Consensus pathways: evidence into practice
Graham McGeoch, Ian Anderson, Juanita Gibson, Carolyn Gullery, David Kerr, Brett Shand

Abstract
HealthPathways is a website that provides general practice teams with guidance on clinical assessment and management of medical conditions, relevant to local services and resources. The website evolved in 2008 as part of changes towards an integrated healthcare system in the Canterbury region of New Zealand. The website differs from other clinical guidance websites as the clinical pathways are formulated by local healthcare professionals, health managers, and technical writers. This process is facilitated by a proactive group called the Canterbury Initiative. The website now contains over 570 clinical pathways, with access increasing seven-fold since 2009 (visits/mth; 1053 in 2009 vs. 7729 in 2014).

HealthPathways has contributed to the delivery of more care in the community (e.g. primary care spirometry; 1443 measurements in 2014 representing one-quarter of the total number). Introduction of the website has been associated with an improvement in referral quality, more equitable referral triage, and more transparent management of demand for secondary care.

Because the website provides relevant localised clinical information required during a patient consultation in an easy-to-use standardised format, it has overcome many of the barriers encountered by other online clinical guidance systems. The website has also acted as a change management tool by disseminating information required for successful integration of health services.

The evolution of HealthPathways
Major changes in healthcare delivery began in Canterbury around 2007. HealthPathways evolved as a consequence of a move towards an integrated healthcare system and acted as a platform to disseminate the key principles required to achieve this objective. These principles included developing primary and community services that supported people to take greater responsibility for their health and ensured patients were treated by the correct person, thereby reducing demand on secondary and specialist resources. To implement these changes partnerships were formed across the full spectrum of healthcare similar to the Health Network approach of Briggs et al.

The interface between general practices and hospital services was recognised as a major area requiring redesign and key to the development of an integrated health system. This led to local general practitioners and hospital clinicians taking part in meetings to discuss possible improvements. With the assistance of senior health system managers, funders, and a facilitator, a plan was prepared that proposed changes in pre-referral and post-referral patient management. Following acceptance and implementation of the plan, this project became known as the Canterbury Initiative.

Work groups in specific medical areas all identified that general practice teams did not have easy access to referral criteria and had poor awareness of available community services. General practitioners consistently stated that best practice advice would encourage optimal management prior to referral and that agreed access criteria and waiting times needed to be defined and collated into a single repository. Hospital clinicians were also often poorly informed about available skills and capacity in general practice and the community.

Using a Canterbury District Health Board (DHB) Innovation Grant, a clinical pathway for management of chronic obstructive pulmonary disease was drafted. To disseminate the information, a website containing the clinical pathway was constructed by a local technical writing company, Streamliners Ltd. The e-web content was structured so that information would be easy to access...
during a patient consultation. Following the development of 10 other clinical pathways, using a standardised format, the website went live in October 2008 under the name, HealthPathways.\(^2\)

The process used to develop a clinical pathway on HealthPathways

At the time of its inception, HealthPathways represented a unique step-forward from other online clinical guidance systems, such as the New Zealand-based sites Best Practice,\(^5\) Web Health,\(^6\) USA-based sites Intermountain HealthCare\(^7\) and Geisinger,\(^8\) and UK-based sites Map of Medicine\(^9\) and Clinical Evidence.\(^10\) The main points of difference were that the clinical pathways on HealthPathways provided locally relevant information and were established by an iterative and collaborative process between healthcare professionals, management, funders, clinical editors, and technical writers.

The steps for developing a clinical pathway are shown in Figure 1 and the personnel involved and their role described in Table 1. Consensus, transparency, and equity were key values used during this process with the main focus being on what is best for patients.\(^11\) The pathways reflect evidence-based best practice while incorporating local expert usual practice.

Where best practice guidelines could not be met, the pathways included the reasons and advice on possible alternatives. The evidence sources are provided in a resource section. Patients are not directly involved in the development of the majority of clinical pathways, although the Canterbury DHB consumer council has been consulted. Funders are integrally involved during pathway development where changes are planned in the site, situation, or clinician delivering care. Many pathways have required changes to diagnostic tests and procedures, whereas other pathways simply describe usual care.

