

# INFORMATION SYSTEM FOR ORAL HEALTH (ISOH)

## 2005 COMPUTERWORLD HONORS CASE STUDY

### MEDICINE

THE INFORMATION SYSTEM FOR ORAL HEALTH ENABLES FAIR AND EFFICIENT PATIENT ACCESS TO TREATMENT AT PUBLIC HEALTH DENTAL CLINICS AND FACILITATES EARLY INTERVENTION TO PREVENT DETERIORATION IN THEIR ORAL HEALTH STATUS, SERVICES FORMALLY PROVIDED DISPROPORTIONATELY ON A FIRST-COME, FIRST-SERVED BASIS. [2005325]

### SUMMARY

ISOH - Information System for Oral Health. ISOH is a software solution that enables fair and efficient methods by which patients can gain access to treatment at public health dental clinics and be provided with early intervention to prevent deterioration in their oral health status without the inconvenience of having to queue on a first-come, first-served basis.

### APPLICATION

ISOH - Information System for Oral Health.

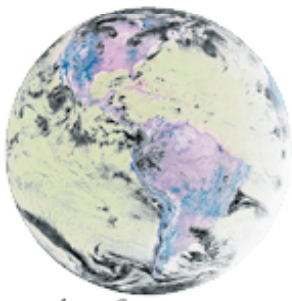
In the past, patient access to public dental services has been on the basis of queuing at local dental clinics on a first-come, first-served basis. For other than the most serious of emergencies, there was no priority based system through which patients could be triaged / assessed and appointments arranged. Understandably, this lack of appropriate prioritization caused patients tremendous frustration, especially those suffering pain, when having to queue for hours to see a dentist. The level of frustration was such that arguments occurred and security guards had to be employed to supervise these queues that often spilled onto the street.

A new model and work practice had to be developed to arrange dental appointments and deliver a prioritized service based on the condition of the patient, their socio-economic factors and manage a limited resource, i.e. public health dentistry. Therefore in 1997 the Westmead Centre for Oral Health (WCOH) set out to develop an information system for business practice management of their oral health service facilities. The new system needed to support improved access for patients and to allow more efficient distribution of the patient workload. It especially had to provide the ability to manage a demand that constantly outstrips service capacity.

The resultant "Information System for Oral Health" (ISOH) is a patient centric integrated system to support the service delivery process in public dental clinics. Without requiring medical training, operators / receptionists using ISOH can receive requests from patients, be it face-to-face and / or via call centers (as is most often the case nowadays). By using questionnaires incorporated into ISOH, the non-clinical staff are able to screen / access the patient (triage) and prioritize dental service delivery based on the needs of the patient. ISOH can then schedule an appointment via management of waiting lists and clinical rosters. ISOH also manages the clinical waiting rooms during an appointment by tracking the arrival and progress of the patient and can record the patient's dental treatment history. The clinical tools, Oral Workbench and Treatment Module also provide the ability to store and view radiographs, clinical notes, clinical indicators, treatment requirements and other medical information.

ISOH has taken away the need for appointed patients to queue at dental clinics as most pre-appointment communication now occurs by telephone or automatically generated appointment letters. The new work practice supported by ISOH has resulted in a much fairer method of allocating appointments, has significantly reduced the stress levels of patients who previously had to join lengthy queues and has also resulted in greater levels of staff satisfaction in the clinics.

The Information System for Oral Health (ISOH) has so improved patients' access to services, and provided information to management for analysis & improvement of those services, that ISOH has now been rolled out to every public dental facility across its home state of New South Wales, Australia (122 clinics) and, now adopted by Queensland Health, is in the process of a state-wide roll-out across Queensland (190 clinics as at Dec 2004). Upon completion of these deployments, ISOH databases will contain 65%+ of Australia's public oral health data.



*A Search for New Services*



Robert Carrigan,  
Chairman of the Chairmen's Committee

Ron Milton,  
Vice-Chairman of the Chairmen's  
Committee

Dan Morrow,  
Chief Historian

Significantly, profits realized by the ISOH Business Unit through the supply of ISOH are directed back to the oral health service providers thereby increasing the funds available to deliver public dental services.

## **BENEFITS**

ISOH - Information System for Oral Health.

· Has your project helped those it was designed to help?

