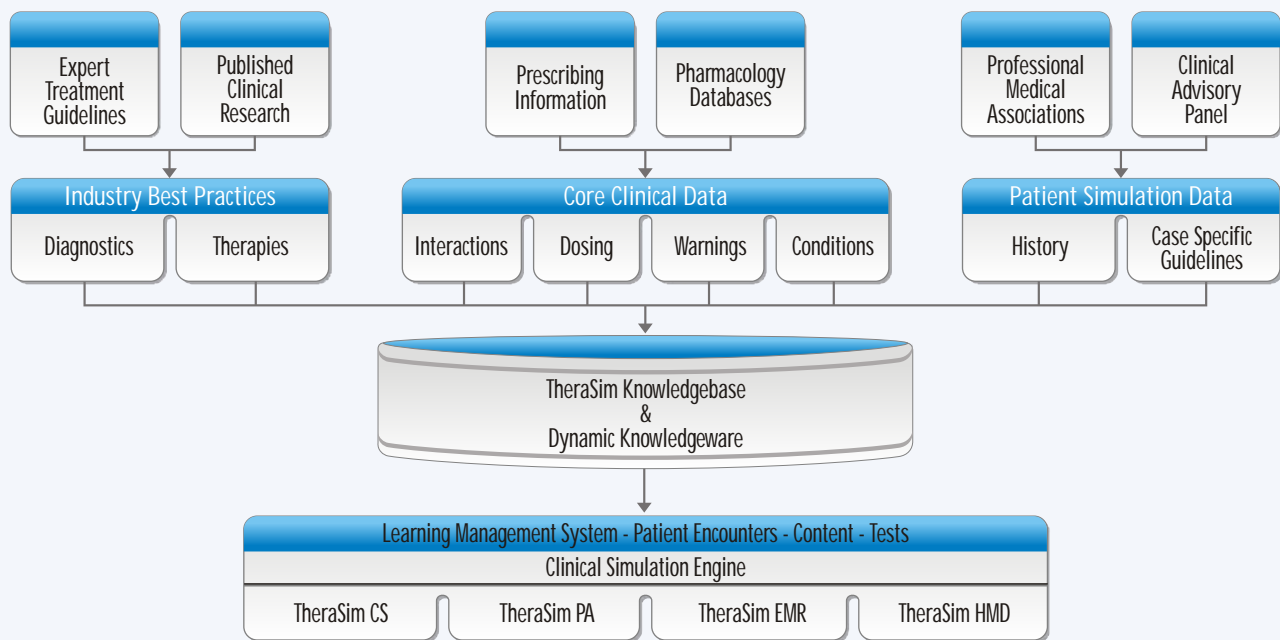
Figure 1: TheraSim CPM Clinical Performance Management, Product Suite: (Left) TheraSim CS – Clinical Simulator, is the behavioral assessment tool for CPM. TheraSim CS provides a fully interactive patient simulation with thousands of diagnostic and therapy choices. TheraSim CS measures clinician behavior and captures clinical performance metrics on medical error and a full range of skills, vital to the successful diagnosis and treatment of chronic and infectious diseases.

(Top) TheraSim HMD - Health Metrics Dashboard is the business intelligence tool of CPM. HMD gather and displays the performance data from the CPM tool suite and 3rd party systems. HMD uses data from TheraSim CS and other clinical data systems to predict medical error and guide the rest of the TheraSim CPM tool suite in the prevention of those errors through targeted simulation training and point of care clinical decision support.

(Right) TheraSim Health Tracks is comprehensive professional learning tool. Using assessment data from TheraSim CS, Health Track adapts and targets simulation cases and didactic content to the specific learning needs of each clinician. The TheraSim CR clinical decision support system (CDS) works in a similar fashion to adapt the point of care decision support messaging to the specific needs of each clinician. Out of the box, the TheraSim clinical decision support modules provides decision support in areas such as drug-drug, drug-lab and drug-medical condition interactions, dosage and guidelines. The system can also be coded with custom rules by the treatment provider to avoid specific recurring problem and problems identified by TheraSim CS.

(Bottom) TheraSim EMR is an open source, fully featured electronic health record. It is integrated with TheraSim CR and HMD to provide interactive decision support as well as dashboards to query and report on clinical data and physician behavior.

