

## Microsoft® Office System Customer Solution Case Study



### Surgical Audit Information with Microsoft Office InfoPath 2003

#### Customer Profile

Northland District Health Board was established in accordance with the New Zealand Public Health and Disability Act 2000 on January 1 2001. It provides and buys government-funded healthcare services

#### Business Situation

The board's paper-based general surgery audit process was time-consuming and prone to error. It wanted to implement a solution that accelerated processes and ensured data accuracy to assist in the

#### Solution

Northland District Health Board engaged the services of long-term technology partner firstBASE to implement a Microsoft® solution including Microsoft Office InfoPath™ 2003 and Microsoft SQL Server™

#### Benefits

- Data gathering process reduced from eight weeks' duration to one day.
- Aids the comparison of clinical activity with international standards and guidelines
- Improved data accuracy
- Improved operational processes and lower operational costs
- Easy to implement and develop

“The flexibility of the InfoPath 2003 solution has enabled us to tailor the technology to meet both the health board's and the clinicians' needs. Now, we can ensure greater accuracy and consistency of data across the audit process.”

David Warren, Managing Director, firstBASE

Northland District Health Board in New Zealand follows international clinical guidelines that provide benchmarks for the quality of patient care. To monitor and improve its performance against these benchmarks, the board decided to replace an inefficient and time-consuming paper-based general surgery audit process with an automated solution. Microsoft® Certified Partner firstBASE and Microsoft Consulting Services engaged with the board to design and implement a solution that replaced the existing paper process with electronic forms based on Microsoft Office InfoPath™ 2003. The new solution empowered clinicians to enter diagnostic and procedural information directly into systems from a familiar Microsoft Office environment, eliminating the need for re-keying information, improving data accuracy, and reducing time spent on form-filling. Data from these forms is automatically submitted to a Microsoft SQL Server™ 2000 database via Web services, where reporting and analysis tools can look for trends and identify potential areas for improvement. The board is now better placed to identify any changes in clinical practice that may be required to reduce general surgical risk and improve patient care.

## Situation

Like many hospitals around the globe, Northland District Health Board in New Zealand benchmarks its surgical activities against international clinical guidelines or 'indicators' which promote best practice in patient care. These guidelines are derived from a number of sources, including the World Health Organisation's ICD-10. Though most are voluntary, they are adopted by health care organizations to improve clinical practices and the quality of patient care by delivering a better understanding of the audit trails associated with patient diagnosis and clinical procedures.

Some guidelines suggest, for example, the recommended length of time between patient diagnosis and treatment. Healthcare organizations are constantly striving to measure their performance against these measures. Jo Wheat-Connelly, Manager, Information Systems, Northland District Health Board, says: "If patients are on a waiting list for too long, the condition for which they require treatment may deteriorate unacceptably. Every activity must be looked at carefully to ensure effective management of the time between diagnosis and treatment to minimize patient risk. By accurately measuring these and other factors, we can ensure alignment with clinical indicators and make process improvements if necessary."

To monitor and improve its performance against these guidelines Northland District Health Board in New Zealand wanted to ensure it could keep track of its general surgery procedures effectively, accurately, and in a timely manner. The board had a general surgical audit process in place to track activities prior to, during, and after surgery, but this process used paper-based forms to record information relating to each surgical procedure. Traditionally, procedural information was recorded in paper forms by doctors and then re-entered into a database

by data entry operators. The paper forms could be misplaced, and the process of re-keying data was time-consuming and could result in inaccuracies.

Wheat-Connelly says: "Clinicians would record information regarding diagnoses and procedures onto paper-based forms. Data entry operators would then code from forms into systems. The whole process could take up to eight weeks in duration and there was no way of validating that the coders had correctly entered the information. The information the clinician provides is integral to understanding the potential risk trends, and re-keying of data could lead to inaccuracies. Northland District Health Board wanted to improve data accuracy by minimizing the number of steps between data gathering and data entry."

Because information was comprised of free-form text and did not exist in a structured database, analyzing and reporting statistics was also particularly difficult. The board wanted to study every procedure in general surgery to identify improvement opportunities. Wheat-Connelly says: "To assess and evaluate clinical practices, internal clinical auditors had to access a combination of structured and unstructured data, the latter being available only in paper form. This made information difficult to find and analyze. Incomplete and untimely information compounded the problem."