ISOH is providing many benefits to the eligible population:

a) An orderly and convenient methodology by which patients can access treatment.

b) A huge reduction in patient inconvenience and frustration when compared to the older system where patients had to physically queue on a first-come first-served basis rather than queue “electronically”.

c) Rapid initial assessment of the patient’s condition over the phone. This method quickly and conveniently determines the priority of the patient and frees up trained clinicians’ time so that they in turn can treat more patients.

d) Increased availability of treatment because of improved resource management via the roster management component of ISOH.

e) Licence sales of ISOH generate additional income that is then allocated to dental services.

· In your opinion, how has it affected them?

The new work practice supported by ISOH has resulted in a much fairer method of allocating appointments and has significantly reduced the inconvenience to patients who previously had to join lengthy queues. All patients now receive appropriate priority, are being provided with early intervention to prevent deterioration in their oral health status and are being treated within targeted timeframes.

Additional benefits for the patients, who are often in the lower socio-economic community, are significant savings in time, expense and the frustration associated with unnecessary travel to a clinic. The patients can be remotely assessed and appointments scheduled while they remain in the comfort of their own home.

· What new advantage or opportunity does your project provide to people?

Resource management scheduling via ISOH has increased “Occasions of Service” (i.e. episodes of treatment) so that services can be delivered to an increased number of patients. The ISOH databases will shortly contain treatment data relevant to 65%+ of Australia’s eligible public dental patients which will provide quality oral health data for analysis to support appropriate policy development with a view to improving oral health outcomes and service delivery for the population.

· Has your project fundamentally changed how tasks are performed?

Yes, the Information System for Oral Health (ISOH) has been designed to completely manage the delivery of treatment to the patient from initial contact through to finalization of the treatment plan (“Course of Care”). At the very first contact, usually through a call center, the patient can be triaged / accessed “electronically” by non-clinical staff via ISOH and from this assessment ISOH then determines the prioritization of treatment for the patient. Then, via electronic scheduling and roster management, ISOH either makes an appointment for the patient to be treated at the nearest suitable clinic, or if treatment is determined by ISOH to be low priority, the patient is placed on a waiting list. ISOH then manages this waiting list based on patients’ treatment priorities and will automatically make an appointment for patients at some future date whereupon ISOH will generate the necessary notifications to be sent to the patient.

## **IMPORTANCE**

ISOH - Information System for Oral Health.

Information technology provided the flexibility to define custom business rules and configuration data to control the logical processing of information. This flexibility has permitted the application to be implemented

in public health care providers, e.g. hospitals and community health centers with varying levels of business process maturity. The application then permits the public health care provider to standardize practices across oral health services within all of its hospitals and community health centers.

The use of Sybase rapid application development methodologies and tools also helped to increase the speed at which development occurred as well as reducing the overall development costs.

## **ORIGINALITY**

ISOH - Information System for Oral Health.

The aim of this project was to build a software solution to support the business practice needs of oral health service facilities to implement fairer, cost effective and efficient methods by which clients can gain access to public dental services.

Robert & Linda Passam were engaged by the Westmead Center for Oral Health (WCOH) to cooperate on the development of the client registration and treatment recording modules. Robert's information technology experience combined with Linda's dental therapy experience provided the groundwork for development of the new system. Upon the successful implementation of these two modules at WCOH, this major oral health clinic then provided funding for prototyping of other modules. These prototypes, together with SWOT analysis and testimonials of clinicians, was presented to the state oral health services executive and, after a number of audits, this executive invited the Minister of health and his advisors to a strategic presentation. Support from the Health Minister was gained and funding was provided to turn the prototype into a fully functional business application.

ISOH is the first system in Australia with the ability to provide a single view of a patient's oral health treatment history as provided by any public health facility across a state. The system was integral in permitting the establishment of telephone based triage centers that allowed clients, who may be geographically distant from an oral health facility, to have their oral health issue triaged. Based on this assessment, the system can then search any appointment book across one or more oral health service providers and book the appointment.

The system is scalable and able, from a centralized implementation, to support the practice management needs of dental services ranging from a small two chair dental clinic to a large 200+ chair dental hospital such as WCOH that provides emergency, general, specialist referral and teaching services.

· What is its background?

Access to clinical oral health services was based on first come first served basis, rather than on a clinical needs basis that led to an inability to provide early intervention to prevent deterioration in clients' oral health status. Also, the use of manual appointment books was leading to an inability to reduce clinical downtime and effectively manage resource utilization.

The business practices used for access to oral health services between institutes was inconsistent, as was the infrastructure to support the new software solution, which in turn lead to difficulties in being able to implement state-wide policies and common business practice reforms.

