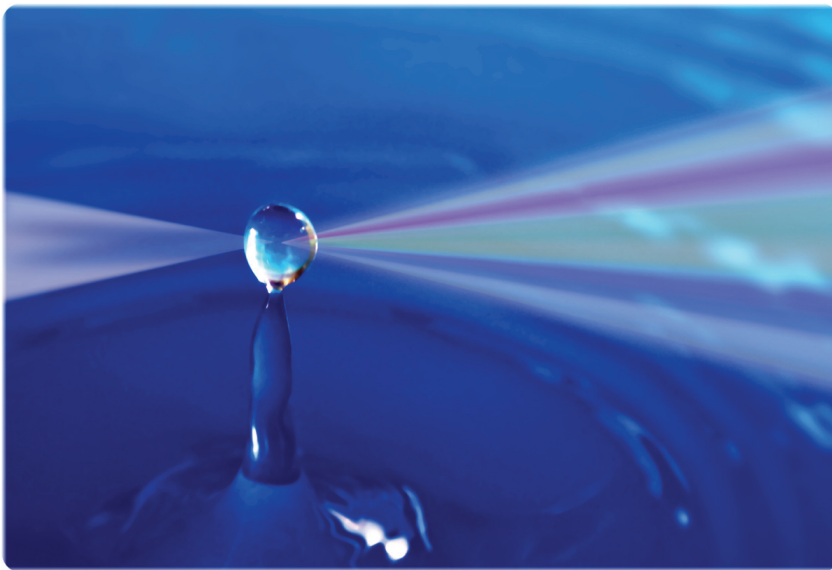


Health Outcomes Sciences™

# Personalized Risk Information Services Module

ePRISM®



*The practice of evidence-based medicine requires complex medical decision making that takes into account a broad array of patient-specific factors. ePRISM® gives healthcare providers and institutions the tools they need to deliver evidence-based care that is custom tailored to each individual patient, elevating the quality of healthcare delivery and maximizing resource utilization by targeting those most in need.*

Health  
Outcomes  
Sciences

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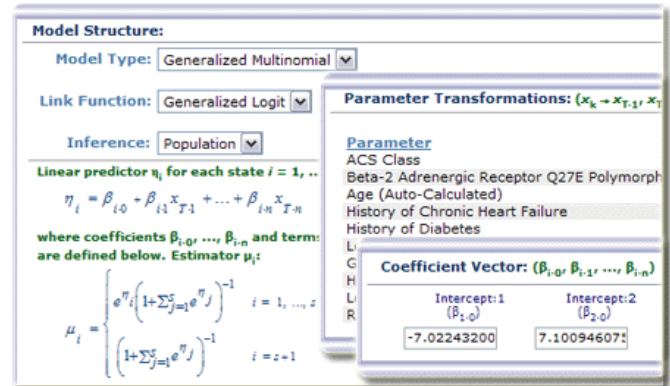
*Providing evidence-based care...one patient at a time.*

## The Challenge

The past decade of health services research has witnessed an explosion of prognostic models to help physicians and patients better understand the outcomes associated with specific disease states as well as the risks and benefits of proposed treatments. Statistically robust risk models from sources such as the American College of Cardiology's NCDR can be used to provide evidence-based custom-tailored care for individual patients as mandated by the Institute of Medicine (IOM) and the Centers for Medicare & Medicaid Services (CMS). However, the application of such models to clinical practice has been limited by their complexity and the lack of a practical mechanism for making them available for routine care.

## The Solution

The **Personalized Risk Information Services Module (ePRISM<sup>®</sup>)** for **EPOCH<sup>®</sup>** provides a powerful and versatile platform for translating complex risk-prediction models into web-based tools that can be used for a broad range of clinical applications including expert decision support, real-



ePRISM<sup>®</sup>'s visual model designer allows even the most mathematically complex models to be translated into usable web-based tools within minutes.

time patient risk stratification, generating patient-specific documentation for resource utilization reviews and audits, and patient education (including creating informed consent documents customized to a specific patient's risk profile).

A signature feature of ePRISM<sup>®</sup> is its visual model editing environment, which allows complex mathematical models to be rapidly defined in a matter of minutes, utilizing dynamic on-screen instructions and rendering of prediction formulae as well as robust validation services; no coding is required. Once defined, models can be delivered *via* EPOCH<sup>®</sup> in any number of forms, ranging from stand-alone web-based prediction 'calculators' to robust patient-specific clinical documentation systems to XML web services.

ePRISM<sup>®</sup> employs a general regression model framework for expressing predictions, encompassing all major types of prognostic models including linear, generalized linear, cumulative multinomial, generalized multinomial, proportional hazard and other custom model types.

### Key Points

- Robust general regression modeling framework
- Codeless visual model designer
- Standardization of parameter definitions
- Scripting support for non-standard models types
- Support for confidence interval computation
- Dynamic mathematical equation rendering engine

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Once models have been defined within ePRISM®'s modeling library, they are readily available to users of EPOCH®. Models can be executed either individually or in user-selected groups.

