

A Web-Based Electronic Neurology Referral System: A Solution for an Overburdened Healthcare System?

Abstract:

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Abstract

Ireland has the lowest number of consultant neurologists per capita in Europe. This results in long waiting lists, overbooked clinics, unnecessary emergency department presentations and patient frustration. In 2006, the neurology department in St. Vincent's University Hospital and the National Healthlink project, launched an internet referral system (Neurolink) for GPs, to alleviate the administrative burden on staff, reduce unnecessary visits for patients, shorten waiting lists and improve patient care. 710 electronic referrals from GPs between December 2006 and January 2011 were analysed. The average time taken to for a consultant to reply to a GP referral was 19hours 8minutes. When asked their opinion as to the suspected aetiology 33.7% (239/710) of GPs selected the option 'unknown', followed by epilepsy 12.1% (86/710), migraine 12% (85/710), and multiple sclerosis 7.6% (54/710). Significantly, 19% (127/662) of referrals did not require a neurology outpatient appointment and the GP was given advice. The results highlight the benefits of using an electronic communication system with primary care; allowing prompt response to GP enquires, early initiation of treatment and reducing the number of patients attending hospital clinics.

Introduction

Healthcare systems are under pressure to deal with increasing numbers of patients within financial constraints. Neurology care in Ireland faces these problems such that time spent on waiting lists can be in excess of one year. Over-subscribed outpatient services often result in unnecessary emergency department presentations. In SVUH, a tertiary referral centre, less than 4,000 patients were seen in the neurology outpatient department in 2005. By 2010 this number had increased to over 8,000. In anticipation of this increasing demand a web-based referral system for general practitioners (GPs) called Neurolink was launched in 2006 by the neurology department in SVUH and the National Healthlink project. An audit of Neurolink was undertaken to assess GP satisfaction with Neurolink, patient profile and its potential impact on managing outpatient referrals. The main aim was to develop a streamlined referral system to reduce waiting times and improve communication between community and specialist services.

Methods

Neurolink referrals between December 2006 and January 2011 were analysed. GPs fill out an electronic template using a series of 'drop down' menus. Data entered includes patients' name, date of birth, presenting complaint, symptom description and duration. The GP is asked for a suspected diagnosis and can choose from a 'drop down' menu including brain tumour, multiple sclerosis, migraine and epilepsy. The referral takes about 3 minutes to complete. Text boxes are provided for GPs to add more information or queries. There are also some mandatory fields to ensure referrals are completed. Interested GPs were trained by Healthlink Ireland in the use of the referral system. It is a binary process; GPs log on to the web application, send a referral and a neurologist is alerted by email. The neurologist then logs on and views the referral. Consultant neurologists send a reply via the web application. They may offer 'advice only' - indicating that the patient does not need to attend the neurology clinic; 'advice and investigations' - where investigations are recommended in addition to clinical advice; or 'arrange outpatient appointment' - in which case the patient offered a neurology appointment. Investigations such as blood tests or imaging are often suggested to the GP so these may be done in advance.

For the purpose of this analysis details of referrals were collected using the hospital's network diver system. The diver product accesses the Healthlink referral database each day. A copy of the referral data is pulled from its source and rebuilt in a model in diver. A diveplan (view) containing dimensions (fields) is set up to access this data. Data on the neurology consultant responses and recommendations were collected from hard copies printed at the time of response. GPs using the system were contacted and invited to complete a questionnaire about their views on the Neurolink system. The patient demographics were similar for patients referred via Neurolink and for those via paper referral. GPs using Neurolink were invited to participate in the pilot program because of a previous frequent referral. This was an audit of a clinical project and was not originally set up as a research study so submission to our local ethics committee not was required.

Figure 1: Number of referrals received per annum via Neurolink.

Results

Seven hundred and ten referrals (417 women and 293 men) were sent via Neurolink between 2/12/2006 and 27/01/2011. The volume of referrals has increased every year since Neurolink was launched (Fig. 1) and now accounts for 10% of all new outpatient referrals to SVUH. Patients' ages ranged from 16-87years (mean 46years). Data on the timing of referrals and replies were available for 662 patients. The neurolink pilot underwent a number of technical adaptations in its first year and this led to a change in storage of referrals. The missing data pertains to early referrals prior to technical advances in the system. We were unable to access 6.7% of referrals as a result. Of the 662 referrals with available data the average time taken for a consultant neurologist to reply to a GP referral was 19hours 8minutes (range; 3minutes - 18days 3hours).

When GPs were asked to give their opinion as to the suspected aetiologies of presenting complaints many left the section blank (239/710). Migraine, epilepsy and multiple sclerosis occurred frequently (Table 1). Details of the GPs' clinical examination are vital to interpreting the referral and determining response. On the basis of GP assessments, 376 (53%) had a normal neurological examination and 334 (47%) had an abnormal examination (Table 2), with some patients having multiple abnormal clinical signs. Significantly, 19% (127/662) of patients were felt not to require a neurology outpatient appointment and were given advice, treatment and investigation options instead. Of the patients that were not allocated an outpatient appointment, the GP had interpreted the patients presenting complaint as a 'headache' in 38% (48/127) and a 'seizure' in 25% (32/127). Others included pain, paraesthesia, dizziness and tremor. Of note, 40% of all seizures and 31% of all headaches referred were treated as outpatient complaints.

