

Clinical Paper

A Neurology Advanced Referral Management System (NARMS) Reduces Face-to-Face Consultations By Over Sixty Percent

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ABSTRACT

Background

The COVID-19 pandemic has made neurology clinic waiting times longer. To prevent a build-up of patients waiting, we introduced a neurology advanced referral management system (NARMS) to deal with new referrals from GPs, using advice, investigations, or the telephone, as alternatives to face-to-face (FF) assessment.

Methods

For six months, electronic referrals from GPs were triaged to the above categories. We recorded the numbers in each category, patient satisfaction, inter-consultant triage variation, re-referrals, and calculated CO2 emissions.

Results

There were 573 referrals. Triage destinations were advice 33%, investigations 27%, telephone 17%, and FF 33%. Of patients referred for MRI, 95% were happy not to be seen if their investigation was normal. Less-experienced consultants triaged 20% and 30% respectively, to advice or investigations, compared with 40% by a triage-experienced neurologist. Four percent were re-referred. Numbers on the waiting list did not increase. CO2 emissions were reduced by 50%.

Discussion

Two thirds of neurological referrals from GPs did not need to be seen FF and 50% were dealt with without the neurologist meeting the patient. Carbon emission was halved. This system should be employed more, with FF examination reserved for those patients who need a neurological examination for diagnosis and management.

Keywords

Neurology; Referral management; Triage; CO2 reduction; Ambulatory care.

Introduction

Even in high-income countries such as the UK, waiting times to see a neurologist as a new referral can be very long. The situation in Northern Ireland is particular problematic with many patients waiting over four years to be seen¹.

The COVID pandemic has exacerbated this situation but gave us the opportunity to introduce a neurology advanced referral management system (NARMS) in our Trust area to try and deal with newly-referred patients effectively, and, by so doing, prevent an increase in the number of patients waiting to be seen. We report the results below.

Methods

Location

The South Eastern Health and Social Care Trust supplies neurological outpatient care to a population of 350 000 people to the east and south of Belfast. There are 2.75 whole-time-equivalent (WTE) permanent consultant neurologists. A 0.4 WTE temporary neurologist was appointed in May 2020. The Trust includes a large busy district general hospital with about 60% of neurology referrals originating from ward referrals and the rest from local GPs. These GP referrals were the focus of this study.

Triage system

This was based on the successful system operating in the south-west of Northern Ireland between 2000 and 2008 where referrals from GPs were received by email and triaged to either advice or investigations or a face-to-face (FF) clinic²⁻⁴. There were, however, some important differences:

- This was a much larger catchment population – 350 000 as against 110 000 previously
- The referrals were received electronically on the Trust webserver rather than by email
- The triaging neurologist had access to the electronic care record of the referred patient
- A telephone clinic was added to the list of triaging options.

Using the Trust's available electronic systems, it was possible

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to write to GPs about those patients triaged to advice or investigations, to order investigations, to discharge those given advice, and to specify appointments by telephone or FF for those requiring them.

The triage system was designed to produce minimal change to the existing referral system. GPs were informed about the introduction of the new system, and about the minor changes in referral which it would require, principally that referred patients would be informed by their GP that they would be receiving the opinion of a neurologist and might not need a clinic appointment.

Two neurologists performed the triage, one focusing on headaches, and the other, on everything else.

We recorded the number of patients triaged over a six-month period from June to December 2020.

Patient satisfaction

For patients triaged to magnetic resonance imaging as an investigation, an MRI checklist was performed by telephone during which the patients were asked "Are you happy with triage to Imaging as opposed to face-to-face consultation? You will not be seen in clinic if the imaging is normal."

Inter-consultant variation

Triage rates for two consultants with no triaging experience were measured on 20 consecutive patients with non-headache symptoms and compared to that of the triaging consultant.

Effects on waiting lists

We obtained the numbers of patients waiting to see a neurologist to estimate whether the introduction of NARMS had any effect on this.

Ethical issues

This was a service improvement initiative and did not require Ethical Committee approval. The paper follows the SQUIRE 2.0 guidelines.

Results

Total referrals

There were 573 referrals from GPs in the six-month period. Sixty-one percent were female, and the age range was 15 to 97 years-old with a mean of 46 years and a median of 45 years.

The reasons for referral - different symptoms or the presence of abnormal neurological signs or the presence of known neurological diseases - are shown in Figure 1.

Their triage destinations are shown in Figure 2 and individual triage outcomes by most frequent referral reason are shown in Figure 3.