Figure 1. The process used to develop a clinical pathway on HealthPathways

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3. © NZMA
Table 1. Personnel involved in the development of a clinical pathway

<table>
<thead>
<tr>
<th>Members of work group</th>
<th>Roles</th>
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<tbody>
<tr>
<td><strong>Medical personnel</strong></td>
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<tr>
<td>Clinical editor</td>
<td>General practitioner who writes much of the content, and ensures that it is relevant to the local situation and conforms to international best practice guidelines.</td>
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<tr>
<td>General practitioner liaison</td>
<td>Assists with triage of referrals, organises education sessions, and oversees updates to website and referral forms.</td>
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<tr>
<td>Clinical leader</td>
<td>Promotes acceptance and dissemination of the new processes and clinical pathway.</td>
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<tr>
<td>Clinician content facilitator</td>
<td>Gathers clinical information with the content required based on the level of expertise of local primary care.</td>
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<tr>
<td>Clinical director of hospital dept</td>
<td>Signs off the pathways with the clinical editor.</td>
</tr>
<tr>
<td>4 to 6 general practitioners</td>
<td>Provides knowledge and experience of primary care.</td>
</tr>
<tr>
<td>2 to 5 hospital clinicians</td>
<td>Provides knowledge and experience of secondary care.</td>
</tr>
<tr>
<td>Number of nurses and allied health professionals</td>
<td>Provides knowledge and experience on the medical area in the clinical pathway.</td>
</tr>
<tr>
<td>Subject matter experts</td>
<td>Often secondary care clinicians who write and review pathways with the clinical editor.</td>
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<tr>
<td><strong>Administration personnel</strong></td>
<td></td>
</tr>
<tr>
<td>Work-group facilitator</td>
<td>Acts independently of the local clinical community involved in the discussions.</td>
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<tr>
<td>HealthPathways coordinator</td>
<td>Collection of non-clinical information, monitoring feedback and liaison with other centres using HealthPathways.</td>
</tr>
<tr>
<td><strong>Technical development personnel</strong></td>
<td></td>
</tr>
<tr>
<td>Technical writing company</td>
<td>Streamliners Ltd, Christchurch. Technical writing, content development and maintenance of the website.</td>
</tr>
<tr>
<td>Technical writers and editors</td>
<td></td>
</tr>
<tr>
<td>Website developers</td>
<td></td>
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<tr>
<td>Information technology experts</td>
<td></td>
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</table>

**Information provided on a clinical pathway**

The primary objective of HealthPathways is to provide concise information required for a patient consultation and to overcome the difficulty general practices may experience when organising multiple sources of information. The clinical pathways include information on all areas of referral for secondary care, but not tertiary care. It is not intended as an automated or structured decision support tool or to describe the management of a condition within the hospital.

The website provides information on investigations, differential diagnosis, acute and conservative management, and patient education. Important information on possible severe adverse events is highlighted by a ‘red flag’. The pathway may include links to resources on background clinical information, aetiology, supporting international guidelines, or the details of educational sessions. Pathways that have been audited contain a link to a summary of the major findings and planned improvements.

The majority of pathways include a link to HealthInfo, a website that provides health information for patients, consistent with that described in the clinical pathways. The clinical pathway for colorectal symptoms is shown in Figure 2.
Figure 2. Example of a clinical pathway
In 2010, the Canterbury DHB introduced an electronic request management system (ERMS) to transfer structured electronic referral information from general practices to a central database, and from there to community and hospital services. Each referral form on ERMS contains a link to the relevant condition on HealthPathways which provides reminders of key criteria required for acceptance of referrals.

The quality assurance program for HealthPathways

To ensure the information on HealthPathways is up-to-date and accurate the website is open to continual scrutiny and improvement. A feedback button is located on each webpage, with all responses reviewed daily and acknowledged, and managed by clinical editors, where necessary. This ability for anyone in the health system to contribute to content and suggest improvements has led to increased acceptance and use of the website.

The clinical pathways are formally reviewed every 2 years, while pathways with the potential to change delivery of care are subject to clinical audit, with the frequency of audit depending on the potential for adverse events. The audit process involves longitudinal evaluation on subsets of referrals to determine if the clinical pathways have delivered timely and appropriate care. Based on the findings, recommendations for improving the quality and structure of the pathway or better safety monitoring of the patients may be initiated.

The role of HealthPathways in healthcare integration in Canterbury

It is not possible to measure the impact of HealthPathways in Canterbury in isolation from the many other changes in healthcare delivery that occurred around the same time. Measures used in this paper as indirect indicators of the effectiveness of the website include changes in website access measured using Google Analytics (Google Inc, CA, USA), key indicators of healthcare delivery, review of pathway audits, and the role of the website as a change management tool.

Website use and activity—Canterbury has a population of 510,000 with 140 general practices. Site access is restricted to health professionals. The total number of visits (1053 in 2009 vs. 7729 in 2014), pages viewed/month (20372 in 2009 vs. 313630 in 2014) and unique visitors to the website/month (280 in 2009 vs. 1285 in 2014) have increased steadily. The website is used daily by many general practice teams who currently make 5 new feedback comments each day. There are currently over 570 pathways on the site, covering 40 specialities, with 79 referral pages. The five most frequently accessed clinical areas are child health, women’s health, gynaecology, mental health and diabetes.