## Solution

In May 2004, firstBASE proposed a surgical audit solution based on Microsoft® Office InfoPath™ 2003, which enables clinicians to record surgical information quickly and efficiently so that diagnosis and procedures are better tracked.

David Warren, Managing Director, firstBASE says: "Patient management systems exist, but because of their complexity, they require

someone other than a clinician to code activities. And the information entered into these systems can be difficult to extract and reuse. InfoPath 2003 enables the clinician to enter information directly, eliminating the risk of misinterpretation by third parties. And since InfoPath supports interoperability with Web services, the information gathered is easily integrated with the board's existing databases and servers."

With the InfoPath solution, clinicians use desktop PCs to enter diagnostic and procedural information into a simple electronic form. InfoPath captures and stores the information in XML, its native file format. Using a series of Web services, InfoPath sends the clinical information to a Microsoft SQL Server™ 2000 database where it can be processed and analyzed.

Warren says: "Report and analysis tools analyze the data looking for trend information across patients, clinicians, and procedures. For example, it might become clear based on the number of procedures performed in a specified period that a particular clinician has a full case load and that further patient assignment could represent a risk."

The forms themselves are quick and easy to use so virtually no training was required. The familiar Microsoft Office System environment provides clinicians with authoring features like the inline spelling checker, AutoCorrect capabilities, font formatting, and other familiar tools. Warren says, "The majority of doctors are already familiar with Microsoft Office applications, such as Microsoft Word and Microsoft Outlook. InfoPath provided them with a familiar environment, so medical staffs were not intimidated by the new technology."

InfoPath also facilitated firstBASE's use of an iterative prototyping approach in the development cycle. Warren says: "We

involved key users of the system in the development process. Because InfoPath makes it easy to develop and deploy rich, dynamic forms, which can be updated, revised, and made available for use within a short period, we were able to quickly devise prototypes that showed clinicians what the forms would look like and how they would work. We also took advantage of InfoPath's interactive preview so that users would know exactly how the form would behave and look. Based on feedback, we were able to modify and refine the user interface according to requirements. This helped to further facilitate adoption and cultural acceptance of the solution."

Drop-down menus guide doctors through the forms. (See Figure 1). Warren says: "Clinicians just click and choose rather than type in information. This ensures data accuracy and consistency of presentation. It also saves a lot of time and enables clinicians to focus on patient care rather than forms administration."

While the solution is now focused on general surgery, the health board plans to extend the technology to other areas of surgical speciality, such as gynaecology and urology. The solution provides secondary InfoPath forms for audit areas such as Colorectal Resection and Trauma Laparotomy, and will ultimately provide a number of pre-designed InfoPath forms tailored to other specialities.

Jo Wheat-Connelly says: "The success of the InfoPath 2003 pilot has prompted us to consider the usefulness in some areas of Office 2003 in the organization. At the moment, the health board is running a mixed desktop environment. The latest release of Microsoft Office will enhance operational efficiency and allow the board to benefit enterprise-wide from business process automation solutions based on InfoPath."

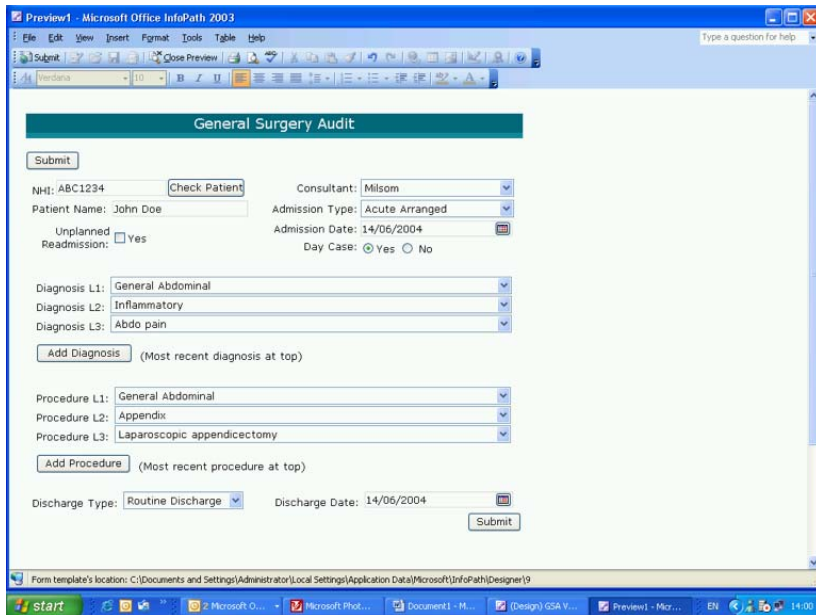


Fig 1

## Benefits

### Benchmark against International Clinical Indicators

Using InfoPath 2003 to improve the process of patient and departmental data capture, the health board can better measure its activities against international guidelines. The new solution enables the health board to quickly identify and report on surgical procedures and more efficiently analyze general surgical events and trends.