· Planning

A strategic oral health team with representatives from state policy, information technology and clinical oral health specialists was established to identify major issues and possible solutions.

The Dental Statistics & Research Unit in Adelaide, Australia was commissioned to conduct and analyze business practice changes within various clinical settings. This research included surveying clients and consultations with administrative and clinical staff.

Process decomposition and flow charts were used to remodel and assist in reengineering the oral health intake processes; process modeling is still being used to support the continuing software development cycle.

The product development team is physically located within a clinical oral health environment allowing easy access to clinical and administrative experts thereby enabling the developers to gain first hand experience of the product in use within a clinical setting.

## **SUCCESS**

ISOH - Information System for Oral Health.

· Has your project achieved or exceeded its goals?

The ISOH Business Unit (IBU), established as a result of the successful uptake of ISOH, has achieved its goals by producing an enterprise oral health business practice management system to better service the needs of our patients by providing a fairer and more efficient method of gaining access to public dental services. It then exceeded its goals when the system was also adopted by the state of Queensland. The IBU has:

- introduced electronic scheduling that has enabled remote assessment of clients for whom appointments can then be scheduled.
- established a training service to educate staff and to assist in the implementation of new business processes.
- introduced electronic document storage and retrieval within the ISOH system.
- streamlined and standardized oral health business practices at state level.
- implemented an oral “Workbench” function for the provision of timely and accurate information at the ‘point of clinical care’ (i.e. chair-side) to support the delivery of clinical treatment.
- introduced electronic data extraction routines to support data analysis functions.
- introduced standards that supports the use of ISOH across corporate networks and geographically isolated centers.
- returned A\$195,000 to its host health organisation in 2003. Returned A\$192,000 to collaborative organisations in 2004.

· Is it fully operational?

Yes, ISOH has been in use since 1997 at the Westmead Center for Oral Health located in the western suburbs of Sydney and is the largest oral health service provider in Australia. It was adopted state-wide by New South Wales in 2001 and, following a successful pilot in 2003, ISOH is now being rolled-out across the state of Queensland. This represents 312 Australian dental clinics using ISOH as of December 2004. Interest from other Australian states and territories is now very strong and it is expected that another of these government entities will implement ISOH in 12 months time.

· How many people benefit from it?

It is estimated that ISOH is managing treatment for approx 1.7 million patients across the Australian states of New South Wales and Queensland.

· Describe future plans for the project.

Building on the success within Australia, the ISOH Business Unit will continue to deliver its quality product recognizing the need for continual improvement guided by a collaboration of product users. The ISOH Business Unit will promote the sale of licenses to non-government oral health service providers as well as inviting other Australian government bodies into this product sharing arrangement thereby increasing the benefits and return-on-investment to all concerned.

## **DIFFICULTY**

ISOH - Information System for Oral Health.

There had been a number of prior attempts to implement a common IT platform statewide so gaining support from health ministers for the development & implementation of yet another software application had to initially contend with a negative perception. This perception was changed by identifying the weaknesses of other systems / products and by gaining support from senior clinicians and executives at one of the countries largest oral health teaching facilities (Westmead Center for Oral Health).

The state of New South Wales, Australia, was divided into 18 health service areas each of which has its own CEO and governance structures, not to mention different work practices. This meant that patients’ access to services varied between these areas which led to a high level of confusion and subsequent generation of complaints that highlighted the difference in work practices and procedures. The introduction of ISOH permitted these variances to be gradually aligned over the first year of its implementation and now there is a greater level of both patient and staff satisfaction which also led to a marked reduction in the level of complaints.

One of the main business change management hurdles was to convince senior clinicians that it was possible for

clients to be triaged over the phone and to ensure that the time frames for providing treatment to those patients with serious/urgent needs were not undermined. To help solve this problem, a team of clinical oral health specialists was formed to firstly look at the formulation of the triaging questionnaire and then, during the first six months after system completion, to support a pilot implementation of ISOH in six major oral health service institutions where results of the triaging system were compared with the clinical opinions of dentists in relation to treatment needs. These results were then analyzed by the independent Dental Statistics and Research Unit based in Adelaide, Australia. The findings showed a very high correlation between the ISOH system and the clinical opinion regarding patient assessment and treatment priority. Having proved its success in electronic assessment, the application was then rolled out to the other 12 health service areas across New South Wales and then, recently, all public health services in Queensland (approx 312 public clinics/hospitals in total).