(Center) TheraSim CR is the Clinical Rules engine at the heart of the TheraSim CPM product suite. TheraSim CR provides an easy to use clinical rules authoring system for custom rules and comes coded with thousands of rules for drug interactions, dosage, guidelines and other clinical support areas. TheraSim CR can be integrated with other clinical data systems (CIMS) through HL7.



#### TheraSim Clinical Rules engine (CR)

TheraSim CR provides guidance to the clinician and to assess how fit a therapy is for the patient based on current best practices and custom rules. All TheraSim CPM tools rely on this engine to provide relevant clinical feedback to clinicians, decision makers and learners using the clinical simulations to provide predictive performance modeling.

#### TheraSim CS (Clinical Simulator)

The TheraSim Clinical Simulator is an interactive clinical patient simulation software tool for diseases diagnosis and treatment. TheraSim CS is revolutionizing clinical training much as flight simulators did for aviation. If aviation had the error rate that medicine has, then everyday there would be fatal aviation accidents every day from pilot error<sup>4</sup>. TheraSim CS assesses competency levels and gathers detailed clinical performance metrics on physicians, nurses and pharmacists. Using these metrics, the system structures a customized, case simulation-based training plan for each clinician. Much of clinical training is still based on reading and lecture. The TheraSim Clinical Simulator brings the training experience closer to what physicians actually do in practice, treat patients. TheraSim CS gathers detailed and quantitative clinical performance metrics. The clinician user in a TheraSim CS simulation is presented with thousands of diagnosis and therapy combinations. Competitive products which only provide a few multiple choice options nullifies the assessment value of the resulting data as the physician is fed the correct answer with only two or three wrong answers. The robust and clinically accurate nature of the behavioral metrics gathered by TheraSim CS are the basis of the predictive capability of the TheraSim CS system.

- Adaptive simulation based case-training
- Clinical competency tracking and assessment
- Behavioral metrics collection
- Fully featured clinical case simulation
- Internet, LAN/WAN or removable media based.

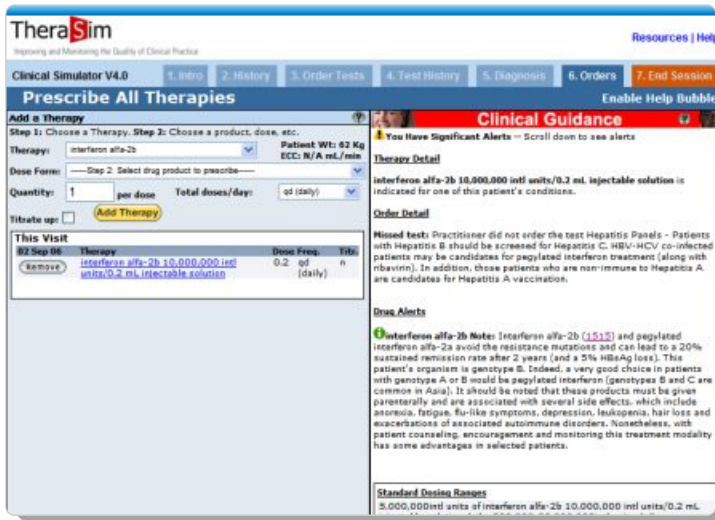


Figure: The TheraSim CS – Clinical Simulator uses a real medical record interface to view patient data and order labs. The system presents the users with thousands of therapy and diagnosis combinations. In this interface, clinicians have the same breadth of choices as they have in a real medical setting. This simulation has proven to accurately measure behavioral metrics as they relate to clinical behavior.

TheraSim HMD (Health Metrics Dashboard): TheraSim Health Metrics Dashboard is the business intelligence tool for the TheraSim CPM system. TheraSim HMD gathers clinical performance data from TheraSim CS and TheraSim Health Tracks and then statistically analyzes the data to predict the likelihood of medical error and clinical performance outcomes. Error rates from case simulations are displayed, showing the competency levels of all participating clinicians. The data is then combined with operational metrics and recalculated, forming predictive analysis reports. From these reports, preventative measures can be recommended in the form of additional training, clinical rules and operational policy changes. HMD also issues and tracks continuing medical education (CME) credit certifications, required to maintain medical licensure. TheraSim HMD is unconstrained by the source of its acquired data and can display and analyze data from other medical information systems.