*Total percentages >100% owing to overlap - some patients had multiple abnormal clinical findings.

103 GPs sent 710 referrals between 2006 and 2011. The number of referrals sent by individual GPs ranged from 1 to 90. 25 GPs sent 10 or more referrals. These 25 GPs were contacted and asked 9 questions about NeuroLink in order to gauge their reaction to the system and telemedicine as a whole. Replies were received from 18 (72%) of these GPs. 94% of GPs felt the system led to shorter waiting times for their patients. All GPs surveyed said they preferred referring via NeuroLink rather than a regular mail. The main reason for this was the quick response time and the additional treatment advice. 12/18 GPs felt more comfortable dealing with neurological conditions as a result of using NeuroLink and 12/18 GPs said they would be happy if only NeuroLink referrals were accepted by the neurology department in the future. All of the GPs said they would like web-based referrals to be extended to other specialties; popular choices included rheumatology, dermatology, ENT and gastroenterology.

Discussion

Telemedicine² is a growing application of clinical medicine, which has been utilized to improve the provision of medical services, often in rural areas or as a method of triage for busy services. It has been utilized in acute critical care, such as telestrokeology, and in the primary care setting to facilitate non-urgent access to specialist services. Structured referral sheets like the templates in NeuroLink have been shown to improve outpatient referral appropriateness³. Almost 20% of the patients referred via a NeuroLink⁴ did not require a neurology outpatient appointment and were managed by providing advice to the GP. Without a NeuroLink⁵ these patients would have been allocated an outpatient slot. Over 3100 new patients are seen in the neurology clinics in SVUH annually. NeuroLink therefore has the potential to make an additional 610 new patient clinic slots available each year. This should go some way to reducing waiting times for those most in need of a consultation with a neurologist. Those who do not need a neurology review avoid unnecessary travel-time, expense, anxiety and appropriate community based treatments can be initiated earlier.

The neurologists in SVUH work as a group practice; running new, review and specialist clinics. On monthly rotation, one of the outpatient-based consultants allocates about 20-30 minutes each morning to answer neuroLink referrals. It has been our experience that the time invested in using NeuroLink is comparable to time taken to deal with paper referrals and reduces GP telephone consultations for advice. Most non web-based referrals are sent via post, others by fax and a minority via electronic referral on the hospital intranet neurology consult system. A natural concern is that of patient safety and the possibility of missing a serious condition or mismanaging a patient as a result of not seeing them in the clinic. GPs are advised to re-refer patients if symptoms or signs change and a neurology outpatient appointment arranged urgently. Studies to date have shown that email triage is safe and effective^{4,5}, but clinical judgment must always err on the side of caution and assess the patient in neurology outpatients if any doubt. Studies have shown that 15-20% of all patients presenting to the emergency department have a neurological problem.⁶ A recent analysis of neurology consults in our own hospital found that 40% of in-hospital consults by the neurology team were for patients in the emergency department. After neurology review, one third of these patients were discharged home, therefore avoiding an inpatient stay and could possibly have been treated as outpatients thereby avoiding emergency department attendance.

The feedback from GPs is also encouraging, and, is in agreement with other studies⁷. All GPs surveyed preferred the system to a regular mail⁸ referrals and all would like to see electronic referrals extended to other specialties. Many GPs stated an area of particular satisfaction was the quick response time from the consultant neurologists (mean 19 hours and 8 minutes) and the opportunity for timely management advice. A paper referral, allowing for no lost mail or misdirected mail (urology instead of neurology for example) may take about ten days for the appointment to be made and another few days to reach the patient. This highlights the importance of pre-visit communication in improving the efficiency of specialist services and patient care as borne out in other studies⁸. We acknowledge that there exists a certain selection bias, in that GPs who use the service regularly are more likely to approve of it. To date, any interested GPs have been given access to neuroLink but barriers to uptake may include availability of technology in GP practices and the capacity of healthlink.ie. Over 70% of GPs stated their patients were aware that NeuroLink was used for their referral; patients can be reassured that their problem has been reviewed by a consultant neurologist and management begun almost immediately. NeuroLink and similar initiatives, like the eConsult system developed by the Centre For Innovation at the Mayo Clinic⁹, demonstrate that web-based referral systems can contribute to good communication between primary care and specialist services; an obviously vital consideration in patient care as our health system continues towards a primary care led service.

The most frequent presenting conditions were epilepsy, migraine, MS, seizures and headache; thus highlighting areas of neurology GPs encounter most frequently in primary care. The results also indicated that the neurological conditions most amenable to a advice only¹⁰ were headache and patients with a known seizure disorder. These are common conditions and the frequency of their referral to neurologists may highlight a need for further support to GPs in their management. The success of this pilot study is encouraging. It may promote the development of further teleneurology services in SVUH such as utilized in telestrokeology¹¹. Expanding the process of web-based referral developed by neuroLink is now a priority in the National Cancer strategy and many other specialties are interested in its application. This study reveals many of the potential benefits to patients and care-givers of an asynchronous electronic consultation system with a rapid turn around time by improving communication with GPs and improving access to neurology services.

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