Localised versions of HealthPathways are now used or planned by 11 DHBs in New Zealand and 14 health organisations in Australia, covering approximately 10 million people.

An online survey of healthcare professionals in Canterbury on their perception and use of HealthPathways showed a high rate of positive responses to questions regarding localised guidance on medical conditions and the referral process (88–97%), while about 50% of respondents considered the website had improved their relationships with patients and other healthcare professionals. About one-half of respondents considered HealthPathways had increased the duration of a patient consultation, with a similar proportion stating that they preferred to make their own clinical decisions rather than obtaining advice from structured decision support systems. HealthPathways does not provide structured decision support. The increase in consultation length may reflect the ability of general practice teams to provide more information and services for their patients. A future survey may explore this possibility.

The series of earthquakes in Canterbury demonstrated the usefulness of HealthPathways in emergencies as it was used as a communication tool for general practices, community nursing, and pharmacies with daily and sometimes hourly updates being provided. HealthInfo was established...
immediately after the major earthquake on 22 February 2011 and used to disseminate public health messages to the community. As shown in Figure 3, visits to earthquake-related pages peaked immediately after major quakes, with the earthquake recovery patient information sheet being the third most viewed page in 2011. The ability of the website to rapidly add information has also been useful in times of hospital gridlock and influenza outbreaks.

**Figure 3. Access of pages providing information related to the Christchurch earthquakes (2011–2014)**

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**Key indicators of health care delivery**—By promoting better patient management in general practice HealthPathways has contributed indirectly to a number of positive changes in service delivery. These include an improvement in referral quality and a reduction in the overall rejection rate of referrals. A case study of changes in gynaecological services in the first 3 years after introduction of the website showed referral acuity had increased, with a significant rise in the proportion of gynaecological referrals accepted for first specialist assessment (65% in 2007 to 80% in 2011).

Our online survey showed that 69% of hospital clinicians considered HealthPathways had ‘improved the overall quality of referrals’. A similar response was obtained from meetings held in 2014 between hospital clinical directors and Canterbury Initiative members, with 14 of the 17 departments reporting better referral quality over the last 5 years.

Indicators of a more integrated health system include the fact that some investigations previously undertaken by the hospital can now be carried out in the community (e.g. 43000 fully-funded diagnostic investigations in 2013 including 381 pipelle biopsies and 2355 skin cancer removals). Waiting times for these procedures has decreased (e.g., investigation of heavy menstrual bleeding; 100 days in 2007 vs. 35 days in 2013). Other indirect indicators of successful healthcare integration include a slowing in growth of acute medical and surgical admissions against a background of an aging population, with an associated increase in elective surgery (297 procedures/10,000 people in 2007 vs. 424 procedures/10,000 people in 2013).

**Pathway audits**—Since 2011, 60 clinical pathways have been audited. The majority of audits confirm the increases in referral quality and acceptance rate described in the previous section. Wait-times for assessment and treatment in all the pathways audited either improved or were within accepted guidelines. Many of the audits identified factors that needed to be changed such as referral...
criteria or information included in the pathways. If necessary, repeat audits were carried out to determine whether the changes had resulted in improvements in service delivery.

**HealthPathways as a change management tool**—The website has contributed to the negotiations, dissemination, and implementation of many of the major changes in healthcare delivery that occurred in Canterbury over the last 6 years. For example, HealthPathways was an integral component in the development of several community-based services such as level 1 sleep studies and spirometry where a third of testing is now community-based.

As shown in Figure 4, there is a significant temporal relationship between changes in the number of sleep assessments and spirometry tests carried out in the community and access of information related to these services on the website.

**Figure 4. Graphs showing the association between provision of information on HealthPathways and the development of community-based clinical services for spirometry and sleep assessment**

![Graph showing correlation between visits to healthpathways and spirometry/sleep assessment](image-url)
What lessons have been learned from the development of HealthPathways?

Why did HealthPathways prove popular with general practice teams at a time when it was generally recognised that clinical guidelines and structured decision support systems were not delivering the anticipated results of reduced variation and best practice management?\textsuperscript{15–17} We consider this was attributable to the wide range of information that general practitioners require for decisions and that this information had not been integrated into a single repository that was easy to use in day-to-day clinical practice. Other systems that integrate practice management software with decision support tools require complex software that limits the rate clinical pathways can be produced and updated.\textsuperscript{18}

These systems are not always popular with general practitioners who find them overly prescriptive and time consuming,\textsuperscript{19,20} preferring instead to make decisions based on their experience and available information. Our online survey\textsuperscript{4} emphasised the importance of time constraints during a patient consultation and showed that general practitioners preferred not to use structured decision support systems when making clinical decisions.

