

Health Risk Analysis: Health Risk Predictive Model Based on Disease Morbidity Progression Analysis: Responsible Care™ Disease Management

By: Raymond Gavery, M.D.
Clinical Professor, College of Health Sciences, UWM
Chief Medical Officer, US HealthCenter, Inc.

The intent of any disease management program is to substantially improve healthcare delivery with the focus on managing the patient and the disease with equal attention, and provide the decision makers with the best strategic tool to decide which parts of their services they should allocate for the most cost-effective health careⁱ. David Goodhill in his book “Catastrophic Care...” discussed the need for change and a more cost-effective and humanistic approach to health care delivery. Healthcare industry should adopt the same efficiency models as business experts recommend to other industries. For instance, it should judge its effectiveness of disease management and the associated cost based on the Action Priority Matrixⁱⁱ, i.e., to deliver the best care with the least cost exposure. There is no doubt that there is much duplication and waste in healthcare management. If we look at the chart below, it is evident that healthcare must concentrate on strategies to deliver its services at high return and reasonable cost.

High		
Return	High Return / Low Cost	High Return / High Cost
	Low Return / Low Cost	Low Return / High Cost
Low	Low	High
	Low	High

The intent of Responsible Care is to create a self-perpetuating health care and health delivery improvement process, which concurrently identifies major problems and refines the knowledge base, guidelines and best-evidenced protocols for disease and health management through better data collection, analysis, deployment and interdisciplinary communication of incremental health data. This plan provides an insight on how to:

- Apply analytics to achieve impact across healthcare delivery system
- Leverage predictive analytics to improve operational efficiencies and drive the cost down
- Use analytics to automate decisions at the point of impact
- Ensure analytics deployments to create new and better strategies of patient care

USHC Responsible CareSM concentrates its efforts on the advancement of medical practice by creating a Wholeistic™, patient-centric healthcare delivery, while focusing on specific disease progression events. The application is a structured system responding to a set of problems, which are evident in all Healthcare systems. It identifies a fragmented and uncoordinated set of arrangements, which presently has a strong bias towards crises-oriented treatment and neglects preventive/ preemptive strike approach. Its intent is to identify the full spectrum of strengths and deficiencies in disease management in order to ensure greater cost-efficient strategies.

- a. Create a complete knowledge base for as many conditions as possible in order to develop a better consensus of outcomes, i. e., which patterns of practice should prevail and which should be discarded.
- b. Standardize and coordinate all corresponding healthcare resources for a structured disease management approach to patient care that will deliver the best effi-

ciencies.

- c. Implement evidence-based medical protocols and targeted outcomes in an integrated care delivery to all providers, patients, health coaches, patient advocates, and other support professionals, who participate in active management of disease conditions.
- d. Combine patient education, patient counseling, advocacy, guidance and behavioral modification to improve self-efficacy, health acuity, health-awareness, conation and compliance.
- e. Encourage self-care and self-reliance in chronic disease management
- f. User-friendly, practical solutions

The main features of Responsible CareSM Disease Management are:

- a. Accurate predictive model to determine high incidence, cost and utilization population (HICUP)
- b. Targeted predisease intervention to prevent onset of chronic disease
- c. Patient-centered, outcome-focused disease management
- d. Objective evidence-based model to ensure credibility and acceptance
- e. Reduction of variations and uncertainties in medical practice
- f. Promotion of standardization of care based on realistic assumptions and statistically relevant variables
- g. Markers to minimize barriers and maximize benefits
- h. Disease Risk Resolution GuidelinesTM (RRG) and cost-awareness for patients.
- i. Patient education and self-care training
- j. Patient coaching, guidance and health advocacy

The Business Model

The main purpose of patient-centric disease management is to provide the highest quality care at the most reasonable cost throughout the healthcare system. To achieve this goal, the program must provide a disease-preventive model, a standard for disease management, analysis of patterns of practice and a cost analytics system.

USHC disease progression analytical system is a closely constructed model based on the latest available scientific methods and studies. It adheres to the strictest standards of predictive analysis, which include synthenalysis, algorithms based on best-evidenced risk factors, their weight and interaction, using regression formulas to calculate the level of risk.

The main task of the Disease Morbidity Progression Model is to analyze disease progression rate, its management and cost from the aggression state to disease end-stage. It uses a segmented predictive model identifying main stages of pathogenic progression to deliver targeted preemptive intervention to minimize major medical occurrences. It enables providers to deliver effective disease prevention and treatment plan decisions.