- Robust custom query tool. Queries can be graphed and displayed on dashboards.
- Analyzes clinician behavior based on performance in clinical and simulation treatment settings.
- Displays longitudinal clinical performance metrics, detects strong and weak skills and competencies.
- Predicts clinical performance based on medical error that occurs in rich clinical simulations



Figure: The TheraSim CS – Clinical Simulator presents the user with medically relevant patient simulations. These simulations test the users ability to diagnose and treat a variety of chronic and infectious diseases. The system measures clinical competencies and then builds the training content around the competencies that need improvement.

## HMD

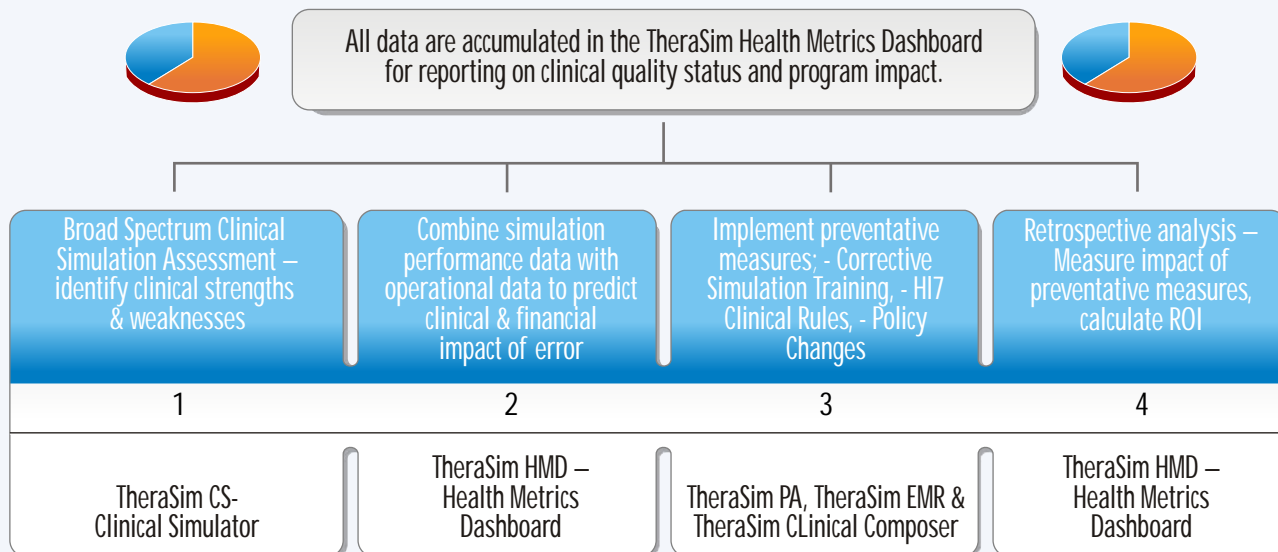


Figure: The TheraSim HMD performance assessment, analysis and prediction lifecycle;

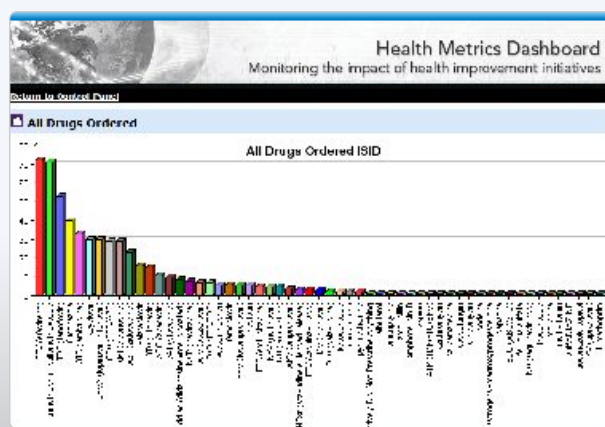
### Steps in the HMD Performance Lifecycle:

Step 1: TheraSim CS conducts a *broad spectrum analysis* of clinician skills in relevant therapeutic areas using a battery of case simulations covering all the major clinical competencies.

Step 2: The resulting performance data from the broad spectrum analysis are gathered by the TheraSim HMD - Health Metrics Dashboard. Performance levels are displayed including key clinical performance metrics. These data are combined with key operational data such as staffing levels, patient levels, orders written, etc. and the likelihood of specific medical errors is extrapolated into the practice. Historical clinical performance data can be analyzed to confirm error rates in the practice.