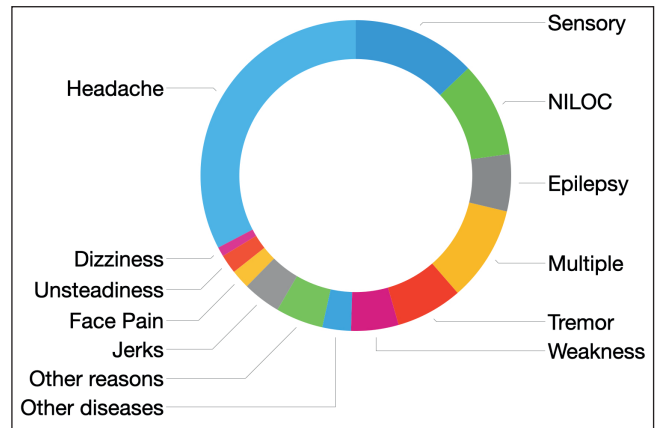


Figure 1. Referral reasons for 573 patients. (NILOC = new intermittent loss of consciousness)

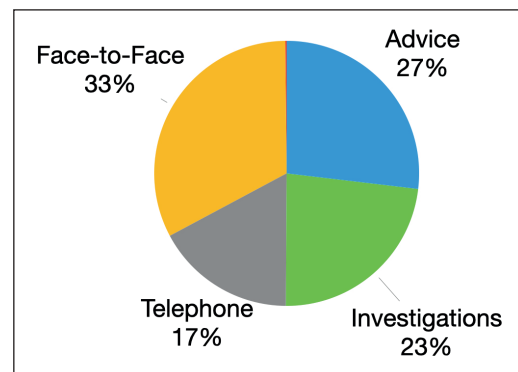


Figure 2. Triage destinations for 573 referrals.

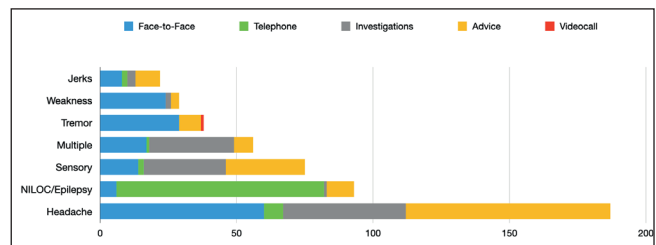


Figure 3. Triage destinations for the seven commonest presentations

Advice and investigations combined, accounted for 50% of referrals and a third of the remainder were managed by telephone so only one third of all patients referred by GPs required a FF consultation.

Investigations were especially used in those patients referred with headache, sensory disturbance, and multiple symptoms; usually this was to exclude a brain tumour in the first, and multiple sclerosis in the last two.

Telephone was the almost exclusive way of dealing with referrals with new intermittent loss of consciousness (NILOC), and epilepsy, but was little used otherwise. Reports from eye-witnesses, where indicated, were also obtained by telephone during these consultations. FF examination was required in most presentations with weakness and tremor.



A single patient, referred with tremor, was dealt with by videocall as she was unable to travel easily to a hospital clinic.

Referrals from GPs were classified, by them, as “Red flag”, where malignant disease was suspected, “Urgent”, or “Routine”. Analysis by these classifications is shown in Figure 4. For “Red flag” referrals, investigation was the management of choice, usually a CT scan of brain to exclude brain tumour. For “Urgent” and “Routine” referrals there was little difference in how patients were triaged.

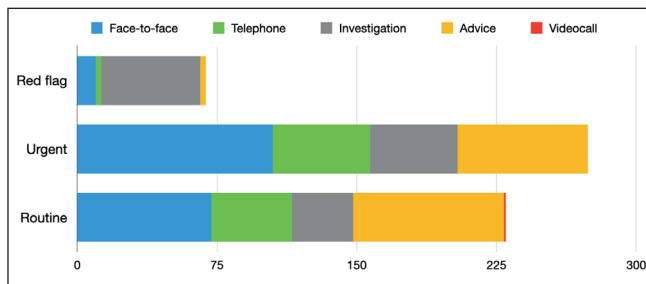


Figure 4. Outcomes by urgency of GP referral

Investigations ordered

These are shown in Figure 5. MRI and CT of brain were the commonest investigations. Videoclips, mostly of abnormal movements, were requested initially, but abandoned because of difficulties accommodating these within an NHS record. No EEGs were ordered in the initial management of referrals, but some were requested following telephone consultations in those presenting with NILOC or epilepsy.