Warren says: "With greater control over the flow of data, it is easier for the health board to trace information regarding the dates and times of procedures and the surgery itself. Once clinical directors have examined the data, they are much better positioned to pinpoint areas for attention and improvement."

### More Accurate Data

Eliminating the need for re-keying information has significantly lowered operational costs and the occurrence of manual errors. Moreover, the InfoPath forms validate data to

help ensure that the information being gathered is accurate and meets the board's criteria. Warren says: "Because we were able to include extra functionality such as drop-down menus and information validation against existing databases, we can ensure greater accuracy and consistency of data across the audit process."

### Familiar Microsoft Office Environment

The solution builds on the clinicians' familiarity with the longstanding operation conventions of Microsoft Office. Warren says: "The clinicians like it, as do the clinical directors. They deliver high-quality patient care and InfoPath 2003 helps them do this by ensuring accurate information. There was no staff resistance to the project when users saw how easy InfoPath is to use."

Support for Customer-Defined Schemas  
Richer page layout controls and better schema support in InfoPath 2003 enabled firstBASE to customize the forms according to the board's exact requirements. Through powerful data and schema validation features, InfoPath forms helped to ensure that the data collected could be used efficiently within Northland District Health Board. The forms require certain fields to adhere to specific formats and flag fields that have incorrectly formatted information.

firstBASE was able to easily create a form for general surgery as well as a range of forms for each surgical speciality. Warren says: "The flexibility of the InfoPath 2003 solution has enabled us to tailor the technology to meet both the health boards' and the clinicians' needs."

### Dramatically Reduces Time Spent on Audit Administration

In the past, paper forms could be misplaced and clinicians were unable to match coded

discharges against the performed procedures. With a clear user interface and tailored form templates, the implementation of InfoPath 2003 enables clinicians to input information at the time of patient discharge, when both the patient and procedure are fresh in their minds.

Wheat-Connelly says: "It could be up to eight weeks from the point of patient discharge before general surgery audit information was available for analysis. The new solution enables clinicians to enter procedural information into an InfoPath 2003 form at discharge and that data can then be sent to the database in real time. Access to accurate and timely information makes a real difference in healthcare and delivery of critical health services"

#### **Ease of Development**

The InfoPath 2003 support for XML and its powerful design features ensure a sophisticated solution can be developed rapidly. firstBASE was able to create forms from existing data schemas, Web services, XML data, and from scratch. With a built-in script editor, rich object models and programmable task panes, firstBASE could easily develop a solution tailored to the health board's specific needs. Warren says: "We found that InfoPath 2003 was excellent from a development point of view; it shortens programming time dramatically."

Wheat-Connelly adds: "The great thing about this solution is that InfoPath leverages our existing technology investment. There's no complex XML scripting required to get data from the form to the SQL Server database."

#### **Future Plans**

With the new solution set to improve efficiency in general surgery, the board is now exploring ways to further take advantage of the value InfoPath delivers as part of the Office System. Wheat-Connelly says;

"InfoPath 2003 is helping us transform the way we capture data. With improved efficiency at the audit process level, patients can be more effectively diagnosed and treated. And with the implementation of Office 2003 Editions, the board is looking to extend these benefits to other processes and parts of the organization."

Using Microsoft Office InfoPath 2003 Service Pack 1 (SP1), the board will be able to take advantage of the improvements Microsoft is delivering to make InfoPath 2003 more secure and reliable, as well as the feature enhancements that aid developers and end users in capitalizing on the InfoPath platform.

Warren says: "SP1 provides the health board with richer page layout controls, improved coding tools and improved schema support to help further accelerate processes. And with improved support for data validation, the board will have even greater confidence in the accuracy of the procedural information it captures."

## For More Information

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### Software and Services

#### ■ Products

- Microsoft Office 2003 Professional
- Microsoft Office Infopath 2003

– Microsoft SQL Server 2000

#### Partners

- firstBASE

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