Step 3: TheraSim recommends specific preventative measures to avoid medical errors with a high likelihood of occurrence. These measures can include operational policy changes, corrective and preventative training through TheraSim Health Tracks, specific clinical rules which can either be delivered through TheraSim EMR and TheraSim PA or existing CIMS systems.

Step 4: TheraSim HMD can conduct ongoing retrospective analysis to observe the impact of the preventative measures on targeted clinical performance levels. Return on Investment (ROI) can be measured based on both quality adjusted life years and operational savings.



TheraSim HMD – Health Metrics Dashboard, is a full clinical reporting tool that can be used with all of the TheraSim CPM tools as well as 3rd party clinical information management programs. TheraSim HMD increases the access to strategic health information for management and key decision makers. Information is updated daily and the reports and dashboards are highly customizable.

TheraSim EMR (Electronic Medical Record): TheraSim EMR is a fully featured web-based electronic health record system. TheraSim EMR has all the functionality you need in an electronic medical record including scheduling, graphing, health maintenance reminders, lab tracking, integration with other data systems, and customizable fields. In addition TheraSim EMR offers several distinguishing features such as;

- TheraSim CR: TheraSim EMR is fully integrated with TheraSim CR – the TheraSim clinical rules engine for clinical decision support.
- Remote consult: This feature allows groups of users to collaborate on patient cases over the internet.
- TheraSim HMD: The TheraSim Health Metrics Dashboard is the query and reporting tool for TheraSim EMR.

TheraSim CS and HMD components provide quantitative metrics on clinical performance as only a fully interactive patient simulation tool can. Just as you can't measure a pilot's ability to land a plane through a multiple-choice test, you can't measure a clinician's ability to treat a patient with equally crude testing instruments. The evidence-based clinical performance metrics collected by TheraSim CS provide a unique view of clinician behavior that is not currently provided outside of TheraSim programs. These behavioral metrics provide the basis of TheraSim HMD's predictive modeling capability that can project the likelihood of medical error occurrence, associated costs and recommended preventative clinical measures.

Together, these tools provide a comprehensive and quality focused health data infrastructure which measures and improves patient care.

ID	Name	Age	Sex	Alerts	Next Appointment
100-524-68	Bovine C.	32	Female		10/05/04 15:45
110-240-50	Lester L.	43	Male		11/13/06 09:45
120-503-31	Brenda A.	33	Female		01/03/06 17:15
220-610-31	Virgil T.	59	Male		08/23/06 09:45
222-100-18	Maria G.	42	Female		02/17/06 16:45
230-123-65	Jane H.	34	Female		06/28/06 18:15
222-509-82	Carl D.	56	Male		07/01/06 18:45
226-221-92	Susan I.	62	Female		10/21/06 09:45
233-748-23	Robert M.	38	Male		04/27/06 18:15
230-160-74	Janece J.	35	Female		03/25/06 17:00
210-811-84	John E.	24	Male		10/14/06 14:30
210-830-74	Mary G.	39	Female		11/24/06 08:15
207-824-84	John B.	44	Male		12/13/06 08:45
208-369-94	Lester L.	35	Male		09/16/06 10:45
209-812-67	Jack S.	38	Male		02/20/06 08:00
210-382-97	Busan K.	31	Female		12/04/06 12:00
213-752-83	Jane D.	28	Female		04/29/06 13:45
220-815-98	Jay T.	33	Male		02/04/06 18:00
220-890-28	Jan V.	52	Male		12/27/06 17:45
221-542-17	Jan V.	52	Male		11/22/06 08:45
221-526-03	Jan V.	52	Male		09/17/06 11:00
227-920-21	Jack D.	40	Male		07/21/06 14:00
240-500-52	Mark S.	25	Male		09/29/06 15:45
250-848-88	Buffy V.	18	Female		08/18/06 12:15
219-871-93	Brian W.	25	Male		02/18/06 16:15
212-520-65	Kovine K.	39	Male		04/03/06 18:15
218-121-30	David D.	31	Male		04/02/06 17:00
283-878-13	Tore M.	57	Male		01/24/06 17:15
286-241-29	Tore M.	57	Male		02/09/06 16:15
287-674-54	Tore M.	57	Male		04/17/06 16:15