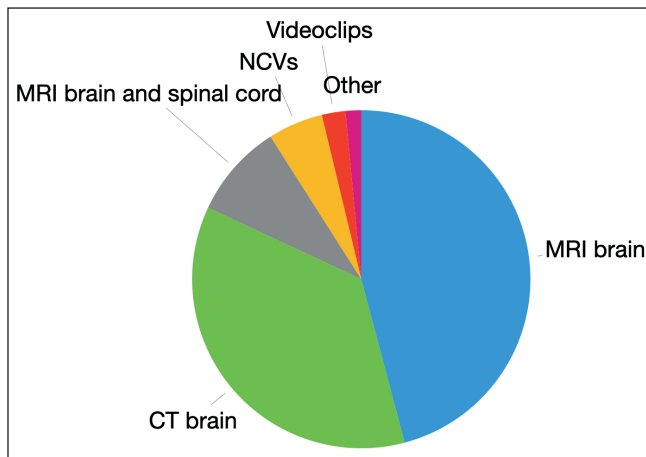


Figure 5. Investigations performed on 133 patients. (NCVs = nerve conduction velocities)

Feedback results from patients triaged to MRI scanning

Sixty-four patients replied to the question, “Are you happy with triage to Imaging as opposed to a face-to-face appointment? You will not be seen in the clinic if the imaging is normal.” Sixty-one (95%) were happy not to be seen with three wishing for a clinic appointment as well.

Rereferrals

Seven out of 187 patients (4%) initially triaged to advice or investigations, were re-referred following initial triage.

Inter-consultant variation

Twenty non-headache patients triaged by the triage consultant were later assessed by two other consultants to see what their triage decisions would have been. Results are shown in Table 1. In 10 patients there was complete agreement between all three observers.

Triage Outcome	Triage Consultant	Consultant 1	Consultant 2
Advice	3	1	3
Investigations	5	3	3
Telephone	5	7	6
FF	7	8	8

Table 1. Differences in triage outcomes in 20 patients. (FF = Face-to-face)

Effects on waiting lists

During the study period there was no rise in the number of patients on the neurology waiting list suggesting that supply was approaching demand.

Environmental benefits

Patient transport costs for one trip to hospital were saved on the 154 patients given advice and the 99 who received a telephone consultation or videocall. Also, we can assume that 50% of those triaged to investigation (66) would have had that investigation requested separately at a FF appointment. Thus, in the six-month period, there were 320 patient-journeys using NARMS, compared with 640 if the patients had received conventional care, a reduction of 50%. In absolute terms, using the assumptions in Box 1, NARMS reduced CO2 output by about 912kg over the six months.

80% use private transport
Average return distance 10 miles
Average vehicle fuel consumption 40 miles per gallon
CO2 output is 14.3 kg per gallon of fuel

Box 1. Assumptions to calculate CO2 emission savings of NARMS.

Discussion

Statement of principal findings

Active management of neurology referrals from GPs can reduce the need for face-to-face clinic consultations by two-thirds. This was delivered with very minor change to the way patients were referred from general practice. This is the first neurology referral management system which includes telephone consultation as a triage outcome; the telephone is a well-accepted way of reviewing neurological patients but during the Covid pandemic it has needed



to be used to deal with *new* neurology referrals as well. Telephone is particularly useful for referrals with either established epilepsy or NILOC, the latter including those with “first seizure”. Here neurological examination is usually unrewarding and a history, which can be taken over the telephone, is key to diagnosis and management. Most telephone consultations were completed within four weeks of referral. The National Institute of Health and Clinical Excellence (NICE) in the UK has a somewhat aspirational guideline, stating that such patients should be seen within two weeks of referral⁵. Before the introduction of NARMS, the waiting time was many months, so four weeks is a much better approximation to the NICE guideline.

Investigations replaced FF consultation in about a quarter of referrals, mostly in two circumstances: CT scan of brain was performed in referrals with headache in whom brain tumour was suspected, and MRI of brain, and if indicated also spinal cord, was ordered in people with either sensory symptoms or multiple symptoms, to exclude multiple sclerosis (MS). In both of these instances, the investigations are considerably more sensitive than FF examination, rendering the latter unnecessary. Once underlying diseases have been excluded, the dynamic of the consultation changes. Feedback from 62 of these patients showed that 95% were happy not to see a neurologist if their MRI scan was normal, suggesting that reassurance may be all that is necessary. On receipt of the investigation result a letter was sent to the referring GP giving the result and suggesting a course of action. Over 95% of such patients were discharged from the clinic. In “Red flag” referrals, the referral question is simply whether a tumour is present, so most of these were investigated and not seen. Most of the scans were completed within three months.