Predictive Disease Risk Model identifies and monitors four major risk categories:

- Lifestyle,
- Predisease,
- Disease and
- Disease End-stage states

It determines the progression of a set of risk variables that triggers a morbidity process and defines its pathogenic progression for each state. The program is constructed to closely monitor management lifestyle and predisease risks, episodic care by implementing standards of care. The main purpose of a Disease Progression Model is to survey disease management at three major levels:

Surveying the Lifestyle Management:

- a. Identify major lifestyle risks that contribute to chronic disease
- b. Determine lifestyle risk levels and their major target organs
- c. Attribute direct and indirect cost to lifestyle risk
- d. Prioritize the intervention by importance of the lifestyle risk and its pathogenic impact and economic exposure
- e. Implement the appropriate behavioral modification protocol based on motivational interviewing and the Prochaska Transtheoretical model
- f. Offer a reward system based on measurable achievements
- g. Track the intervention process of lifestyle changes using empirical measurements

Surveying the Predisease Management

- a. Determine the predisease morbidity progression predicated on the disease (pathogenic) attack time.
- b. Determine the predisease level of risk within one to five years.
- c. Attribute direct and indirect cost to predisease risk.
- d. Prioritize the intervention by risk level, pathogenic impact and economic exposure.
- e. Determine a window of intervention opportunity by identifying major pathogenic thresholds and deliver

just-in-time interventions.

- f. Implement the appropriate interventions based on the best-evidenced protocols.
- g. Track the intervention process of predisease conditions by HRA and claims using proper protocols and markers of individual predisease and disease states.

Surveying Disease Management:

The USHC disease morbidity progression system monitors the progress of disease pathogenesis and its management including its utilization, quality and cost, based on a standardized patterns-of-treatment protocol.

- a. Assess the pathogenic process and severity of a disease.
- b. Implement standardized patterns of diagnosis and treatment.
- c. Compile data of all incremental medical events by disease category from inception of care from all providers involved in the care delivery.
- d. Analyze utilization, cost and quality of care using severity of disease and proprietary patterns of diagnosis and treatment system.
- e. Collect claims data of medical episodes and compare to the local and national utilization and cost equivalents.
- f. Analyze the patient's health behavioral patterns for better communication.
- g. Analyze patient compliance and/ or barriers to disease management and implement motivational health coaching.
- h. Build patient compliance through trust, motivation, positive reinforcement, reward system, messaging and reminders.
- i. Implement an information dissemination system that communicates with, and offers portability of health information to, all parties involved in care management.
- j. Create a better transparency of the healthcare delivery and its cost.

The Sequence of the Predictive Model

1. Define risk factors using synthenalysis of publishing sources and studies.
2. Determine the risk weight using regression analysis.
3. Categorize the group risk index and risk interactions.
4. Determine total risk contribution values and levels of risk for each predisease category.
5. Compare the calculated risk to other published risk

assessment sources, such as, the Framingham study.

The Sequence of Risk Resolution Delivery

1. Prioritize the health risks pools.
2. Identify the high incidence, cost and utilization population (HICUP) in each pool.
3. Assign a health management team.
4. Establish goals.
5. Develop specific strategies.
6. Implement targeted preemptive interventions.
7. Implement specific lifestyle behavioral modifications.
8. Create a knowledge base.
9. Provide guidelines to self-care process.
10. Analyze outcomes and compliance.
11. Create future strategies.

Morbidity progression stages allow intervention at just the right time with the best-evidenced and targeted protocols for all three phases: Preclinical, clinical and end-stage.

Morbidity Age:

Each disease has a predictable disease attack time with a set of predisposing risk factors. The rate of morbidity progression depends on the pathogenic mix and density of the risk factors and comorbidities. Predisease and disease states do not usually assume constant transition rates, and have to address covariates, aggregate affects and multi-state transitions in order to be predictably relevant.

Typically, morbidity progression follows a slow period until it reaches a critical density, at which time the rate increases exponentially until it reaches the disease stage, thus morbidity progression follows an exponential Sigma (expS) curve. The linear progression rate is adjusted for the exponential growth of a sigma curve based on the disease progression rate and level of risk. The individual's chronological age is then superimposed on the curve's major thresholds in order to estimate the window of intervention. To each window, USHC has attached a targeted, best-evidenced management protocol.

In conclusion, USHC has created a disease analytics process delivering providers a set of metrics to track the progression of disease management, thus providing their patients and clients with the best-evidenced and the most cost-effective healthcare delivery. Its major features consist of a lifestyle and predisease predictive risk model to implement targeted preventive and preemptive interventions before onset of a symptomatic disease. For patients with active medical conditions, it provides analytical and reporting tools, which concurrently identify the full spectrum of strengths and deficiencies in disease management to develop and improve efficiencies in their healthcare delivery. The program

coordinates care of multiple medical problems, provides greater effectiveness of the medical practice and justifies the cost of medical services.

Responsible CareSM program is a web based application, which, as a stand-alone or integrated with client's EMR, automates, coordinates and analyzes disease management from its preclinical phase through the active disease phase providing a tracking system that offers a clear overview of the Patterns of Diagnosis and Treatment (PDT) and reports to providers their effectiveness of the disease management, patient compliance and number of billed and paid services thus eliminating care gaps and improving practice operating margins.

For the patient it provides greater transparency, effective disease prevention and lifestyle modification program, as well as a better coordination to deliver seamless stream of services, greater understanding of and participation in the treatment plan resulting in improved compliance.

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ⁱInternational Journal of Health Care Quality Assurance, Vol. 9 Iss: 2, pp.4 – 8; Ulrika Dellby, (1996) "Drastically improving health care with focus on managing the patient with a disease: the macro and micro perspective",

ⁱⁱThe Boston Matrix: Focusing effort to give the greatest returns