**TheraSim**  
Welcome Shadden on September 04, 2006 | Logout  
Patient: Lester L. (110-240-50)

Summary | Conditions | Meds | Labs | Orders/Reports | Demographics | Resources

**Summary**

**Demographic Data**

Name: Lester L.  
Id: 110-240-50  
Gender: Male  
Patient Since: 09/04/2006  
Next Appointment: 11/13/06 09:45  
Chief Complaint: 0017  
ARV Therapy: 3TC, LPV/r, AZT

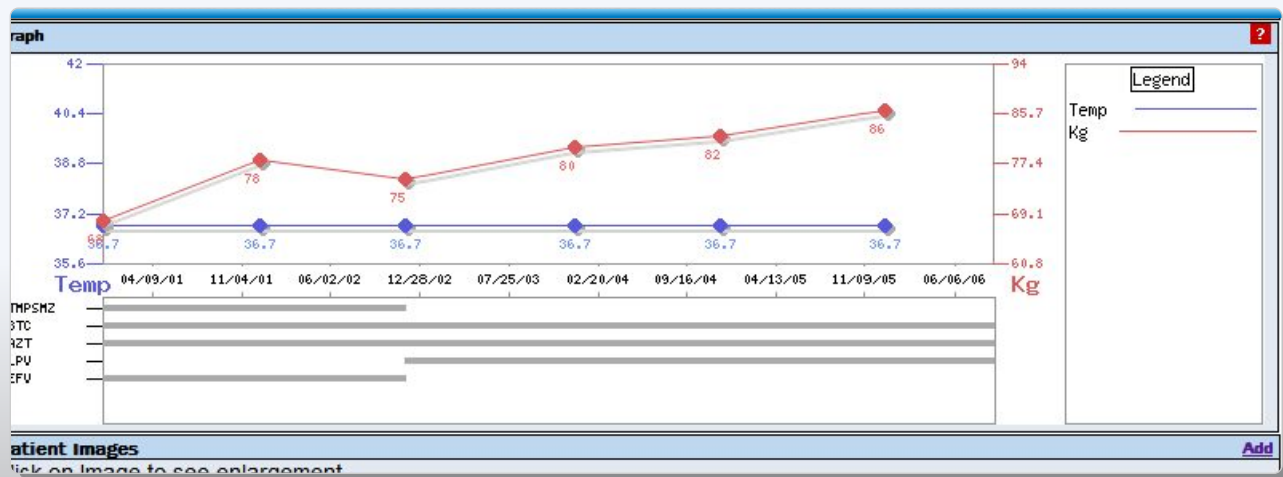
**Current Therapies**

Therapy	Dose	Freq.	Condition	Grade
3TC (lamivudine)	150mg	qd		
LPV/r (lopinavir/ritonavir)	400/100mg	qd		
AZT (zidovudine)	300mg	qd		

**Potentially Significant Clinical Alerts**

You Have Severe Alerts - Scroll down to see alerts

Drug - Medical Condition Interactions



The TheraSim EMR – Electronic Medical Record, is a full featured health information management system for tracking patient data. The distinguishing features of the TheraSim EMR are a robust, dashboard-based clinical reporting tool (TheraSim HMD) and an online, customizable clinical concept and rules engine for providing decision support at a clinical level (TheraSim CR).