Twenty-seven percent of referrals were given advice and discharged from the clinic. This was normally within a week of referral. This required more careful thought by the neurologist than the other triaging options. We did not evaluate GP and patient satisfaction with this, but the re-referral rate was only 1%. There was little difference in the percentage of patients needing FF examination between the two triaging neurologists – 35% for headaches, and 32% for other neurological referrals.

Triage rates from two triage-inexperienced neurologists compared reasonably well with the results of the triage neurologist. The number needing FF appointment was little different but the numbers were too small to speculate further. This suggests that the ability to triage is not confined just to those with previous experience of it. It seems likely however that it is a skill that can be improved with continuing use – like most other skills in neurology.

There was a small decrease in the number of patients on the neurology waiting list during the period of NARMS it is not possible to relate the two as there were other factors in play at that time.

Last but not least, the carbon footprint of the neurology service was halved, at a time when green issues are beginning to permeate the thinking of the NHS.

Strength and weaknesses

This study was performed in the real-life setting of a busy general hospital and community Trust. No upfront investment was required other than extra consultant neurology hours (VP). The project was helped by supportive management, a helpful Information Technology department and some enthusiasm on the part of GPs, consultants and medical secretaries, all of whom had to change their practice a little. From conception to commencement took eight weeks. The number of patients referred over the six months, allowing for an extra 60% from in-hospital referrals, was 8 per 1000 population, which is the average for England⁶.

We did not look specifically at any measures of safety, but a previous study from Northern Ireland (see below) had shown a high level of safety in patients triaged to advice or investigations⁴.

Strengths and weaknesses in relation to other studies, discussing important differences in results

This is the first triage study which uses telephone as one of the modes of referral management so it is not completely comparable to previous studies. The non-contact options – advice and investigations – were 50% in the present study which was lower than the 56% and 67% in the earlier studies in N Ireland^{3,4}. One change in the 16 years separating these studies is the approach to headache referrals. Previously, most headaches were deemed tension headaches and had a non-contact triage rate of 95%². Now most headaches are deemed to be migraine with many new treatments approved by the UK National Institute of Clinical Excellence so the non-contact triage rate in this study was lower at 64%. The overall triage to advice and investigations is greater than other published studies from elsewhere: a large study from New Zealand⁷ triaged 22% of referrals to advice and investigations. The others used advice only (Dublin⁸, Edinburgh⁹), with triage rates of 19% and 10% respectively. In an unpublished study from elsewhere in N Ireland, 29% of 515 referrals were triaged out of the clinic by a combination of advice and investigations (Forbes R, personal communication).

This is also the first study to look at inter-rater variation in triage rates between neurology specialists, finding them not very different.

Meaning of the study: possible explanations and implications for clinicians and policymakers

A referral management system for neurology makes sense and has previously been shown to be popular with patients¹⁰. The main purpose of a face-to-face attendance is to perform a neurological examination, but investigations such as MRI scanning in particular have made this much less relevant



for many patients, particularly where multiple sclerosis is considered possible. Neurologists frequently emphasise that the history is the way to make a diagnosis and of course a history can be taken perfectly well over the telephone.

It could be argued that a referral management system might “deskill” neurologists, and affect postgraduate neurological training, presumably by reducing the number of patients with normal neurological examination that trainees might see. This seems unlikely, but the primary duty of neurologists is to their patients, and if referral management systems improve the service to patients, as this study suggests, then it is up to neurologists to ensure that they and their trainees do not become deskilled.

Health care systems, such as NHS England, have set up so-called “advice and guidance” pathways in which a GP can seek advice through a pathway which is distinct from conventional referral^{11,12}. Having two separate pathways does not make sense in neurology, because it is difficult for GPs to appreciate what outcome is best for an individual patient. By providing advice as a core part of its purpose, NARMS makes a separate advice and guidance system unnecessary.

It is not clear why local policymakers have not been interested in referral management systems in neurology; the effectiveness and cost-savings of 35% have been known since 2010² and their earlier implementation might have prevented the current serious local problems with neurology waiting lists.

And last but not least, such systems, by reducing travel and therefore CO2 production, help make the planet a healthier place to live. NARMS achieved a 50% reduction in CO2 emissions compared with a conventional neurology service, from a reduction in patient travel. The NHS in the UK is committed to net-zero carbon emissions by 2045¹³. Referral management systems such as NARMS can help it achieve that, as well as delivering a service of higher quality, which can be introduced at scale.

Acknowledgements

We are grateful to Michelle Pryke for her considerable help and to Steven Hutchinson for his expert advice.

Ethical considerations

This was a service improvement initiative as defined locally and did not require Ethical Committee approval or patient informed consent.

Funding

This work received no funding.

Competing interests

The authors declare no competing interests.

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