Name: Doe, John      DOB: 1/1/1950      MRN: 123456789

Category: All

- Complications for High Risk Surgical Procedures (ACS NSQIP)
- Complications for Low Risk Surgical Procedures (ACS NSQIP)
- In-Hospital Bleeding Risk with PCI (NCDR)
- In-Hospital Mortality for PCI (NCDR)
- In-Hospital Mortality for Surgery (ACS NSQIP)

EPOCH® users can select which models or embedded document templates they wish to execute.

ePRISM® dynamically creates a data input form containing only those data elements required by the requested model(s). When combined with the **Clinical data integration Platform Services for Enterprises (eClipSE®)**, users of ePRISM® can have the form pre-populated with patient-specific information derived from third-party clinical information systems or previously stored inputs. An intelligent data collection engine automatically maps related data fields and eliminates any redundant data elements across multiple selected models.

## Key Points

- Dynamic generation of data input forms
- Automatic elimination of redundant data elements
- Ability to embed modeling results into documents
- Multiple graphical display options for model outputs
- HTML and PDF output support

Institutions can also create customized documentation templates containing the embedded outputs of modeling results, allowing for the rapid creation of patient-specific documentation solutions for such applications as informed consent and resource utilization audit defense. Custom documents can be readily created using ePRISM®'s built-in Microsoft Word®-like editing capabilities, with a broad range of graphical output options to meet specific needs. Documents can either be rendered as HTML or PDF files, and can be updated on-the-fly by institutions as needed.

The screenshot shows a document template for 'The eHeart Center' with patient information: Patient Name: Doe, John Q., Date of Birth: 01/01/1954, Medical Record Number: 123-456-7890. It features a section for 'Angina Frequency at 1-Year' with a pie chart showing predicted frequencies: Daily (15.4%), Weekly (15.7%), Monthly (26.1%), and None (26.7%). The document also includes a 'Consent for Coronary Artery Intervention Procedure' section.

ePRISM® allows for the rapid creation of document templates containing embedded risk modeling results, which can be displayed in any number of formats.

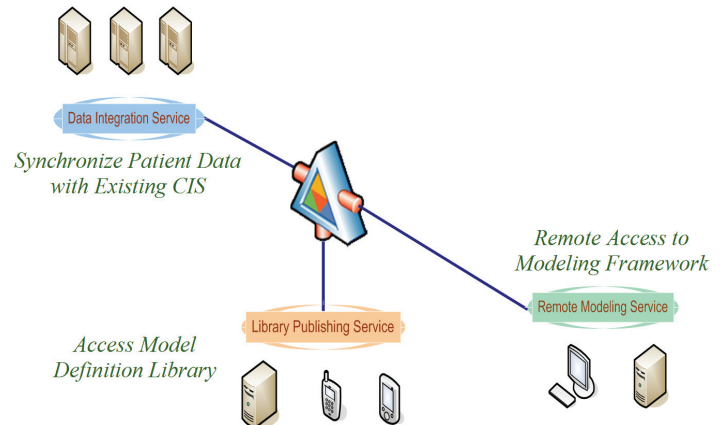
Whenever a model definition is updated within ePRISM®'s modeling library, all document templates utilizing that definition are automatically updated, ensuring that users have access to the most up-to-date models.

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ePRISM® makes full use of EPOCH®'s XML web services infrastructure to allow third party products and remote clients to readily integrate with ePRISM® via the industry standard Simple Object Access Protocol (SOAP).

ePRISM®'s *Remote Modeling Service* provides a powerful set of functions for accepting submitted patient data from remote computing clients and executing a set of requested models against that data; processed results are then returned directly to the requesting remote client application. The *Remote Modeling Service* provides institutions with the means to couple their own custom front-end client solutions to ePRISM®'s powerful back-end model execution engine.

ePRISM®'s *Library Publishing Service* provides functions for publishing all model and supporting parameter definitions as a Predictive Modeling Markup Language (PMML) compliant XML document. Exported definitions can be used in data mining applications that support the PMML standard or for collaborative sharing of model and parameter definitions across different entities.



Available ePRISM® XML Web Services.

When used with eCLIPSE®'s *Data Integration Service* and its companion relay server, **eCLIPSE® Connect**, ePRISM® can be readily linked to an institution's third-party clinical information systems (CIS). eCLIPSE® offers a comprehensive yet easy to implement solution for accepting HL7 feeds over a variety of transport layers—including TCP/IP, HTTP, FTP, and Email (*for more information, please see the eCLIPSE® whitepaper*).

Access to all web services is readily configurable through EPOCH®'s web portal administrative interface. Links to Web Service Definition Language (WSDL) contracts and supporting documentation are available on the web portal's global navigation menu and gives developers rapid access to the information they need to start developing and testing remote client applications.

## Key Points

- *Remote Modeling Service* allows third-party applications to access ePRISM®'s modeling services
- *Library Publishing Service* allows for exporting of model and parameter definitions as PMML documents
- *Data Integration Service* (via eCLIPSE®) offers a flexible solution for linking to clinical information systems