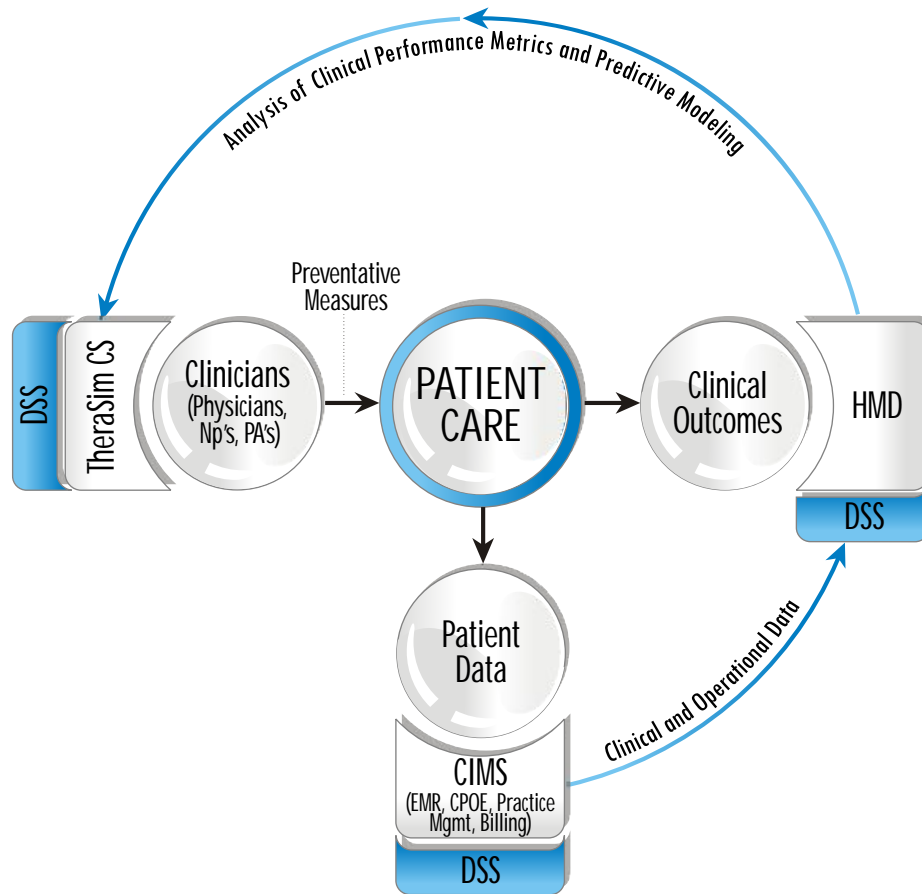
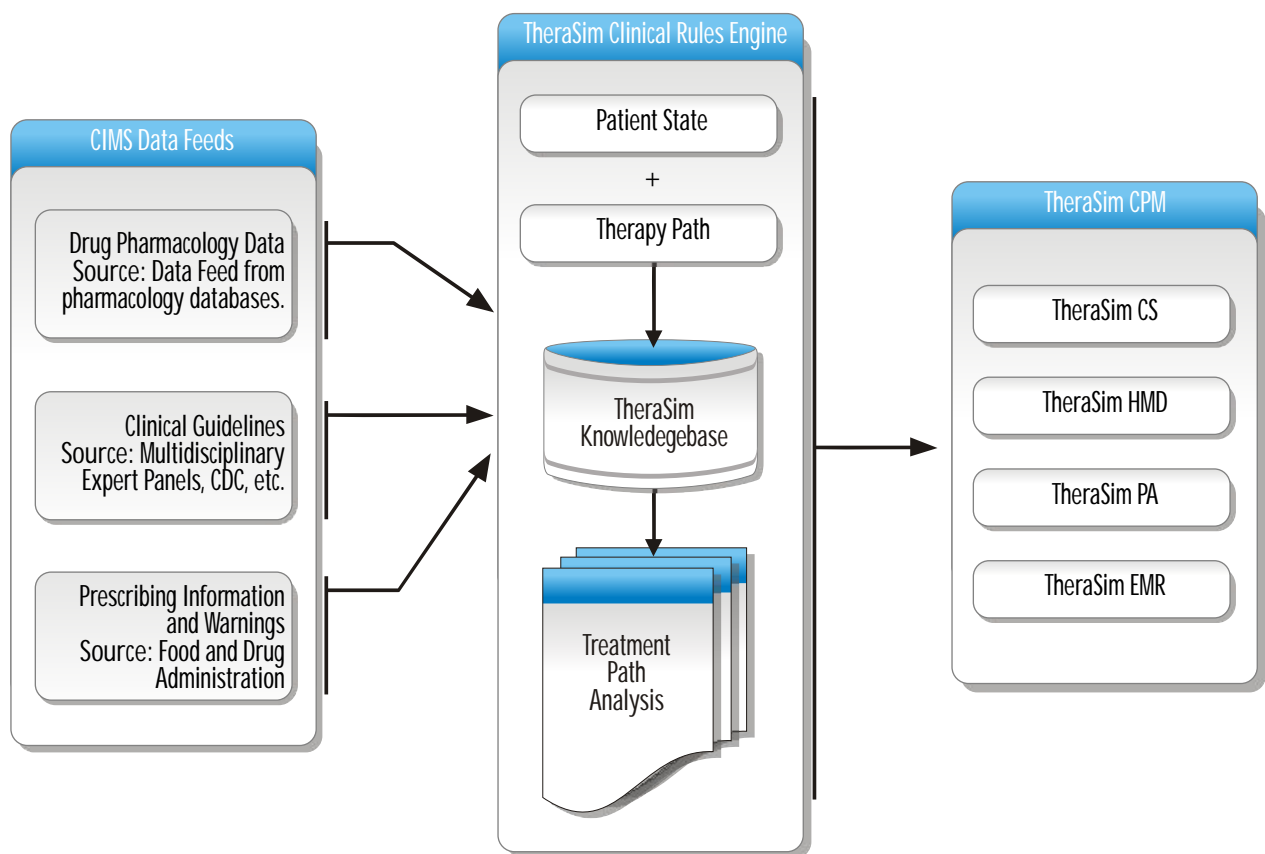