Another probable reason for HealthPathways becoming the preferred information source for general practice teams is that it contains information on locally available health resources and services. In contrast to other clinical guidance websites that may be perceived as being written by experts who do not understand general practice,\textsuperscript{21} the clinical content on HealthPathways is written and edited by general practitioners and local subject specialists.

Another important factor in acceptance of the website by general practice teams is that it assists in the care of patients with the poorest health status by providing clear access guidelines based on the need, cost and availability of these services. The provision of local information for patients on HealthInfo\textsuperscript{12} that is consistent with the guidance on HealthPathways is also considered to have been a helpful initiative.

The organised collaboration between general practitioners and hospital clinicians in writing the pathways has been a key component in the development of HealthPathways. At least 300 clinicians or local subject experts, 100 practice nurses and allied health professionals, and 80 hospital managers have been involved in development of the website, and our survey\textsuperscript{4} showed this has led to improved communication and better working relationships. Specialist clinicians contributed to the educational seminars for some of the clinical pathways and HealthPathways is now used widely in hospitals for teaching. Some pathways are already shared with hospital clinical manuals and more work is planned to integrate the website with regional and national clinical guidance systems.

Key indicators of healthcare delivery\textsuperscript{14} provide indirect evidence that the website has contributed to improvements in patient management and referral in primary care. The website has been an integral component in the establishment of new community-based clinical services, and was used to gain consensus amongst clinicians on the best site of care and management of these services and to disseminate this information to the clinical community. Because clinicians may be concerned about loss of control or degrading of patient services, these issues were addressed solely from the viewpoint of what was best for the patient and the health system. The changes were documented on HealthPathways so that they were visible to all health care professionals who were then able to contribute and alter by consensus.

Hospital clinicians have participated in the HealthPathways process with enthusiasm and acknowledge they now have greater ability to influence standards of care in the local district and decrease the amount of repetition on common clinical areas. Other perceived benefits are that referrals are now more comprehensive and patients referred are of higher acuity, resulting in higher acceptance rates and a greater proportion of patients requiring specialist assessment. The establishment of clear access criteria for services in HealthPathways and accurate triage has allowed measurement of the number of patients declined or not referred.
Estimation of the number of patients unable to access services at a clinical threshold agreed between general practice and hospital specialists represents challenging new work. The risk of imposing strict access criteria is that unmet need is not visible. Waiting lists have traditionally been used to manage and measure need, although as they contain referrals covering a wide range of acuity this may be an arbitrary and inaccurate method in the absence of clear access criteria. For example, a review of 5000 referred patients carried out in Canterbury in 2007 showed that about a third could be managed in the community, a third needed minor investigations, and a third required a specialist opinion.

The imposition of clear access criteria on pathways allows referred patients who do not meet the threshold for a funded service and are declined despite meeting the clinical threshold to be counted. We are now planning to determine the number of patients who meet the clinical threshold and are not referred because the pathway makes it clear they will be declined.

The development and dissemination of clinical guidance systems is best seen in the broader context of policy change. Implementation of the new pathways of care on HealthPathways required allocation of funding and resources supported by all levels of the Canterbury DHB especially the CEO, Board, and Planning and Funding Division. This close relationship has led to the website acting as a change management tool from inception of the changed services to their embedding in the health system. For example, during the Canterbury earthquakes, the movement of services to community settings was accelerated following the loss of buildings and hospital beds.

Funding was not removed from secondary care to develop these services, with secondary care clinicians fully involved in these initiatives. HealthPathways proved very useful for these innovations and although expectations cannot always be met the majority of clinicians accepted this reversal of traditional top-down resource allocation.

Like all new projects and systems, the development of HealthPathways was not without challenges. The online survey showed that about 5% of respondents considered the introduction of HealthPathways was associated with an increased workload in their sector without a compensatory increase in funding. Future development needs to be aware of the risk of the website becoming too large, difficult to navigate, and overly prescriptive.

The editorial team tries to keep each pathway brief and target the information to the needs of general practice teams. However, none of the pathways are obligatory and the website is clearly only advisory. The ongoing resources and work required for quality assurance and ensuring the information on the website is up-to-date and accurate are other important challenges facing HealthPathways in the future.

In conclusion, this paper suggests that HealthPathways has contributed to better patient management by general practice teams in the Canterbury region, in addition to assisting with the provision of more health care in the community, and improvement in the quality of referrals for hospital treatment.

The points of difference between HealthPathways and other clinical websites include the involvement of multidisciplinary work groups, clinical editing by general practitioners, a brief and consistent layout, and relevant information with high local content. The website has also acted as a change management tool by helping to establish and disseminate the key principles required for successful health integration. These principles include a strong and consistent governance structure, equitable funding across a continuum of care, ongoing trust and collaboration between hospital management, general practices, and secondary care clinicians, and rigorous quality assurance of health services.
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