JAMES A ROBERTSON AND ASSOCIATES
STRATEGIC BUSINESS SOLUTIONS

POSTNET SUITE 143, PRIVATE BAG X100 30,
RANDBURG, 2156, SOUTH AFRICA
TEL ++27-(0)11-791-2327; CELL ++27-(0)83-251-6644;
FACSIMILE ++27-(0)11-791-2327 (MANUAL);
EMAIL James@JAR-A.com
WEBSITE: www.JAR-A.com

OUR REF: 2m-c-pub/53_Clinical Data Coding v 02.wpd/JAR/jar
Date: 8 July 2002

SOME THOUGHTS ON IS AN ENGINEERING MAINTENANCE MANAGEMENT METHODOLOGY COUPLED WITH A RADICAL RETHINK ABOUT CLINICAL DATA CODE DESIGN THE ANSWER TO RADICALLY IMPROVED HEALTH CARE IN THE NEW MILLENNIUM?

by
Dr JAMES A ROBERTSON

We routinely travel in commercial aircraft for thousands of kilometres and view it as a major event when mechanical faults delay departure. Mechanically related in-flight failures are major events in worldwide news reports since they are so extremely uncommon.

While the human body is immensely complex, it is arguable whether there are more discrete components and systems in the human body than in any of the modern generation of airliners. Yet catastrophic failure of major human body systems is far more common than comparable system failure of aircraft, nuclear power stations and other comparably complex systems.

It can be argued that the level of variation between different human beings is greater than that between aircraft. However consideration of the diversity of aircraft ranging from F15 fighter aircraft, through Boeing 747 Jumbo Jets to heavy lift transports such as the C130 Hercules and the wide diversity of helicopters in the air today, must indicate that the overall diversity of human form is FAR LESS than that of aircraft.

If we consider all aspects of the complexity and diversity of modern flying machines and the extremely low in-flight mechanical failure rate, we must surely ask ourselves whether modern human maintenance management lags seriously behind the standards of maintenance management applied to advanced engineering systems such as nuclear power stations, spacecraft and aircraft of all sorts.

An enormous amount of human maintenance management, that is medical care, is reactive in response to manifestation of symptoms of unwellness. As much as the health care industry may strive to take measures to introduce preventative healthcare measures, honest introspection must lead us to conclude that something is lacking.

An objective technical analysis of health maintenance management techniques compared to the highly sophisticated predictive maintenance management techniques applied in the aeronautical industry must lead to a conclusion that there is a major gulf between what is routinely successfully applied to keep aircraft from falling out of the sky or suffering crippling or disabling failures on the ground or in the air and the measures applied to managing the health of human kind!

The reason for this gulf, despite the massive investments and massive per capita expenditure on health insurance / medical aid is a fundamentally different approach.

From the inception of design throughout the operating life of any major commercial or military aircraft, sophisticated computerized risk management systems monitor operating conditions and other indicators which are applied to determine when repair, replacement or refurbishment of components is statistically required in order to meet the criteria of millions of event free air miles that are standard in the industry.

To the best of the writer's knowledge no comparable system is operating anywhere in the health care industry and there are fundamental factors which stand in the way of such an objective.

It is the writers contention that the factors which are preventing such a quantum improvement in health management are:

1) the lack of an industry vision that such an approach is possible.

2) the bias of the industry toward reactive health insurance instead of health management.

3) the lack of suitable structured data coding systems to make effective technical health maintenance management possible.

Given the trends in the health insurance industry in recent years and particularly developments in South Africa in the past three years, there must surely be those

who would embrace a vision of effective health management were such a vision to be effectively presented within a set of parameters which indicate that it can be made to work. In other words, factors 1 and 2 are relatively easily overcome by people with vision within the industry.

The major challenge facing the industry lies in point 3.

It is this point which makes this subject relevant and topical to a conference on Clinical Data Management.

On a technical level, viewed from the perspective of acquisition, storage, processing and interpretation of computer based data, the single biggest factor, and perhaps the last frontier in clinical computer application, is the lack of effective engineered data codes and data acquisition.

ICD9 and ICD10 while supposedly essentially diagnostic codes contain components which link back to the cause of injury, the type of vehicle involved and a wide diversity of other factors. Collectively these represent literally dozens of different technical data entities all lumped into one coding scheme. The net effect is that any form of automated, reproducible interpretation of clinical indicators based on ICD requires enormous technical complexity in the software which then becomes proprietary, copyright and inconsistent across the diversity of software applications available internationally. The lack of congruency and conformity between ICD9 and ICD10 is a further indicator of the extremely unhealthy state of healthcare information coding, particularly when contrasted with the exceptionally high levels of standardization in component specification, classification and description that pertains in the Engineering industry.

CPT4 and CPT5 are supposedly essentially treatment and procedure codes to be used for billing but code components range over a diversity of factors which overlap with ICD and include variable parameters such as time embedded as code components. Again dozens of individual technical data entities are lumped into one omnibus code system which defies simple, elegant and reproducible analysis directed at developing predictive measures of health condition that can be mobilized sufficiently early on to indicate preventative adjustment at a level that will prevent the occurrence of disabling or fatal conditions.

Going beyond the limitations of ICD and CPT as maintenance management software support tools the lack of industry standardization of available measurements further mitigates against effective human maintenance management. For example, the ECG is a widely used device for measuring heart condition and performance and ECG response to stress is an important indicator of future heart attack. However, following detailed research a few years ago, the writer was unable to locate any standard computer based techniques for describing in detail the wave form, amplitude pattern, frequency pattern and other characteristics of the ECG test result. The sole data acquired from an average ECG is an overall, experience based, categorization of the resulting output into what amounts to categories of good, bad or imminently dangerous. The reality must be that the use of digital ECG devices provides an opportunity for numerical acquisition and

analysis of the ENTIRE wave form at a level of technical detail that will enable even the most minute aberration to be identified and tracked by computer thus permitting effective early diagnosis and prescription of correcting behaviour years before the deviation becomes visible to the naked eye of even the most experienced medical practitioner.

Armed with data acquisition tools such as these, harnessed to technically sound first principles design of structured codes which exactly capture all aspects of the human condition, effective probabilistic techniques linked to existing data warehouse and data mining technology have the potential to support a quantum leap in HEALTH MANAGEMENT techniques.

All that is lacking is for a significant player to seize the vision and finance the development work that is necessary to put together the solution.