Figure 1: TheraSim CPM Process:

Care begins with clinicians. TheraSim CS measures clinician behavior and detects gaps with best practices and managed care clinical policy. Predictive modeling stimulates preventative measures that are deployed through TheraSim CS in the form of target simulation training and at the point-of-care through TheraSim CR in the form of clinical rules. TheraSim DSS can be integrated with EMR, handheld, CPOE and pharmacy systems through HL7. TheraSim clinical performance metrics can be displayed alongside other clinical metrics and operational data through the TheraSim HMD or through a healthcare provider's business intelligence tool.

Figure 2: TheraSim CPM Structure

TheraSim CPM takes data feeds on drug information and clinical guidelines and processes this information into the TheraSim knowledgebase. TheraSim uses a robust online clinical rules authoring and management system called the Clinical Composer that allows for rapid translation of information into knowledge. TheraSim CR analyzes a therapy path for specific patients using this knowledgebase to provide the clinician with clinical guidance and to assess how fit that therapy is for that patient, based on current best practices. All TheraSim CPM components rely on this engine to create realistic clinical simulations, to provide predictive performance modeling, and to conduct retrospective analysis of therapy choices.



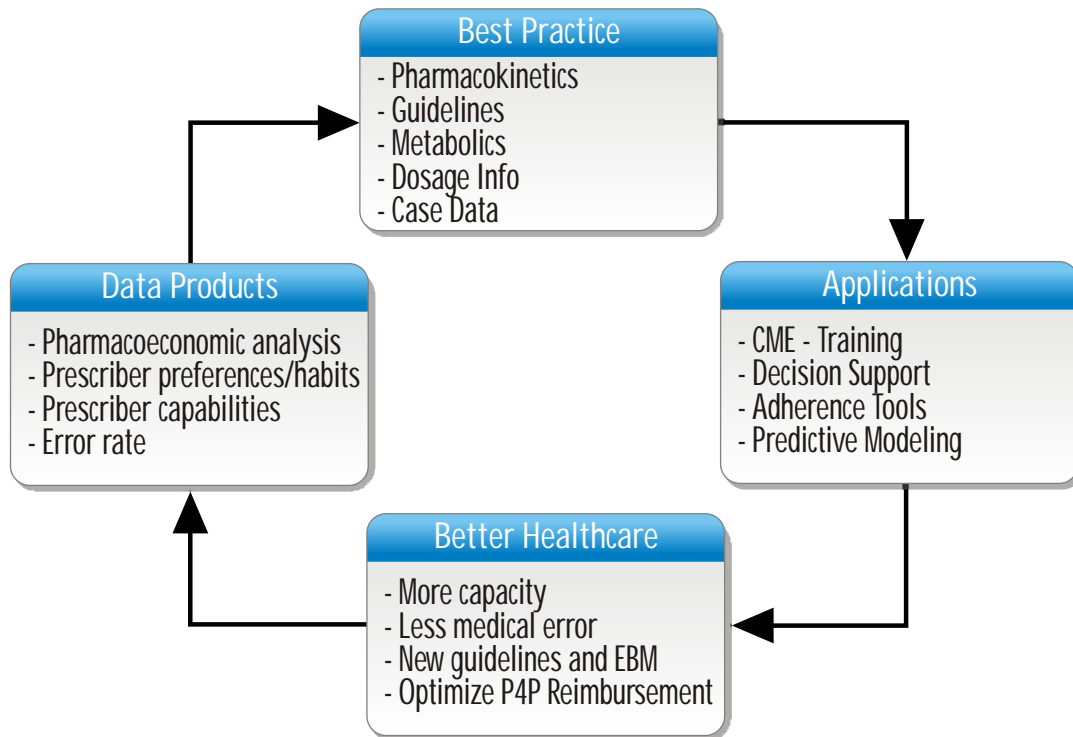
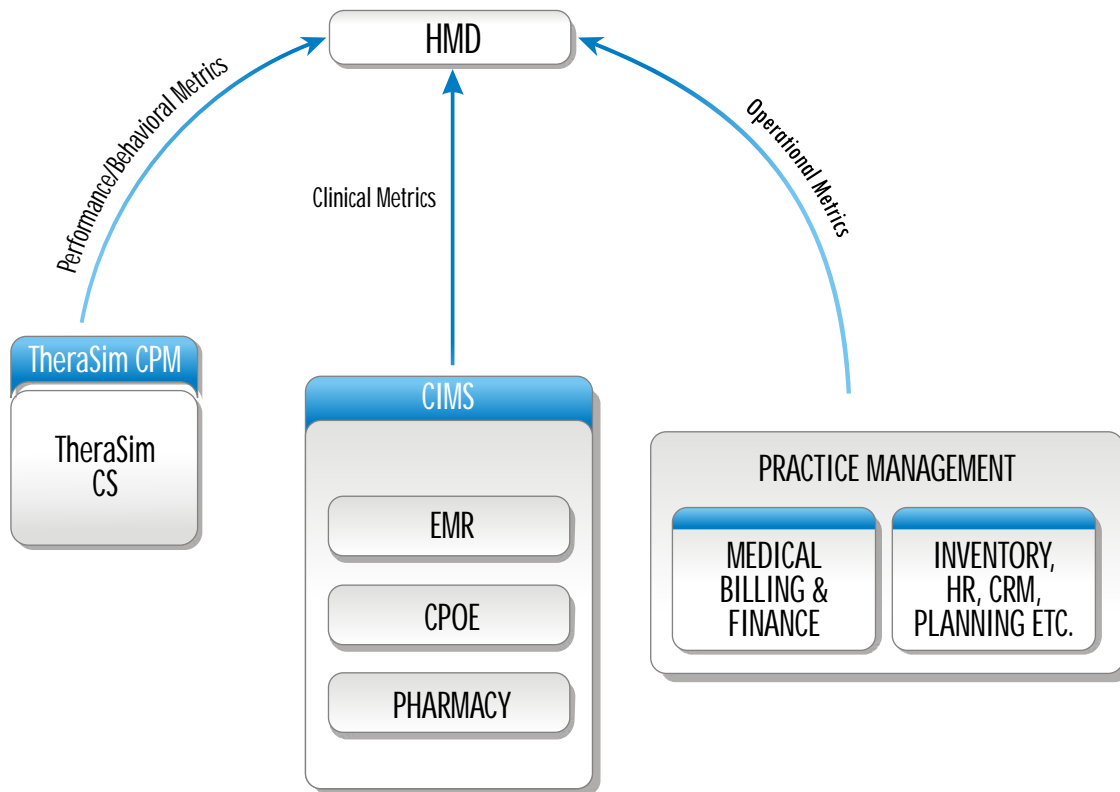


Figure 3. Quality Improvement Cycle

TheraSim CPM enables a continuous quality improvement cycle whereby best practices are translated into clinical practice, resulting in better transparency into the performance of a healthcare organization and, ultimately, into better patient care.

Figure 4: Consolidated Health Metrics.

TheraSim HMD consolidates two fundamental types of health metrics, the clinical metrics on patient performance which are derived from CIMS (Clinical Information Management Systems), and operational metrics from the practice management software such as billing and scheduling, TheraSim CPM adds a third metric to the mix, clinical performance /behavioral metrics. The clinical performance /behavioral metrics enable the health practice to continuously measure the error rates and competencies of their healthcare workers.



# TheraSim<sup>®</sup>

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For more information about TheraSim,  
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